THE NATURE OF SCAFFOLDING INTERACTION: MOTHER AND CHILD CONTRIBUTION ACROSS TIME AND CULTURE

by

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STATEMENT

I confirm that the current thesis is entirely original and has not previously been submitted to any educational institution, in part or in full, in order to gain any other qualification.

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ABSTRACT

Children's learning within the home can be characterised by variety in the cognitive, behavioural and affective contributions of both mother and child, as well as by the wider environmental influences on family functioning. The concept of scaffolding may be useful for understanding home learning processes and provide a framework for new knowledge in order to develop a better understanding of what is required for successful learning at home.

The research has three main aims based on an adaptation of the Process-Person-Context-Time (PPCT) model of development (Bronfenbrenner & Morris, 2006). The first aim was to investigate the role of the child's behaviour during scaffolding interactions, test the inter-relationship between the child's and mother's behaviours and to identify how variations in these behaviours impact mutual intersubjectivity. The second aim was to examine how person characteristics of the mother and child, along with the home environment, contribute to the process of scaffolding across time. The third aim was to conduct a preliminary study in Russia and to test cross-cultural patterns and their determinants between UK and Russian families.

A longitudinal cross-cultural design has been adopted with two-time point measurements in England, approximately seven months apart, and cross-sectional design in Russia. Using non-probability sampling methodology, 68 dyads (children, four – five years old) were recruited for the English sample and 16 dyads took part in the Russian study. The research used cross-informant methodology to collect data during home visits and through observation of scaffolding interactions during simple problem-solving tasks.

The results contribute to the base of existing knowledge with a number of findings: 1) the scaffolding process is bidirectional with unique contributions from mother and child; 2) intersubjectivity within the dyad is important in understanding scaffolding interactions across time; 3) individual differences in maternal emotional and social abilities, but not parenting aspects, predict maternal scaffolding behaviour; 4) child's cognitive and emotional abilities explained their behaviour later in time; 5) number of siblings played an important role in the mother's and child's behaviour, while household chaos was not significant; 6) the cultural context plays a unique role in shaping scaffolding practices within families.

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CHAPTER 1. INTRODUCTION

According to the Department of Education report, ‘Provider influence on the early home learning environment’ (2011), the involvement of parents in learning is the element which has the most significant impact on a child’s success in life. The report suggests that a positive learning environment at home is essential in ensuring a child’s development and their future educational success. A significant dimension to the educational process includes children’s learning at home and engaging in activities such as homework which is aimed at improving knowledge and skills. Homework is reflected in educational policy as an essential supplement to the child’s academic progress in the early years of schooling (Gill & Schlossman, 2004). However, there is no clear benchmark for the amount, regularity or level of difficulty of children’s homework (Cooper, Robinson, & Patall, 2006). Specifically, for primary schools, there are no unified and precise governmental guidelines that would indicate which types of activities are suitable or the amount of time required to spend completing the homework (Ofsted: School inspection handbook, 2017). This leaves schools, in particular governors and head teachers to decide on homework policies on a school-by-school basis. Whilst allowing individual schools autonomy in deciding their homework policy, this has also led to inconsistencies in practice between schools in the absence of clear guidelines. For example, some children in primary schools complete a project at home once within a school term while other children do weekly or even daily reading activities.

As confusing as it might be for school practitioners, it has a direct impact on families too and parents in particular. Almost every child at primary school requires parental assistance with homework before they are able to master these activities independently (Cooper, Lindsay, & Nye, 2000). However, there is an ongoing debate about whether parents should provide their children assistance with their homework and, if so, how much help to offer (Jeynes, 2003). Several research studies have identified that parental aid during homework is salient to children’s academic achievement, both at primary and secondary school levels (Christian, Morrison, & Bryant, 1998; McBride & Lin, 1996; Shaver & Walls, 1998; Singh et al., 1995; Xu & Corno, 2003). However, it was also suggested that it was not the amount of support that matters to the child’s success, but rather the type of assistance and the strategies that parents utilise with their child during homework (Patall, Cooper, & Robinson, 2008; Pomerantz, Wang, & Ng, 2005).

Many parents may feel that it is obligatory to be involved in the child's homework, that it is expected of them, not only by their own children but also by school professionals (Hoover-Dempsey et al., 2001). That is critical because parental pedagogical skills vary substantially and consequently parents differ in their ability to provide this kind of support. Some parents may find the tutoring experience stressful and challenging (Epstein & Lee, 1995). Parents may not fully understand what their child needs to achieve in order to be successful in each task, nor the level of support this may require. Frustration can arise for both parent and child around failed communication during the process of learning at home, leading to further anxiety and subsequent reluctance to participate in future activities (Levin et al., 1997; Solomon, Warin, & Lewis, 2002).

The current piece of research aims to tackle the issue of understanding what is successful maternal tutoring support and to develop the knowledge as to why some mother-child dyads have more productive interactions than others. Through an understanding of the mother's and child's individual and combined roles within collaborative problem-solving at home, such as a homework scenario, prerequisites of the tutoring practices that successful parents use could be identified.

For almost 30 years psychologists have been studying parent-child tutoring interactions in the context of learning at home and the role that parental support plays in child development (Cole, 1985; Vygotsky, 1930-1934/ 1978; Wood & Middleton, 1975). Wood, Bruner, and Ross (1976) proposed the metaphorical term, 'scaffolding', which is described as parental contingent support to the child in problem-solving situations. Later, it was suggested that scaffolding interactions within task-solving situations, such as homework, involve not only flexible and appropriate support of the child, but another three behavioural dimensions of support in order to be successful: cognitive support, emotional support and transfer of responsibility (Landry, Smith, & Swank, 2006; Neitzel & Stright, 2003, 2004; Pianta & Harbers, 1996).

Conner, Knight and Cross (1997) established that although maternal and paternal scaffolding practices are varied and delivered in different ways, they are both equally associated with the child's achievement and accomplishment of the task. However, the research report (Peters, Seeds, Goldstein, & Coleman, 2008) revealed that, compared to fathers, there is an increased likelihood that mothers report being 'very involved' in their child's education. It was also outlined that mothers more often help children with homework, compared to fathers. Therefore, the current study investigates the scaffolding behaviour concerning a single gender - mothers.

A plethora of theoretical work has emphasised that the child is an essential and active participant in collaborative problem-solving situations (Granott, 2005; Griffin & Cole, 1984; Rogoff, 1990; Stone, 1993). Furthermore, both the mother and child are functional contributors to the process of learning at home (Kochanska, Koenig, Barry, Kim, & Yoon, 2010; Mercer & Littleton, 2007; Palincsar, 1986; Wertsch, 1985). Elbers (1996) stated the child's input to the scaffolding process is mainly unrecognised and 'even if the adult has the lead, the child's role should not be belittled' (p.282). Thus, the nature of the scaffolding process is bidirectional (Granott, 2005; Rogoff, 1990, Wood et al., 1976), in which there are reciprocal influences and a shared outcome between mother and child (Belsky, 1984). The role of mutual understanding of the task between mother and child, their shared motivation and strategies of task completion, in particular, dyad's intersubjectivity, was recognised as crucial for successful scaffolding interaction (Deater-Deckard & Petrill, 2004; Mulvaney, McCartney, Bub, & Marshall, 2006).

It is this scaffolding support provided for children at home by their parents or carer that is highly related to the child's development. Numerous studies have shown associations between maternal scaffolding and the child's development across different areas such as general cognitive abilities (Hammond, Müller, Carpendale, Bibok, & Liebermann-Finestone, 2012; Hughes & Ensor, 2009; Landry, Miller-Loncar, Smith, & Swank, 2002; Lowe et al., 2014; Pacifici & Bearison, 1991), social abilities (Leve & Fagot, 1997; Pettygrove, Hammond, Karahuta, Waugh, & Brownell, 2013; Rheingold, 1982; Svetlova, Nichols, & Brownell, 2010) and emotional abilities (Hoffman, Crnic, & Baker, 2006; Landry, Denson, & Swank, 1997; Landry et al., 2006; Landry et al., 2012).

Wood and colleagues (1976) believed that successful scaffolding is a simple way of measuring a child's success or failure in relation to task accomplishment. However, further studies have highlighted a number of individual differences which may affect the mother or child's behaviour to produce more or less successful scaffolding (Conner & Cross, 2003; Mulvaney et al., 2006; Neitzel & Stright, 2003). Specifically, the use of appropriate scaffolding strategies by the mother during problem-solving interactions is related to various maternal characteristics such as the level of education (Carr & Pike, 2012; Neitzel & Stright, 2004), aspects of parenting (Carr & Pike, 2012), social abilities, such as maternal mind-mindedness (Ereky-Stevens, 2008; Meins, 1997), and emotional abilities (Bradley, Whiteside-Mansell, Brisby, & Caldwell, 1997; Pomerantz et al., 2005). Furthermore, a number of child traits were also identified as influential to the learning process, in particular, the child's behavioural adjustment (Denham, 2006; Coldwell, Pike, & Dunn, 2006;Raver & Knitzer, 2002; Zins, Bloodworth, Weissberg, & Walberg, 2007) and regulatory capabilities (Graziano, Reavis, Keane, & Calkins, 2007; Gumora & Arsenio, 2002; Norona & Baker, 2017), along with socio-emotional abilities (Galende, de Miguel, & Arranz, 2012; Hughes & Devine, 2015; Trentacosta & Izard, 2007).

The majority of existing knowledge about the scaffolding process has been primarily acquired through English-speaking studies focused on problem-solving interactions between a mother and her child within Western societies. Therefore, our understanding of scaffolding practices is based on how learning at home occurs within individualistic cultures such as English (Hofstede, 2001). However, what is unclear is whether or not the same principles and strategies are applied in alternative collectivist cultures such as Russian (Hofstede, 2001; Triandis, 1995). While the understanding of the culture as two broad categories is oversimplified, culture may be represented by the social processes and policies that support the 'family institution' which enables the identification of more distinct differences among the cultures (Hughes et al., 2014; Ratner, 1999; Wang, Devine, Wong, & Hughes, 2016). For example, the formal 'pedagogical experience' of children in England begins at age 4, while Russian children start school at age 7. The understanding of the cross-cultural difference and the impact on the educational process as a variation in cultures (i.e. language, societal formation, beliefs and values) could be related to differences in academic achievement.

By exploring cross-cultural variations in relation to educational systems, we can better understand individual differences that can inform our thinking, leading to changes that may enable parents to provide more effective support for their children's learning.

1.1 Theoretical framework: The bioecological model

Urie Bronfenbrenner (1977, 1979) proposed a theoretical model of child development called the ecological model. The ecological model highlights the importance of the environment and divided a person's environment into organised and connected systems – the microsystem, mesosystem, exosystem, and macrosystem.

The microsystem is a child's closest environment which includes immediate connections such as family, friends or school. The mesosystems are interfaces across microsystems. For example, parents that are involved in children's homework as part of the formal schooling process, which in turn influences their academic results. The exosystem can be seen as the circumstances in which the child has been affected indirectly, for example, by parents' workload; the amount and type of work a parent has may affect the way they interact with their chil

d indirectly through degree of availability, work patterns and stressors. The macrosystem represents the global view that includes the child's culture such as traditions or religion within which the child was brought up. Such organisation of nested environments and the interrelationships between them, enable the investigation into the patterns of exchanges between the four systems and how they impact each other and in doing so influence the child's development (Bronfenbrenner, 1979).

Over time, the model has been reviewed, reconsidered and has evolved to become the bioecological model (Bronfenbrenner & Evans, 2000; Bronfenbrenner & Morris, 2006). The bioecological model shifted the attention from purely environmental effects and to the influence of the child's own individual development. This development acknowledged the process of change, arising over time, to the person characteristics of individuals (Bronfenbrenner & Morris, 2006). The bioecological model is also referred to as a Process-Person-Context-Time model, as those four elements are defining facets (see Figure 1.1). These four key elements, according to this model of child development, are interconnected:

> The power of such processes to influence development is presumed, and shown, to vary substantially as a function of the characteristics of the developing Person, of the immediate and more remote environmental Contexts, and the Time periods, in which the Proximal Processes take place (Bronfenbrenner & Morris, 2006, p.795).

In their seminal work, Bronfenbrenner and Morris (2006) defined roles and functions of four key elements or influences on development: *process, person, context, time*. The first fundamental element of the bioecological model is *process* that is referred to as 'proximal processes'. These are the developmental processes of continuous interaction between human beings and their environment. Bronfenbrenner emphasised the importance of proximal processes by referring to them as "the engines of development" (Bronfenbrenner & Evans, 2000, p. 118) and noted that proximal processes are more influential on a child's development than the four environmental systems described in the original ecological model (Bronfenbrenner & Ceci, 1994). Processes, such as playing or learning, are essential in early childhood for an individual's development as it is through these processes that children begin to understand the world around them and how to interact with it (Bronfenbrenner & Ceci, 1994; Bronfenbrenner & Morris, 2006). Particularly, the child's development occurs through interaction with their parents, for example, a learning interaction at home. Also, it was noted that in order to understand fully and meaningfully the effect proximal processes have on the child's development, an investigation of multiple factors, specifically, the impact of the person characteristics, the context and the nature of developmental outcomes, is essential (Bronfenbrenner & Evans, 2000).

The next element is the *person*, or individual, that influences and has been influenced by proximal processes across the lifespan. The role that person characteristics play in social interaction are recognised as part of this element. The characteristics that define the person are grouped into three categories: demand, resource and force. Demand characteristics are focused on demographic aspects, such as age and gender, which enable external identification and categorisation of a specific individual. Resource characteristics are related to physical and mental resources such as abilities, experiences, knowledge and skills. Finally, personal traits such as temperament, persistence, beliefs and values are taken into account and represented as force characteristics. Within the bioecological model, the developing person is viewed as a set of personal traits, with a set amount of resources, which can be used in required situations, and a set of demographic characteristics that make the individual outwardly identifiable.

The root of the third element, context, is drawn from the original ecological model. Bronfenbrenner identified the role of context as central for the child's development as it emerges from the interaction of the individual with their surrounding environment (Rosa & Tudge, 2013). He stated that 'the scientific understanding of the basic intrapsychic and interpersonal processes of human development requires their investigation in [the] actual environment, both immediate and remote, in which the human beings live' (Bronfenbrenner, 1979, p. 12). Individual environment or context involve the four interconnected systems described earlier – microsystems, mesosystems, exosystems and macrosystems (Bronfenbrenner & Morris, 2006). Bronfenbrenner and Morris (2006) emphasised that single or multiple interactions with objects or social partners take place within the microsystem, but within the other three systems, the context is also instrumental in the process of individual development. Furthermore, the context should never be separated from the individual and vice versa.

The last fundamental element of the bioecological model is *time*. Time is a key element of the model reflecting the development or consistency of the other three elements. Time is comprised of three components: micro-time, meso-time and macro-time. Micro-time is associated with a continuous behaviour displayed during events resulting from proximal processes. An example of this would be repeated used of appropriate scaffolding techniques within a single problem-solving interaction such as homework. Meso-time refers to how often these proximal processes arise in the child's environment over the period of time, for instance, routine-based parental assistance during homework completion over the period of a few weeks. Macro-time describes large scale events and ongoing expectation change within society at large. It occurs within a generation but also spans generations as they impact, and are impacted, by the processes and outcomes of individual development over the course of their lives. Therefore, this recognises that individuals experience the same life events or historical events in different ways and so have the potential to impact proximal processes throughout the period of life of the child. An example of this would be a birth of a sibling and the impact it has on the dynamic of regular homework support from a parent.

Bronfenbrenner and Morris (2006) stated that in order to adopt the bioecological model appropriately, in order to understand developmental processes, it is crucial to examine all four elements: process, person, context and time. The model is comprised of proximal processes in the centre, with a number of person characteristics contributing to it that are represented by demand, force and resource characteristics. Although the model is very generous in relation to the variability of factors it may include, it has strict parameters which are not easy to meet (Darling, 2007; Tudge, Mokrova, Hatfield, & Karnik, 2009). For example, in order to fully assess the continuing impact of the determinants of developmental processes, it is recommended that the patterns are measured over multiple time points. Additionally, while this model enables inclusion of a wide range of relevant factors, such an extensive model might lead to challenges in the statistical analyses, difficulty of interpretations and identification of difficult patterns.

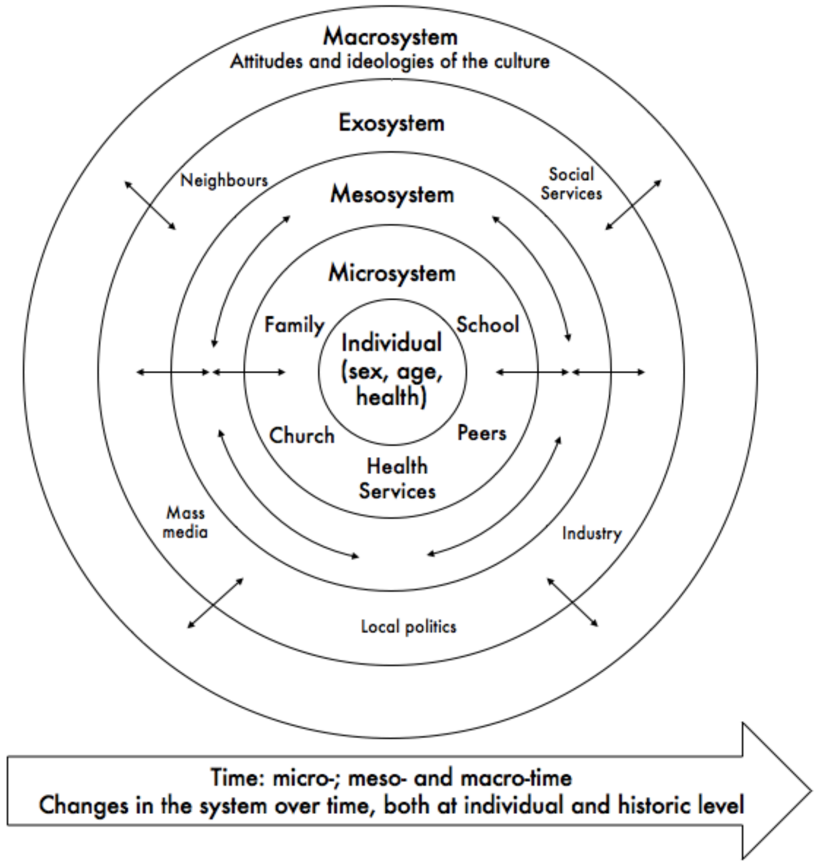

Figure 1.1. The Bioecological Model (adaptation of the figure presented by Dunn, Masyn, Yudron, Jones, & Subramanian (2014)

1.2 Current research

The current study followed Bronfenbrenner's (1995) aspiration that his work "would impel others to seek closure and yield scientific insights" (pp. 619-620). Therefore, the study focused on the adaptation of several aspects of the bioecological theory, with a clear understanding that not all elements of this theory can be assessed within a single piece of research (Bronfenbrenner, 1999).

The interaction between the mother and child, during collaborative problem-solving, such as scaffolding, can be examined as part of the complex ecological system. Within this system, culture (Rogoff, 1990), family (Neitzel & Stright, 2003) and individual characteristics, belonging to both the mother and child, (Mermelshtine & Barnes, 2016; Mulvaney et al., 2006; Carr & Pike, 2012) are considered to be essential. As proximal processes are understood as a continuous interaction through engagement, with which the child develops particular knowledge and abilities (Bronfenbrenner & Morris, 2006), then the process of scaffolding should be considered a proximal process (Mermelshtine, 2016). Furthermore, scaffolding is an interaction which represents 'an interdependent process in which both mother and child share responsibility for the way that the collaboration proceeds' (Mulvaney, 2006, p.301). Thus, in the current study, the bidirectional nature of the scaffolding interaction is assessed through observing the dimensions of both the mother's and child's behaviour in order to understand the patterns guiding the interaction. Following the assumption that scaffolding is a proximal process of child development, it should then be examined through three central elements of bioecological theory: person, context and time (Bronfenbrenner & Evans, 2000).

The research presented in this thesis has three main objectives. Firstly, to examine the person characteristics of both mother and child as potential predictors of the behavioural dimensions of scaffolding. Specifically, the child's general cognitive abilities (working memory and verbal mental age), emotional abilities (emotion recognition and regulation) and social abilities (theory of mind and use of mental state talk), along with aspects of behavioural adjustment are examined. Similarly, the mother's person characteristics including her level of maternal education, emotional abilities (emotion regulation and traits of emotional intelligence) and social abilities (use of mental state talk), along with aspects of parenting (warmth and parenting stress) are all examined in relation to the scaffolding process.

The second main objective is to examine contextual factors and their relation to the process of scaffolding and its associated behavioural dimensions. In particular, the family's home environment, over-crowdedness and the number of siblings in the household are examined as key indicators of context. A secondary aim in relation to context was to explore the role of broader cultural influences on scaffolding practices and behaviour. First steps were taken towards this by adapting all study measures for a Russian sample and running a small-scale study in Russia.

The third and final objective of the research presented here was to examine the bidirectional nature of scaffolding interactions over time. The aim was to identify consistency and change in the nature of the interaction by adopting a cross-lagged design and evaluation methods. In addition, the predictive nature of person characteristics and contextual factors on the behavioural dimensions of scaffolding, exhibited by both the mother and child, are examined across two time points.

In applying bioecological theory to these objectives, the current study addresses five specific aims:

1. To examine the bidirectional nature of scaffolding interaction, in order to understand the predictive relationships between the mother's and child's behaviour in this context.
2. To identify the role of dyadic intersubjectivity in the scaffolding process.
3. To determine individual differences in the behavioural dimensions of the scaffolding process through the examination of the mother's and child's person characteristics, along with contextual factors.
4. To conduct an exploratory study to investigate the nature of scaffolding interactions between Russian mothers and children.
5. Compare cross-cultural patterns obtained in England and Russia.

To address these aims, five study stages were developed, each of which were correlational in nature and employed a quasi-experimental design (see Figure 1.2).

Prior to the main research, a *pilot study* was conducted that aimed to test interactional tasks and develop coding measures on a small sample.

Stage I involved cross-sectional research that investigated the nature of the scaffolding interaction and its determinants within the English sample at the baseline visit.

Stage II comprised of a follow up visit that enabled longitudinal research with two time points over a period of approximately seven months, acting as a continuation of Stage I, to test the cross-lagged effects and stability over time.

Stage III consisted of the measures adaptation used at Stage I for the Russian sample and served as preparation for Stage IV.

Stage IV was a preliminary and exploratory cross-sectional study examining the scaffolding process and the patterns of its relationship with the person characteristics of the mother and child as well as contextual factors within the Russian sample.

Finally, Stage V was a comparative study between the English and Russian samples.

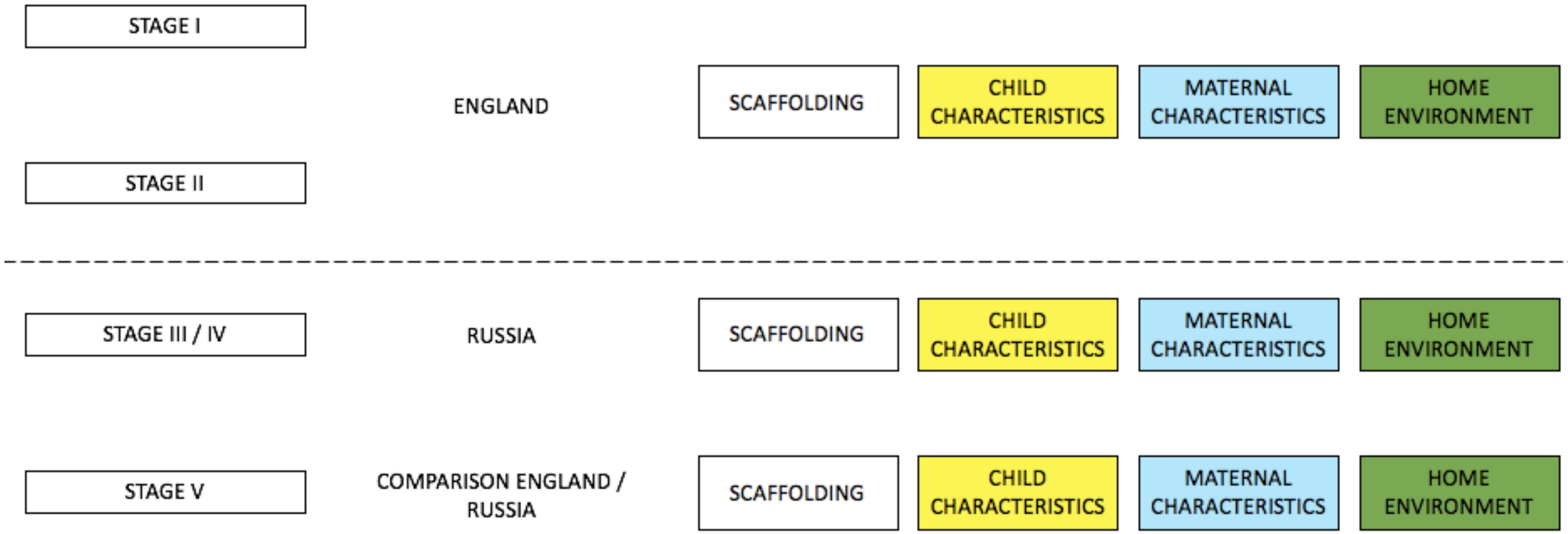

Figure 1.2 Design of the current research

1.3 Thesis overview

Chapter 1. Introduction. Statement of the problem with a concise introduction of the relevant research and theoretical framework, followed by the overview, aims and stages of the current study.

Chapter 2 and Chapter 3. Literature Review: In this chapter, the theoretical issues and discrepancies in the term 'scaffolding' and the variety of dimensions of maternal behaviour are discussed with reference to the background literature. Along with the importance of the scaffolding process in relation to the child's behaviour, the role of the child in the process and the role of mutual intersubjectivity are highlighted. The individual characteristics of both the mother and the child, along with the range of contextual factors relevant to problem-solving interactions are also discussed. This chapter ends with a discussion of the role of culture as a macro-system in relation to cross-cultural variations in scaffolding practices between England and Russia.

Chapter 4. Methodology in England: A detailed description of the methods of Stage I and Stage II. This chapter includes an overview of the conceptual framework for the study and a discussion of ethical issues, details of recruitment and administration procedures, participant information (demographic and SES data), quantitative measures (main and secondary outcome measures) and a detailed description of the interactional measures and coding scheme (process of approbation of interactional tasks through the pilot study and the process of coding scheme development).

Chapter 5. Analysis and results: The chapter presents the analyses relating to the aims of 1 and 2. Firstly, in the preliminary analyses describes the descriptive statistics, testing the assumption of normality and testing the variables against the child's gender. Secondly it presents the tests of hypotheses related to the bidirectional nature of the scaffolding interactions and the role of mutual intersubjectivity within it with the appropriate statistical methods required to support them.

Chapter 6. Analysis and results: This chapter has a similar structure to Chapter III and is intended to address the third aim. The initial preliminary analyses are followed by the testing of hypotheses related to the individual variations of the mother's and child's behaviour in problem-solving interactions using cross-lagged autoregressive panel analyses.

Chapter 7. Methodology in Russia: In this chapter, Stage III presents through the process of adaptation into the Russian language, testing and evaluation of all study measures discussed within Chapter II to address aim 4.

Chapter 8. Analysis and results of Stages IV/V, relating to the final aim of the current research: Preliminary analyses and correlations within the Russian sample group testing the bidirectional relationship between the mother's and child's behaviour during scaffolding interaction. Following this is the examination of individual variations of observed behaviour in respect of the mother's and child's characteristics, along with contextual factors. Finally, a descriptive comparison of findings between the results obtained in the English and Russian sample groups is undertaken.

Chapter 9. Discussion: This part of the thesis includes a discussion of the statistical findings leading to conclusions about the hypotheses and assumptions for the implications of those findings. It also includes a review of the study's strengths, limitations and future directions.

CHAPTER 2. SCAFFOLDING AS A PROXIMAL PROCESS

The current chapter reviews classic and contemporary research, both theoretical and empirical, examining the concept of maternal scaffolding as a crucial process for a child's development. The chapter begins with an overview of Vygotsky's socio-cultural theory before moving on to specifically addressing scaffolding within this broad theoretical framework. Included is a discussion of the discrepancies in the terminology adopted by research and, as a result, a wide range of dimensions of maternal behaviour is reviewed. Furthermore, the nature of the collaborative problem-solving interaction, viewed from the angle of the child's active participation, and the role of mutual intersubjectivity is discussed.

2.1 Sociocultural theory

Over the last three decades, there has been an ongoing debate about the importance of the impact of the social and cultural context of families on children's learning and development (Alexander, 2000; Kagitcibasi, 1996; Kozulin, 2002; Tharp & Gallimore, 1988; Wood, 1998). In the first half of the twentieth century, Lev S. Vygotsky (1930-1934/ 1978), introduced for the first time a sociocultural theory of development. According to sociocultural theory, children's cognitive development and learning are set up as a process of acquiring culture (Cole, 1985) and the individual's development is collaborative and social in nature (Bruner, 1973; Rogoff, 1998; Vygotsky, 1930-1934/ 1978).

Sociocultural theory only became established at the end of the 1970s when Vygotsky's works were translated into English but has subsequently had a significant influence on developmental and educational psychology in Western society. Vygotsky's ideas provided a challenge to the Piagetian theory (1936/ 1952) of children's cognitive development. In this theory, Piaget presented children's development as an active individual process through investigation of their surrounding environment with the egocentric use of language in early years. However, Vygotsky challenged this theory and highlighted the importance of communication with more knowledgeable partners (Greenfield, 2000; Vygotsky, 1930-1934/ 1978).

Piaget ascribed to the theory that the time frame of development occurred in stages specific to the age of the child. As children get older, they gain new skills. In contrast, Vygotsky was one of the first psychologists who suggested that a child's development was dependent on social learning through the child's internalisation of sociocultural activity, such as interactions with parents, carers or peers, and therefore could be accelerated.

Rogoff (1998) noted that both theories agree on the role of the learner; specifically, that learner is actively constructing knowledge through their life experience and with 'an emphasis on achievement of shared thinking' (p.681). However, the sociocultural theory highlights the importance of individuals collaborating in the activity with others through shared goals and understanding of each other.

Vygotsky stated that "learning is a necessary and universal aspect of the process of developing culturally organised, specifically human psychological function" (1978, p. 90) Therefore, the child and parent's joint activity affect the development of the intellectual, social and emotional abilities of the child.

2.1.1 Zone of proximal development

Within sociocultural theory, Vygotsky proposed the theoretical concept of a child's 'zone of proximal development' (ZPD). He defined this as 'the distance between the actual developmental level, as determined by independent problem solving, and the level of potential development, as determined through problem solving under adult guidance or in collaboration with more capable peers' (Vygotsky, 1978, p. 86). The child that cannot solve the task on their own just yet may be able to find the correct answer with assistance from more knowledgeable others. This concept also highlights a central tenet in sociocultural theory – the interdependence of individual and social processes in the co-construction of knowledge (John-Steiner & Mahn, 1996). The co-construction of knowledge occurs when the individual develops their understanding in collaboration and with the support of others. During the interaction with the caregiver, the child has a chance to explore, analyse, understand and restructure their existing knowledge (Forman & McPhail, 1993; Moll, Tapia & Whitmore, 1993).

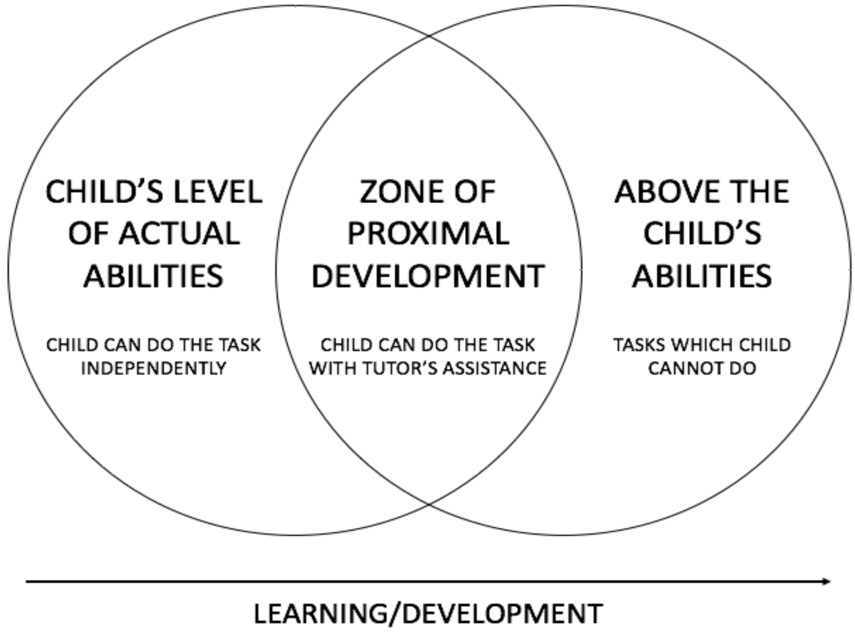

Figure 2.1 Visualisation of Vygotsky's ZPD

As an example, Vygotsky (1930-1934/ 1978) described a theoretical experiment in which two children with the same level of actual development (measured by a test completed by the children without assistance) would be asked to undertake more complicated tests, designed for older children, with support provided by a tutor (leading questions, hints or demonstration). If the result were that one child significantly outperformed the other, that child would have a higher level of potential development. In this instance, the ZPD would be measured using the difference between the level of actual development, as determined by the child's ability to solve the task on their own, and the level of potential development, as determined by the child's ability in collaboration with a more knowledgeable partner.

Vygotsky (1930-1934/ 1978) believed that the ZPD is the consequence of the formation of higher mental functions (for example, memory, attention, perception), which are formed during problem-solving activities in collaboration with a parent, usually the mother, who plays the role of a tutor (Howes, Unger & Seidner, 1989). However, he stated that in collaboration with an adult, the child would most likely perform better than alone, but children would not have the opportunity to infinitely increase their performance. The performance increase in the child's ability is confined within certain limits as determined by their level of potential development (Kozulin, 1986). Over time children gains confidence and take more responsibility for task accomplishment and shared activity (Lave & Wenger, 1991).

Vygotsky illustrated the concept of the ZPD by relating it to the experience of schooling. In principle, the process of schooling is an example of the ZPD as the child does not have skills and knowledge alone, but in communication with teachers and under supervision, the child is able to learn. The ZPD varies across different tasks as children's abilities to learn are unequal, while already existing background knowledge could explain why children learn at different speeds. However, according to Vygotsky, teaching would only be effective if the child is able to follow the instructions and imitate the actions. A demonstration would be a successful teaching approach only if the child has the appropriate skills or abilities to solve the task themselves. As an example, if a child does not understand how to play chess, no matter the level of expertise of the tutor providing instruction, the demonstration of how to win would not be successful.

Vygotsky also suggested the ZPD as a psychodiagnostic tool which would enable measurement of the actual and potential level of a child's development (Chaiklin, 2003). However, the formulation of the ZPD was quite vague with various strengths and weaknesses making it difficult to measure and investigate this abstract phenomenon. Wertsch (1984) remarked that while Vygotsky highlighted the importance of supporting the child during the learning process, he never stipulated what would make it effective. While the child was not viewed as a passive participant in the interaction, the majority of Vygotsky's work focused on the parent as the leading role in the learning process (Goodnow, 1990; Litowitz, 1997).

As one of the first psychologists to acknowledge the importance of mother-child interaction from a learning perspective, Vygotsky's theories had an impact on developmental psychology, and while the theoretical concept of the ZPD was somewhat vague, it laid the foundations for further empirical studies in the area of problem-solving interactions.

2.2 Defining maternal scaffolding

According to sociocultural theory, collaborative learning or problem-solving comprises of interaction between an expert and a novice. Both participants play an important role in successfully accomplishing a given task. The support provided by the expert during the problem-solving interaction does not change the task itself, but provides a simplified structure and essential guidance needed by the novice (Bodrova & Leong, 2007; Lee, 2011). Furthermore, the expert needs to be aware of the novice's current abilities as well as have a general understanding of the task (Wittwer & Renkl, 2008).

In the context of learning at home, the mother usually plays the role of the expert, while the child is the novice. In order to produce an effective collaboration, the expert should provide the instructions which are given in relation to the child's actual abilities and within the range of their potential (Wass & Golding, 2014). Collaborative problem-solving is essential to the child's learning and has been shown to aid the cognitive and socio-emotional development of children (see Subchapter 2.5).

Wood and Middleton (1975) established that children were more successful if their mothers showed flexibility in giving instructions based on the child's performance. Specifically, the research revealed that mothers mostly used verbal instructions with their children during problem-solving tasks. However, children were more successful in task accomplishment when mothers used a variety of tutoring techniques. Moreover, mothers who could adjust the amount and type of support according to their child's level of ability were more successful than those mothers who used only simple tutoring techniques such as a demonstration.

Wood, Bruner and Ross (1976) proposed the metaphorical term 'scaffolding', which they defined as the process through which a child is able to solve a task independently, that was initially out of reach, with adult support and guidance. During this process, the adult takes control of the aspects of the task that are beyond the child's current capability, thus enabling the child to focus on what is within their own ability. As the child becomes able to complete more of the task independently, the adult gradually transfers more control of the task to the child. This concept is similar to Vygotsky's notion of ZPD (1930-1934/ 1978).

To test the theory of scaffolding, Wood and colleagues (1976) observed 30 children, divided into three age groups (three-, four-, five-years old) who had been given wooden blocks to build a pyramid. Although not interacting with their mothers, every child's action was assisted by a trained tutor, who would let the children complete as much of the task as possible themselves. However, if required, the tutor would provide verbal instructions or guidance to help the children accomplish the task. The results showed that the five-year olds significantly outperformed the four-year olds who in turn showed higher achievement than the three-year olds. However, the analysis showed differences in response to the tutor's assistance for each age group. The youngest group of children required the most substantial amount of physical intervention (demonstration of correct actions in order to build the pyramid). In the group of four-year olds, the tutor's behaviour shifted from demonstration to verbal marking (advice, hint, approval/disapproval of child's actions). Finally, the eldest group required interventions only when children experienced difficulties or needed to receive confirmation of their actions. This observation of the variation in the amount and level of support the tutors provided depending on the child's ability led to Wood and colleagues identifying six 'scaffolding functions' which they argue are related to effective tutoring support (see Table 2.1).

Table 2.1

'Scaffolding functions' by *Wood* and colleagues (1976)

Function	Description
Recruitment	Engaging a child and capturing their interest in the problem-solving situation.
Reducing level of freedom	Decrease the number of possible alternative actions required to complete the task, thereby helping the child to resolve the task step by step.
Direction maintenance	The first aspect of this function is the need for the tutor to provide positive reinforcement throughout the task. The second aspect focuses on increasing the level of difficulty once the child has successfully completed the previous task.
Marking critical features	Highlighting the difference between what the child has produced and successful completion of the task.
Frustration control	Control of child's negative emotions and making the task less stressful while avoiding over-dependence on the tutor.
Demonstration	Presentation of task slowly and carefully in "idealised" form in an attempt to get the child to "imitate" the behaviour.

In further studies, Wood, Wood, and Middleton (1978) continued to explore the problem of effective parental teaching and described four interactional strategies that were observed during mother-supported problem solving interactions. The strategies' typology was based on five levels of observed intervention by the mother graded by the level of support provided, from lowest to highest: general verbal encouragement, specific verbal information, selection, prepared material and demonstration. The five levels describe the main parental tutoring interventions. On the lowest level, parents provided the minimum support while the highest level involves the most help from the caregiver. To test the effectiveness of these Wood and colleagues (1978), conducted an experimental study with 32 children aged from three to four-years-old and their mothers. Mothers were allocated to one of four tutoring conditions which varied in the type of support they were instructed to provide; demonstration, verbal, swing and contingent. In the demonstration condition mothers were instructed to provide the highest level of support and demonstrate how to complete the task while the child observes. The verbal condition involved mothers only providing verbal instructions to the child without any physical intervention. The swing condition instructed mothers to 'swing' between positive verbal reinforcement (level 1) and demonstration (level 5). Finally, in the contingent condition mothers were instructed to adopt a flexible approach and provide support only when it was needed and at a level dependent on the child's success with the task.

The results of the first part of the experiment showed that the demonstration, verbal and swing strategies were less successful as a tutoring technique than the contingent strategy. The analysis of post-instruction interactions compared the activities of the children from the four groups and their level of autonomy. It was expected that in the group with contingent tutoring, children would demand less help as they were previously taught more effectively. However, it was children from the demonstration group, who performed with the highest level of autonomy, but not successfully. The results of this study allowed Wood and colleagues (1978) to make a fundamental assumption that patterns of instructional tutoring have an impact on the child's success in learning.

In later studies, the contingent strategy is referred to as the contingent shift principle (Wood, 1980) and is described as the mother providing a high level of interventional support in the very beginning of the task and decreasing this support throughout the task as the child's ability proceeds to increase.

The concept of parental scaffolding gained significant resonance in developmental and educational psychology as scholars continued to investigate the relationship between the child and mother in problem-solving situations (Conner & Cross, 2003; Neitzel & Stright, 2003; Pratt, Green, MacVicar, Bountrogianni, 1992; Rogoff, Ellis, & Gardner, 1984). Through this research, much more was discovered about parental scaffolding and the understanding of the concept has become more precise and grounded in empirical evidence.

Wood's classic experiments about the nature of scaffolding always include the mother playing the role of scaffolder. However, since the mid-1970s there has been a substantial change in gender roles and responsibilities, prompting and increased interest in gender studies. A rise in the volume of studies that investigate the role of the father in relation to effective scaffolding compared to the traditional female tutor has been noted. Conner and colleagues (1997) established that while maternal and paternal scaffolding practices vary from each other and are delivered in different ways, they both predict the child's success at a task equally well.

In summary, parental scaffolding is the interaction between parent and child in problem-solving situations. In order to provide adequate scaffolding, the parent has to be flexible in relation to the amount of support offered to the child at the appropriate time. Additionally, the complexity and variety of the child's and parent's individual traits, and their ability to collaborate with each other effectively, inevitably lead to differences in the nature of scaffolding interactions.

2.3 Complexity of maternal scaffolding

'Theory and research are extending our definitions of scaffolding, what it is, what we should scaffold, how we should scaffold, who or what should do the scaffolding and how we determine the effectiveness of such scaffolds'

(Lajoie, 2005, p.553).

The definition of scaffolding is a broad and ongoing debate lasting over 30 years (Granott, 2005). Researchers have not only debated where (Carr & Pike, 2012; Wood et al., 1976) or when (Hughes, Roman, Hart, & Ensor, 2013; Pianta & Harbers, 1996) scaffolding interaction could occur, but also whether scaffolding behaviour comprises of a single behaviour (Pratt, Kerig, Cowan, & Cowan, 1988; Wood et al., 1976) or a range of behavioural dimensions (Casey, Dearing, Dulaney, Heyman, & Springer, 2014; Landry et al., 2006). Further in this subchapter, these inconsistencies, leading to variations of the definition of the concept of scaffolding, is discussed.

Original works by Wood and colleagues (Wood et al., 1976, 1978) were based on problem-solving interactions that took place in a laboratory settings (Conner & Cross, 2003; Hammond et al., 2012; Pettygrove et al., 2013), but one may argue that a home setting is a more appropriate and naturalistic environment for the observation of mother-child interaction (Carr & Pike, 2012; Casey et al., 2014; Hughes & Ensor, 2009). Also, the type of activities used to observe scaffolding interactions differ widely between studies with a particular distinction between structured tasks (Pianta & Harbers, 1996; Pratt et al., 1988) and free play (Hughes et al., 2013; Merz et al., 2015). All these discrepancies lead to somewhat different perspectives within the same overarching term 'scaffolding'.

Moreover, there is another fundamental theoretical issue that is particularly important for the current study which is the understanding of supporting behaviour. Can maternal scaffolding consist of a single behavioural dimension or is scaffolding behaviour a range of multiple dimensions? This question is also closely related to the methodological issue of the quantity vs quality of maternal scaffolding. In other words, should scaffolding behaviour be understood as a fluctuation of the mother's tutoring behaviour in response to the child's abilities or is scaffolding a complex process that involves not only tutoring but also cognitive support, emotional support and transfer of responsibility. In this case, theoretical and methodological aspects are inter-related as theoretical understanding of what the dimensions of maternal behaviours involve is required for the use of appropriate methodological techniques.

Furthermore, each of these approaches is discussed. The first group of research defined scaffolding as a one-dimensional set of behaviours through which parents provided instructional support according to the child's actions. In the seminal study, Wood and colleagues (1978) examined the six levels of scaffolding intervention (see Subchapter 2.2) through goal-orientated tasks, specifically the parents' tutoring behaviour in relation to the child's progress. At each level of scaffolding intervention, maternal behaviour was classified based on pre-defined, fine-grained, behavioural coding scheme according to the child's performance before the scores were combined. Such an approach enabled the demonstration of the child's 'region of sensitivity' alongside the parent's ability to appropriately shift tutoring strategy based on the child's capability and their requirement for scaffolding.

Pratt and colleagues (1988) slightly modified Wood's structure of interactional levels and added one more category, 'verbal hints', but the rest of the original coding system was fully adopted. To characterise the parent-child interaction, two aspects of scaffolding, in line with Wood's studies, were computed – 'region of sensitivity' and 'contingent shifting'. The 'region of sensitivity' was calculated as a child's success rate in response to parent's different level of interventions, specifically, the level of intervention when the child was least successful was considered as the region of child's sensitivity. The contingent shift was calculated as a percentage of the parental shift of the interventional level as an immediate response to the child's success or failure. In this study, the parents of three- and four-year-olds were observed in problem-solving situations, such as block design and the matrix reconstruction task. The results revealed a positive relationship between the child's success and parental scaffolding behaviours, such as the use of the contingent shift principle and the 'region of sensitivity'.

Using Pratt's methodology, another research project interpreted scaffolding as instructional behaviour, which was associated with the child's overall attitude, engagement and behaviour (Conner & Cross, 2003). Conner and Cross (2003) investigated the problem of stability and effectiveness of maternal scaffolding among 45 mother-child pairs. The study, which had a longitudinal design with four time-point observations over a period of three years (when children were 16, 26, 44, and 54 months old), intended to demonstrate the changing relationship between the parent and their child. Each observation was assessed by six levels of maternal intervention and the immediate response of the child (successful, unsuccessful or lack of response). The assessment of each observation allowed the authors to compute the child's 'region of sensitivity' and success during the problem-solving situation as well as the appropriate shifting by the parent based on the child's success or failure. Over the three years, parents adopted a pattern, providing less support and using more contingent strategies as the child aged. In addition, the child became more independent and evolved from observer to doer. The pattern and style of parents' scaffolding behaviour were not consistent across the four time-points measured. While there may have been other contributing factors, it is possible that, as a result of inconsistent scaffolding, the children did not demonstrate consistent progress through positive results across each interaction.

Another adaptation of Wood's original coding scheme was made by Meins (1997) as part of an investigation into the relationship between children's attachment security and maternal scaffolding behaviour. Each maternal intervention during the interaction was judged and scored by the following criteria: question; feedback (positive and negative) and general non-verbal instruction (divided into spontaneous and requested non-verbal instructions). Also, the interactions were assessed by five levels of maternal intervention, graded similarly to the research above, with increasing specificity; level one- minimal intervention, use of hints and suggestions through to level five-demonstration, performing the operation herself. Finally, the score of sensitivity to feedback, which is conceptually similar to the notion of contingent shift, was calculated to identify the ability of the mother to adapt the intervention in relation to the child's positive or negative results. The results suggested that mothers of securely attached children used more positive feedback, fewer physical interventions and had higher sensitivity to feedback.

This approach was also adopted in the research conducted by Carr and Pike (2012) with the addition of another level of scaffolding intervention – 'simple feedback'.

Subsequently, in this study, the proportion of appropriate (contingent shift) and inappropriate (fixed failure feedback) scaffolding intervention was assessed.

It has been shown that the examination of scaffolding behaviour as a single behavioural dimension enables measurement of an immediate change in maternal behaviour with a single intervention (Carr, Pike, 2012; Conner & Cross, 2003; Conner et al., 1997; Mattanah, Pratt, Cowan, & Cowan, 2005; Meins, 1997; Pratt et al., 1988). The heightened value of this approach is an opportunity to view the scaffolding process as dynamic and changing throughout the problem-solving interaction. On the other hand, this model is an incomplete representation of maternal scaffolding, as there are a variety of behavioural factors, such as emotional support or support of child's autonomy, that may influence the child's successful task accomplishment (Casey et al., 2014; Merz et al., 2015; Mulvaney et al., 2006; Pianta, Smith, & Reeve, 1991).

Another group of studies (Casey et al., 2014; Landry et al., 2006; Merz et al., 2015) adopt an alternative perspective and define scaffolding behaviour and processes as multi-dimensional and focus on a broader spectrum of behaviours rather than just single individual interventions made by parent. This approach typically comprises of a number of overarching behavioural dimensions related to tutoring interactions. For instance, studies have characterised scaffolding as the parental provision of three broad categories of support: cognitive support, emotional support and transfer of responsibility (Neitzel & Stright, 2003, 2004; Pianta & Harbers, 1996).

Pianta and colleagues (Pianta & Harbers, 1996; Pianta et al., 1991) have demonstrated this approach in several studies. For example, they assessed 342 families with children aged between four and six-years-old to establish the relationship of scaffolding interaction and the child's future academic achievement (Pianta & Harbers, 1996). Three dimensions of the mother's behaviour were identified as supporting children's problem-solving: quality of instruction, supportive presence and respect for the child's autonomy. The extent to which mothers displayed each of these behaviours was rated on five-point Likert scale at the end of each interaction. The results of the regression analyses suggested a small, but significant role for the mother-child interaction on the child's academic achievement.

In another study, Leerkes, Blankson, O'Brien, Calkins and Marcovitch (2011) examined metacognitive and cognitive information by using a five-point coding scheme to establish quantity and quality of instructional information provided by the mother, as well as maternal emotional responsiveness, intrusiveness and negativity displayed during problem-solving situations. The study showed the importance of maternal emotional support during scaffolding interaction to gain pre-academic skills such as task persistence and help-seeking.

The main criticism of the multi-dimensional scaffolding model is its inability to gain an in-depth understanding of the dynamic between the mother and child and the temporal processes of the interaction. On the other hand, the inclusion of one of the components from the bioecological model, such as time, could help to understand the fluctuation of the behaviour during the scaffolding process. The observation over time could provide an understanding of the dynamic between the mother and child.

Each of these approaches has its advantages and disadvantages, and prioritisation of one above the other is respective to the research question which underpins each study. In particular, to address the aims of the current research, it is critical to understand the range of maternal scaffolding practices. Further relevant types of maternal scaffolding dimensions are highlighted in the following subchapter.

2.4 Dimensions of maternal scaffolding

Numerous researchers (Bruner, 1986; Leerkes et al., 2011; Neitzel & Stright, 2003, 2004; Pianta & Harbers, 1996; Stright, Neitzel, Sears, & Hoke-Sinex, 2001) have theorised that there are three main facets to parental scaffolding behaviour, each of which enable the child to succeed during problem-solving situations. These are: quality of instruction, emotional support and transfer of responsibility. Quality of instruction relates to the type of cognitive support mothers provide in the form of explanations and metacognitive information which facilitates the development of effective task solving strategies. Emotion support is fostered through encouragement and responsiveness and, finally, transfer of responsibility increases the child’s autonomy during scaffolding interaction (Neitzel & Stright, 2004).

Quality of instruction was highlighted in the seminal work by Vygotsky (1930-1934/1978) as being a critical mechanism through which parents appropriately share knowledge, strategies and instructions to help the child’s learning. It was also remarked that the instructions have to be challenging:

> Instruction is good only when it proceeds ahead of development. It then awakens and rouses to life those functions that are in a state of maturing, which lie in the zone of proximal development. It is in this way that instruction plays an extremely

important role in development. (Vygotsky, 1956, p. 278; quoted in Wertsch & Stone, 1985)

On the other hand, it is essential for parents to deliver cognitive support at an appropriate level that is accessible to the child, thus enabling them to benefit from the metacognitive information being provided (Wertsch, 1985). Furthermore, the importance of cognitive and emotional support provided by the parent has been shown to be related to the child's behavioural regulation and academic achievement later in life as demonstrated through teacher reports (Pianta & Harbers, 1996; Pianta et al., 1991).

The emotional tone of the dyadic interaction during problem-solving situations has received increasing attention as a crucial element of successful scaffolding (Dennis, 2006; Diaz, Neal, & Amaya-Williams, 1990; Landry, Smith, Swank, Assel, & Vellet, 2001) and is often measured in terms of positive/negative responsiveness (Landry et al., 2006). Positive affect may include expressions of warmth or use of praise and encouragement. In contrast, negative affect may be represented by rejection or disapproval.

Parental warmth and responsiveness are also associated with the child's social-emotional abilities (Grusec & Goodnow, 1994). In addition, children whose parents provide higher levels of emotional support within a tutoring interaction perform more successfully on the task (Bruner, 1986; Neitzel & Stright, 2003; 2004). In Neitzel and Stright's (2003) study, in which they observed 68 mother-child dyads in four different problem-solving situations, maternal emotional support and transfer of responsibility were associated with the child's ability to self-regulate. Two aspects of emotional support were judged using the criteria of encouragement and rejection respectively. The study showed that the stronger the level of emotional support provided by the mother, the stronger her instructional manner and the more evidence of transfer of responsibility to the child. A significant correlation between the level of emotional support and the child's task persistence was also found.

Dennis (2006) investigated the association between parental strategies and specific elements of the child's emotional regulation during play. A total of 113 dyads consisting of mothers with pre-schoolers were observed during free play and a waiting task. The results demonstrated a positive relationship between the maternal approach (control behaviour and ignorance of the child) during the waiting task and the children's persistence and frustration. Also, maternal warmth during playtime was associated with the increase of children's compliance.

Another crucial behavioural dimension of scaffolding interaction is transfer of responsibility, also referred to as autonomy support. This describes a behaviour whereby the autonomy of the child is supported by the parent encouraging the child to take on more and more of the problem-solving as their ability for the task increases (Grolnick, Gurland, DeCourcey, Jacob, 2002; Rogoff, 1990). Bernier, Carlson, & Whipple (2010), stated that parental scaffolding involves "respecting the child's rhythm, and ensuring that he or she plays an active role in successful completion of the task" (p. 335). In another study, children aged 54 months to grade three, were given tasks to solve with their parents. Parental autonomy support emerged as a key predictor for boys' reading and maths ability (first to third grade), as well as self-reliance (Belsky et al., 2008).

All three of these key dimensions (cognitive support, emotional support and transfer of responsibility) can be seen in Wood and colleagues' (1976) scaffolding functions (Table 2.1). Specifically, the quality of instruction is conceptually related to 'marking critical features', 'reduction of the level of freedom' and 'demonstration'. Emotional support is also reflective of 'frustration control' and 'task encouragement'. Lastly, transfer of responsibility is related to the notion of 'recruitment' and 'attention maintenance'. However, what it is not reflected in the three basic dimensions of instruction, emotional support and transfer of responsibility is the flexible structure and appropriateness of parental support in relation to the child's ability. This concept of a 'contingent strategy' was of primary importance for Wood and colleagues who argued this was fundamental to successfully supporting a child's success on task.

The concept of contingency is the core, single dimension of scaffolding behaviour in a large body of research (Carr & Pike, 2012; Conner & Cross, 2003; Conner et al., 1997; Mattanah et al., 2005; Meins, 1997; Pratt et al., 1988; Wood et al., 1976). More infrequent is the notion by researchers that contingency is one of multiple dimensions within scaffolding. Nevertheless, contingency has previously been examined in many studies that addressed the multiple dimensions of scaffolding behaviour (Casey et al., 2014; Hoffman et al., 2006; Landry et al., 2006; Maslin-Cole & Spieker, 1990; Merz et al., 2015). For example, Hoffman and colleagues (2006) assessed three dimensions of scaffolding: technical scaffolding, motivational scaffolding and emotional scaffolding. Technical scaffolding is conceptually related to contingency and is described as a well-timed demonstration that can be easily understood by the child, without over-simplification, through the highlighting of critical features and overcoming of sub-steps that the child may find difficult. The study showed that all three scaffolding dimensions were crucial to the child's development. Specifically, poor scaffolding had a negative longitudinal effect on the child's behavioural adjustment and abilities to regulate emotions.

A study by Merz and colleagues (2015) similarly measured parents' warmth, acceptance and responsiveness/flexibility, which theoretically overlaps with contingency, during free play sessions with their two to four-year-old children. One year on, they found that parental responsiveness contributed to the child's cognitive abilities as well as literacy and math.

Moreover, Landry and colleagues (2006) combined all four scaffolding dimensions in their research, referring to them as types of maternal responsiveness. They observed contingent responsiveness, emotional-affective support (both positive and negative affect), attention maintenance (positive responsiveness or, on the other side of the spectrum, lack of responsiveness), potentially representing the dimension of transfer of responsibility, and quality of language input that could correspond to the quality of instruction. The results suggested that heightened maternal responsiveness, during problem-solving situations, determined the promotion of a range of social, emotional and cognitive competences in infants.

To summarise, scaffolding is an interaction that is instructional and intended to extend the knowledge of the child, reduce the difficulty of tasks and transfer responsibility while emotional support is provided by a caretaker (Bruner, 1986). Therefore, maternal quality of instruction, contingent behaviour, emotional support and transfer of responsibility were considered as central aspects of scaffolding behaviour in the current study.

2.5 The role of scaffolding in child development

According to the bioecological theory, a child's development is, first and foremost, a process of continuous interaction (Bronfenbrenner & Morris, 2006). A vital role in the development of the child is attributed to the collaboration between mother and child (Laosa, 1980; Sandberg & Hofferth, 2001). Through this interaction with their parent, the child learns to solve problems independently if the parents provide an appropriate level and flexibility in their support.

While the current study aims to focus on what defines successful scaffolding, it is essential to begin by reviewing evidence on the role of scaffolding in a wide range of developmental areas such as cognitive, social and emotional abilities.

A significant amount of research has demonstrated a positive association between scaffolding and a child's cognitive development. While scaffolding facilitates a child's learning, it also determines a child's higher-order cognitive processes. In particular, scaffolding was identified as a contributor to the development of the child's executive function (EF) (Bernier et al., 2010; Hammond et al., 2012; Hughes & Ensor, 2009; Landry et al., 2002; Lowe et al., 2014). EF is an overarching term that includes the set of higher-order mental processes (working memory, inhibitory control, cognitive flexibility) that control goal-directed responses to new and distinct situations (Garon, Bryson, & Smith, 2008; Hughes, Graham, & Grayson, 2005; Miyake, Friedman, Emerson, Witzki, & Howerter, 2000). Hughes and Ensor (2009) investigated the importance of maternal scaffolding for children's EF. They conducted a longitudinal assessment of 125 mother-child dyads with children aged between two and four. Through the study, they demonstrated the positive effects of maternal scaffolding and the negative effects of a disorganised and hectic family life on children's EF.

Scaffolding has also been acknowledged as a contributor to broader cognitive abilities, such as task-specific skills, academic competence, general reasoning and problem-solving capabilities (Fagot & Gauvain, 1997; Landry, et al., 2002; Mattanah et al., 2005; Mulvaney et al., 2006; Neitzel & Stright, 2003; Pacifici & Bearison, 1991). Specifically, Fagot and Gauvain (1997) examined the relationship between maternal scaffolding and children's performance on cognitive tasks across early childhood. Eighty-five American families participated in the longitudinal study when children were at age 18, 30 and 60 months old. Children's performance was assessed by two problem-solving tasks that were completed independently including a delivery task that required a reverse sequencing strategy and the completion of a jigsaw puzzle. The results showed that maternal cognitive support during problem-solving interactions at 18 and 30 months had a significant impact on the child's general cognitive abilities measured by subscales of Preschool and Primary Scale of Intelligence (Wechsler, 1967) and task performance at 60 months.

Similar results illustrating the positive effect of scaffolding behaviour in relation to children's academic competence were found by Mattanah and colleagues (2005). The study was conducted with an older group of children in fourth-grade and demonstrated that quality parental scaffolding observed at the beginning of the year predicted the children's classroom competence measured at the end of the school year.

Another group of studies focused on how successful scaffolding contributed to the development of a particular set of skills such as spatial and arithmetic (Casey et al., 2014) or language ability; decoding and reading comprehension (Dieterich, Assel, Swank, Smith, & Landry, 2006). For example, Dieterich and colleagues (2006) identified that maternal verbal scaffolding observed during a 60-minute session of daily routines and ten minutes of unstructured play with children (at three and four-years-old) had an immediate, direct impact on children's language abilities, in particular, children's receptive and expressive vocabulary. Further, the indirect impact was revealed on children's reading comprehension at age ten, mediated by decoding and language skills. These findings indicate that extensive language exchange with the child in everyday life fosters language abilities, along with reading skills.

The evidence of a relationship between parental scaffolding behaviour and a child's general or specific cognitive abilities are persuasive, while the literature associating scaffolding with children's development of emotional or social abilities is more limited. This gap in the research literature could potentially be explained through the understanding that, as scaffolding is a learning process, the immediate outcomes typically involve the child's cognitive abilities. However, the emotional and social capabilities of the child are less likely to be under the light of investigation because they are seen to be indirectly related to the process of problem-solving.

Despite this assumption, there are studies that have identified scaffolding as an influential factor in the promotion of social and emotional domains of the child (Landry et al., 2012; Neitzel & Stright, 2003; Rheingold, 1982; Vandell & Wilson, 1987).

Stright and colleagues (2001) discovered that parents' emotional support during scaffolding interactions impacted their children's metacognitive talk and monitoring in their third-grade classrooms. Children were more likely to express their thinking in the classroom if their parents were more encouraging and expressed positive attitudes about their child's abilities to resolve difficult tasks. Furthermore, the following study by Neitzel and Stright (2003) tested links between a mother's scaffolding behaviour and their children's academic self-regulation. It was established that mothers who used more sophisticated metacognitive content helped their child to improve metacognitive talk, monitoring, and help-seeking.

In addition, Hoffman and colleagues (2006) assessed a group of 208 mother-child dyads and established that mothers who used less effective scaffolding strategies were more likely to have children with lower emotional and behavioural competence. Similarly, Fagot and Gauvain (1997) identified that children who display dysregulating behaviour, such as frustration, were exposed to more ambivalent support from parents during problem-solving interactions with a high amount of both positive support and disapproval in relation to the child's task performance.

Also, several studies demonstrated the valuable contribution of maternal scaffolding to the formation of language and social understanding (Carpendale & Lewis, 2004; Leve & Fagot, 1997; Vandell & Wilson, 1987). In particular, Carpendale and Lewis (2004) theorised that children's social understanding, characterised by theory of mind, could be scaffolded by a parent. A child's understanding of other's mental perspectives could be nurtured through social interactions in which they are exposed to conversation about mental states thus supporting a developing understanding that people have different thoughts, beliefs and feelings.

Furthermore, while observing unstructured activities, Leve and Fagot (1997) identified a relationship between positive interactions in the parent-child dyad and positive peer relationships later in life. However, this was the case only for boys, and so the authors suggested possible gender differences in how maternal warmth and scaffolding behaviour may affect children.

Finally, Pettygrove and colleagues (2013) provided evidence which suggests that contingent scaffolding strategies are related to children's prosocial behaviour and self-regulation abilities. They observed 63 parents with their toddlers (aged 18 and 30-month) undertaking a range of interactive tasks together including instrumental and empathic helping and sharing tasks. Their results suggest that parental socialisation techniques (for example, scaffolding, praise, reasoning, negotiation) are linked to children's pro-social behaviour. Specifically, they identified that when children were 30-months old, parental scaffolding techniques positively correlated with children's spontaneous empathic helping behaviour. Other studies have also evidenced a link between parental scaffolding and children's helping behaviour (Rheingold, 1982; Svetlova et al., 2010).

Landry and colleagues (Landry et al., 1997, 2001, 2006) have conducted a series of studies examining children's social-emotional skills. These studies show the impact that maternal emotional responsiveness and warmth have on children's social-emotional development in the early years as well as predicting social competence in later childhood. The results led to the formation of an intervention program (Landry et al., 2012) which was intended to adjust the responsive behaviour of mothers with preschool age children. The findings suggest that it was maternal responsiveness to the child exhibited in daily interaction, not specifically during the intervention, which predicted a higher level of engagement from the child and use of more sophisticated language during shared book reading. The findings indicate that by encouraging maternal responsiveness, children's social skills may be enhanced.

The studies presented above have a number of limitations. For example, sample populations typically tend to be middle-class families with a high level of education. In addition, all studies were conducted in Western countries with the majority of them taking place in the USA, Canada or the UK. However, the evidence of the beneficial nature of scaffolding behaviour is substantial and comprehensive.

The importance of parental scaffolding behaviour is evident to child's cognitive, emotional and social abilities. It is less clear what specific processes, individual differences or contextual factors facilitate successful learning at home during mother-child interactions. Therefore, it seems particularly necessary to supplement the concept of successful parental scaffolding behaviour with new knowledge.

2.6 The bidirectional nature of the scaffolding process

Within sociocultural theory (Vygotsky, 1930-1934/ 1978), interaction with a more knowledgeable other is emphasised as essential to a child's development. In addition, according to Vygotsky (1930-1934/ 1978), the child, or less-knowledgeable partner, plays an active role in this process through participation and internalisation. The child's involvement in the learning interaction is crucial and involves the ability to analyse, reflect and reorganise their current knowledge which is a process achieved through active participation (Forman & McPhail, 1993; Lave & Wenger, 1991).

Although the term 'scaffolding' has its theoretical roots in sociocultural theory, most approaches to defining scaffolding behaviour have primarily focused on the investigation of the mother's tutoring behaviour. Studies have rarely accounted for the child's input and effort during the interaction and the importance of the parent-child partnership (Mascolo, 2005; Van de Pol, Volman, Beishuizen, 2010). Often the child's involvement is represented only by a measure of the child's success during the parent-child scaffolding interaction, which in turn, is indicative of the effectiveness of the mother as scaffolder. A vast amount of empirical research in this field emphasises the parent's role in problem-solving often to the exclusion of the child as an active participant. As a result, the bidirectional and dynamic nature of the scaffolding process is often overlooked in empirical studies (Stone, 1993), even though there is a plethora of theoretical work which assumes the child as an active participant (Elbers, 1996; Forman & McPhail, 1993; Griffin & Cole, 1984; Palincsar, 1986; Rommetveit, 1985; Rogoff, 1990; Wertsch, 1985).

Wertsch, McNamee, McLane and Budwig (1980) argued that the mother and child share responsibility within the interaction and together develop strategies to accomplish the interactional task. In support of this, Mercer and Littleton (2007) outlined that the child, as the learner, effectively becomes responsible for their own learning, thereby taking over from the scaffolder. Furthermore, while the mother provides the scaffolding, the child needs to be receptive of such support (Litowitz, 1997). Mascolo (2005) proposed a more coactive nature for scaffolding in terms of the child's progress. Coactive scaffolding, according to Mascolo, 'refers to any process outside of an individual's direct control that functions to direct individual action toward novel or higher-order forms' (2005, p.185). Since Mascolo's (2005) work over ten years ago, the issue of how and in what way the child influences the scaffolding process has still not been addressed sufficiently in the empirical literature.

However, there have been a limited number of studies that recognise the contribution of the child. For example, the importance of the child's involvement was noted by Hammond and colleagues (2012) but yet again the child's contribution was lost in the measurement of scaffolding behaviour which focused exclusively on maternal support.

Also, Pianta and colleagues (1991) observed aspects of the child's behaviour including affection, negative affect, reliance on the parent's help, task orientation alongside maternal behaviours, and related these to children's behavioural adjustment and classroom competence. Findings suggested that the child behaviour during problem-solving interaction with a parent was a key predictor of their classroom behaviour. Although this research is not specifically focused on the interaction between parent and child behaviour during the scaffolding, it makes a significant contribution to the literature by highlighting the importance of examining the child's behaviour displayed during the problem-solving situations.

Notable contributions to this issue have been made by Deater-Deckard and colleagues (Deater-Deckard, 2000; Deater-Deckard & Petrill, 2004; Deater-Deckard, Pylas, Petrill, 1997). Through adaptation of mix-method, genetically sensitive designs, the authors analysed environmental factors and the child's behavioural adjustment (Deater-Deckard, 2000). Individually, both mothers' and children's behaviour were observed during the dyadic interaction and rated using the Parent-Child Interaction System (PARCHISY; Deater-Deckard et al., 1997). Higher negative affect, control and lower positive affect from the parent were associated with the child's difficult behaviour (i.e. represented by negative affect, noncompliance, low responsiveness to parent and low on task behaviour). Interestingly, the variance of a shared environment between twin participants played the role of mediator for observational data, and the child's genetic variance was a mediator for the same types of behaviour through self-reported data. Although this study was focused on the parent-child interaction in general, not on scaffolding interaction specifically, it did, however, account for and highlight the importance of the child's contribution to the parent-child interaction and laid the foundations for the current investigation.

The concept of bidirectionality is underpinned by an assumption that there is mutual influence and interdependent within a dyadic interaction (Belsky, 1984; Granott, 2005; Kochanska et al., 2010; Rogoff, 1990; Wood et al., 1976). There are various approaches and models used to address the bidirectional effect in child development (Bell, 1971; Belsky, 1984; Patterson, 1992; Sameroff & MacKenzie, 2003). For example, Sameroff's transactional model suggests the importance of the environment in the child's development (Sameroff, 2009), in particular, bidirectional cumulative effects of interactions with parents. Within the transactional model, the bidirectional relationship is understood as a reciprocal process where the behaviour of the child is interpreted by the parent, internalised and, in turn, impacts their reaction to it, resulting in a subsequent change to the emotional tone of the relationship (Sameroff & Mackenzie, 2003). Furthermore, the parent-child relationship is a continuous process, the dynamics of which start as soon as the child is born and the parent responds to their needs, and continues throughout childhood and beyond. Therefore, scaffolding as a specific behavioural process, needs to be understood within the context of the broader parent-child relationship.

Similar to bioecological theory (Bronfenbrenner & Morris, 2006), Sameroff emphasised that the quality of the bidirectional relationship between mother and child is more influential on a child's development than the personal characteristics of either parent or child (Sameroff, 1975; Sameroff & Mackenzie, 2003). However, while both models accentuate the importance of processes for the child's development and its bidirectional nature, the bioecological model is more extensive as it accounts for the impact of a wide range of personal, contextual and temporal factors on the child's development.

In conclusion, the amount of research in which only maternal scaffolding behaviour is measured illustrates that the role of the child in the scaffolding process tends to be underplayed. Although this appears to be the case in the empirical literature there is much theoretical work that assume the active role of the child. Although empirical studies that include the child's contribution are very limited, the ones that do exist (Pianta & Harbers, 1996; Pianta et al., 1991) have helped to identify key behavioural dimensions which are important to consider, such as reliance on a parent's help, positive and negative affect, noncompliance, autonomy and on task behaviour. What remains unclear is how the mother's and child's behaviour interact during a problem-solving context and which of the behavioural dimensions identified become inter-related during the interaction. The current study aims to investigate the reciprocal influences between behavioural dimensions of parent and child.

2.7 The role of intersubjectivity

Sameroff and Fiese (2000) highlighted the importance of bidirectional influences in early childhood as this period is characterised by fast development and change. Parent-child interaction mediates developmental processes, according to a bioecological systems approach. Scaffolding has been discussed as interaction between mother and child whose behaviours, although influencing each other, remain independent and a feature of the individual. However, parent-child interactions could be explored through the lens of shared processes in order to understand the process of the child's learning at another level. During joint task accomplishment both child and parent experience common interest, motivation and an understanding of the task. This mutual quality of the interaction can be understood as intersubjectivity (Rogoff, 1990).

Intersubjectivity refers to the ability of two collaborating partners to gain an understanding of one another and have shared views on the problem they are solving and its potential solutions. By adopting the main principles of sociocultural theory, Rogoff (1990) noted that intersubjectivity is critical for children's development and that mutual understanding with a parent begins to develop during the social exchanges of pre-verbal children and rapidly becomes more advanced with the development of language.

In addition, there is a large body of research which indicates that the foundation of parent-child relationships is based on dyadic mutuality including the establishment and maintenance of emotional warmth, responsiveness, shared understanding and, as a result, cooperation between parent and child (Deater-Deckard & Petrill, 2004; Harrist & Waugh, 2002; Kim & Kochanska, 2012; Kochanska, 2002). For example, the study conducted by Deater-Deckard and Petrill (2004) shows the importance of dyadic mutuality in relation to children's behavioural adjustment. This research examined 241 adoptive families with

396 children in USA (244 children were genetically unrelated siblings) during joint involvement in a picture drawing task and a tilting maze puzzle. The dyadic mutuality score was rated on a 7-point Likert scale and consisted of individual scores for both parent and child responsiveness, dyadic cooperation and dyadic reciprocity/joint attention. The responsive behaviour was judged by how instant and contingent the behaviour was displayed in response to each another's actions. The cooperation dimension was assessed as an agreement of tactics and strategies that would lead to accomplishing the task. Finally, reciprocity was represented through the demonstration of positive affect, shared gazes and communication. The results suggested an association between lower level of dyadic mutuality and challenging aspects of children's behaviour such as aggression and non-compliance.

Mulvaney and colleagues (2006) defined the scaffolding process by individual characteristics of both the mother and child, as well as the dynamic of their relationship. The authors conceptually distinguished between three dyadic dimensions of effective scaffolding. Firstly, a high level of attention in joint activity for both child and parent. Secondly, the importance of the contingent shift principle. And finally, a shared understanding of the task so that transfer of responsibility became possible. In this study mother-child dyads (N=92) were observed while they completed origami figures and the score for scaffolding interactions was comprised of three dyadic dimensions: attention maintenance, appropriate challenge and intersubjectivity. The results showed that maternal verbal intelligence and the child's previous cognitive ability predicted the effectiveness of the scaffolding. Shared sensitivity in the mother-child pair in earlier interactions (in infancy and toddlerhood) was also a predictor of successful scaffolding when the child reached the appropriate age for first grade.

Both studies are an illustration of the significance of reciprocal or shared understanding between partners in order to succeed in problem-solving situations. Furthermore, Wertsch (1984) suggested that to transfer regulatory responsibility of the task to the child, the child and partner must come to a shared understanding of the task and be able to understand how the partner views the task. Language is the primary mechanism through which this shared understanding is conveyed (Callaghan & Rankin, 2002).

While participating in the scaffolding process, both the mother and the child are responsible for the development of mutual understanding or intersubjectivity as an integrated social system (Wertsch et al., 1980). For any learning to be achieved, it is acknowledged that there must be an unspoken agreement and motivation between participants: for the beginner to learn from the expert and for the expert to teach the beginner (Litowitz, 1997; Rochat et al., 2009).

Rommetveit (1985) defined intersubjectivity as a shared situation which can be viewed in the same way by both participants through the process of cooperation. However, in the case of problem-solving situations, the dyad is unequal as the mother has to guide the interaction, thereby assuming more of the responsibility in order to achieve a level of mutual understanding (Vygotsky, 1930-1934/ 1978).

Miller (2005) stated the importance of the exploration of shared understanding as a future direction in scaffolding research. Similar to the issue of bidirectional nature, the role of intersubjectivity has not been thoroughly examined in the scaffolding interaction. The importance of intersubjectivity is primarily recognised through field work such as intervention of scaffolding within a school environment (Palincsar & Brown, 1985; Vacca, 2008). However, this research has focused on the intersubjectivity between tutor and student. For this reason, scaffolding in the school environment does not give a true reflection of the interaction between mother and child. Other theorists have emphasised the importance of a shared understanding, during learning at home, between parent and child (Granott 2005; Mulvaney et al., 2006; Palincsar, 1998; Puntambekar & Hübscher, 2005). Therefore, intersubjectivity is particularly interesting in order to develop an understanding of the inter-relationship occurring during scaffolding interactions and so was included in the current investigation.

To sum up, in the sociocultural theory, aspects of intersubjectivity in the parent-child interaction is essential for the child's development (Rogoff, 1990; Van Lier, 1996; Vygotsky, 1930-1934/ 1978). Moreover, the findings discussed in this subchapter (Deater-Deckard & Petrill, 2004; Mulvaney et al., 2006) suggest the importance of a mutual understanding between the mother and her child during collaborative problem-solving. However, the mechanisms of the interrelationship between the mother and child's behaviour during joint task accomplishment are still unclear, in particular relating to children's learning at home. Therefore, it is essential to more thoroughly investigate the bidirectional relationship between the mother and child's behaviour during scaffolding interactions. Moreover, it is critical to explore which of the participants' behavioural dimensions lead to mutual understanding, specifically dyadic intersubjectivity.

CHAPTER 3. INDIVIDUAL VARIATIONS IN SCAFFOLDING BEHAVIOUR

The current chapter is a continuation of the literature review, exploring the potential prerequisites of maternal scaffolding behaviour by addressing the person characteristics of mother and child, as well as the contextual factors which may come to bear on the individual differences observed in behaviour during joint learning interactions. Finally, maternal scaffolding behaviour is discussed as a culturally-specific practice.

3.1 Maternal person characteristics

Miller (2005) highlighted that the individual differences of the scaffolder are likely to contribute to the tutoring interaction and the learning process in general. In recent years, a large body of research has identified a variety of maternal characteristics that are associated with successful scaffolding strategies (Bigelow et al., 2010; Carr & Pike, 2012; Lowe, Erickson, MacLean, Schrader, & Fuller, 2013; Mermelshtine & Barnes, 2016). Along with 'demand characteristics' (for example, age and education), a number of 'resource characteristics', such as *person traits*, were recognised as significant for the collaborative learning process, for example, cognitive and emotional abilities. In this subchapter, the primary focus is on the maternal resource characteristics. The demand characteristics are closely related to the context, in particular, the microsystem, in which the process of scaffolding takes place and so is explored later in the literature review (see Subchapter 3.3).

There is a substantial amount of research that positively associates maternal cognitive abilities, in particular, verbal intelligence, with effective tutoring techniques (e.g. Mulvaney et al., 2006). Moreover, the level of maternal education is often used as a substitute for cognitive capabilities, and an association between the level of education and scaffolding strategies has also been established (Carr & Pike, 2012; Lowe et al., 2013; Neitzel & Stright, 2004).

Another body of evidence stated the importance of the links between the aspects of parenting behaviour relevant to joint problem-solving and the traits of the parent's personality (McCabe, 2014; Prinzie, Stams, Dekovic, Reijntjes, & Belsky, 2009). Meta-analysis of 30 studies conducted by Prinzie and colleagues (2009) tested the links between the Big Five personality factors and the three dimensions of parenting (warmth, behavioural control, and autonomy support). A higher level of behavioural control and warmth was linked with higher levels of extraversion, agreeableness, conscientiousness, and openness and lower level of neuroticism. Additionally, it was revealed that higher autonomy support by parents was associated with a lower level of neuroticism and higher agreeableness. Parental warmth, behavioural control, and autonomy support are essential elements of the scaffolding behaviour. Thus, the results revealed by Prinzie and colleagues (2009) could be suggestive that maternal tutoring behaviour, to some extent, might be explained by factors of their personality.

Hargreaves (2000) argues that teaching is a complex process, in which 'emotion, cognition and action, in fact, are integrally connected' (p. 812). In line with this statement, there has been research focused on the socio-emotional abilities of the mother and their relationship with the process of learning at home, in particular, emotional availability and sensitivity (Biringen, 2000; Sorariutta, Hannula-Sormunen, Silvén, 2017). For example, maternal sensitivity plays a crucial role in the infant's developmental process (Ainsworth, Blehar, Waters, & Wall, 1978; Bernier et al., 2010) and was found to be positively related to successful tutoring interactions (Van der Veer & Van Ijzendoorn, 1988).

Bigelow and colleagues (2010) observed interactions between infants (N=38) and their mothers across three time-points when children were aged four months, 15 months and two-and-a-half years. The results showed that the level of maternal sensitivity to the child for both aspects (cognitive and emotional) had remained consistent across each time point. The emotional aspect, examined through maternal responsiveness, was associated with the level of affection and enjoyment during collaborative play during the initial assessment with 15 months old children. In addition, the cognitive aspect of maternal sensitivity, demonstrated through the appropriate verbal instructions of the mother, was associated with the quality of the scaffolding process. Furthermore, a link between a child's attachment security and maternal vocal contingency was observed during the interactions when children were two-and-a-half years. However, both aspects of maternal sensitivity did not significantly relate to each other, which suggests they are independent mechanisms.

Often, the construct of maternal sensitivity is considered as fundamental for secure attachment (Ainsworth et al., 1978), although this relationship has not been consistently established (DeWolff & van Ijzendoorn, 1997). It was hypothesised that the mothers' ability to understand and engage with their children at the appropriate level for the child's mental ability is crucial for the development of a secure attachment (Bigelow et al., 2010; Fonagy & Target, 1997; Meins, 1997; Meins, Fernyhough, Fradley, & Tuckey, 2001). In turn, mothers who can establish a secure attachment with their children are more likely to choose appropriate scaffolding strategies (e.g. Meins, 1997; Moss, Parent, Gosselin, & Dumont, 1993). Kafetsios (2004) identified a link between secure attachment and emotional intelligence among adults. Positive relationships were established between secure attachment and facilitation, understanding and management aspects of emotional intelligence abilities.

There is a gap in the literature around the role that emotional intelligence plays in maternal scaffolding behaviour and how significant it is for the process of tutoring. However, it was identified that the maternal ability to understand and respond appropriately to the child was linked to the mother's emotional intelligence (Kafetsios, 2004). These findings may be a 'bedrock' for the assumption that the level of emotional intelligence of the scaffolder could be significant in the process of tutoring.

Initially, the term 'intelligence' was associated only with cognitive abilities, but in the 1980s, the concept of intelligence was reconsidered. Gardner (1983) introduced the model of multiple intelligences with eight domains in which, alongside cognitive-based domains, two were emotion-based, specifically interpersonal (understanding of other emotions) and intra-personal (understanding of one's own emotions) intelligence. Later, Gardner's conceptual ideas were redeveloped and introduced as a new, single construct of 'emotional intelligence' (EI) by Salovey and Mayer known as the 'ability model' (1990). Essentially, emotional intelligence is the ability to recognise, express, comprehend and manage emotions in oneself and others.

Petrides and Furnham (2001) argued that there is confusion in the measurement of *actual abilities* of EI. Multiple measurement approaches have been used including self-reports (e.g. Schutte et al., 1998) and performance-based tasks (Mayer, Caruso, & Salovey, 1999), which are both intended to measure the same concept of emotional intelligence. However, these different approaches have produced different results despite them both attempting to measure the same construct. Therefore, Petrides and Furnham (2001) recommended that there should be a distinction between emotional intelligence *abilities* and *traits* with each being measured differently resulting in the 'trait model'. While the assessment of *traits* of emotional intelligence could be achieved through reports based on self-perception, actual abilities would be recorded through maximum-performance tasks. The authors provided a model with a clear definition, supported by stronger psychometrical tool and achieving higher predictive validity (Newman, Joseph & MacCann, 2010).

The literature supporting a possible relationship between parental scaffolding behaviour and emotional intelligence is limited. A significant number of studies in this area have explored the negative effects of consequences of emotional dysfunction such as depression, parenting stress, emotional instability and harsh parenting on the child's development and the scaffolding process (Egeland, Kalkoske, Gottesman, & Erickson, 1990, Field et al., 1985; Frankel, Lindahl, & Harmon, 1992; Hoffman et al., 2006). Kochanska, Clark and Goldman (1997) illustrated an example of this when they found that there was an overall heightened negative affect and lack of warmth displayed towards children of mothers who had self-reported as neurotic, disagreeable or possessing negative emotions. In turn, this had an impact on the negative emotions of their pre-school children.

While there is, no literature specifying EI as a meaningful contributor to parental tutoring abilities, there are a few studies that investigated the role of teachers' EI. The results demonstrating the importance of the emotional capabilities of teachers in relation to their performance is also mixed. By conducting meta-analyses across 119 studies, Cornelius-White (2007) established an extensive variability in the relationship between teachers' emotional characteristics (i.e. empathy, non-directivity, warmth) and their educational productivity. The scale of effect on these relationships ranged from moderate to strong with the exception of teacher genuineness, which had an overall smaller effect. These findings suggest the importance of teacher's emotional capabilities on their performance and are relevant to the current study as similar tutoring techniques are most likely applied by parents during learning at home interactions.

Furthermore, similar parental emotional characteristics (i.e. warmth and agreeableness) have also been associated with scaffolding performance (Bradley et al., 1997; Carr & Pike, 2012; Pomerantz et al., 2005). For example, Pomerantz, Wang and Ng (2005) examined the emotional support from mothers in relation to the assistance they provided during joint homework completion with their children (aged between eight and twelve-years-old). Maternal positivity during the learning process with their children promoted the child's academic-related capabilities such as motivation and emotional functioning.

Additionally, it has been established that some emotional characteristics possessed by parents or teachers can positively influence the learning experience. It is less clear if emotional intelligence, as a global concept of emotional traits, could be significant for the process of learning and specifically maternal scaffolding behaviour.

There is one aspect of emotional intelligence which requires separate attention and has been overlooked by the majority of research in the area of parental scaffolding: parental emotional regulation. This concept is described as the capability of parents to manage and communicate their own emotions in the context of caregiving (Gross, 1998; Gross & Thompson, 2007). Its function is to enable appropriate responsive behaviour regardless of the child's emotional state (Thompson, 1994).

Emotional regulation becomes vital in a disorganised, chaotic home environment (Valiente, Lemery-Chalfant, & Reiser, 2007). For example, during the joint learning interaction, the child might display negative affect or noncompliance, which could lead to parental agitation, yet would require the regulating ability of the parent to assist the effective learning process.

There are at least two indirect pieces of evidence that point to the importance of examining parental emotional regulation in relation to scaffolding behaviour. Firstly, Raikes and Thompson (2006) identified that maternal responsiveness might influence emotion regulation in both mother and child in addition to providing an opportunity for the child to increase their knowledge about their own and their mother's emotions. Additionally, Gottman and colleagues (Gottman, Katz, & Hooven, 1996; Gottman & DeClaire, 1997) discussed that more responsive parents exhibit certain types of positive parenting (e.g. warmth) and emotional attitudes that contribute to the process of developing emotional regulation within children. While there is a relationship between maternal emotional regulation and responsive behaviour, which was also linked with parental tutoring abilities, as discussed earlier (Bigelow et al., 2010), it is likely that the regulatory process plays an essential role in the learning process between the mother and her child.

Secondly, emotion regulation of the parent has been associated with the child's regulatory abilities (Bariola, Hughes, & Gullone, 2012; Silk, Shaw, Skuban, Oland, & Kovacs, 2006; Zeman, Cassano, Perry-Parrish, & Stegall, 2006). By observing the parent's behaviour during critical situations, children may learn to adopt these regulatory patterns. For example, Bariola and colleagues (2012) provided evidence that mothers who utilised suppression as an emotion regulation strategy had children who copied that technique. Further, Morris, Silk, Steinberg, Myers, & Robinson (2007) suggested a tripartite model of familial impact on the child's emotion regulation, in which three levels of parental influences were noted. First of all, it involved direct observation, modelling and applying the regulatory strategies used within the household. Next, it required the use of parenting practices in relation to emotion or its management (positive/negative affect, warm/authoritarian parenting). Finally, the model suggests that general emotional climate at home (secure attachment, marital relationship) might contribute to the development of the child's emotional regulation.

The child's emotional regulation is consistently linked with academic achievement and behavioural adjustment (Graziano et al., 2007; Gumora & Arsenio, 2002). The evidence that parental emotional regulation is a significant contributor to the development of the child's emotional regulation is also substantial (Bariola et al., 2012; Bridges, Denham, Ganiban, 2004). Perhaps both mother's and child's emotional regulation may contribute to the process of scaffolding interaction, which is subsequently related to the child's academic achievement and behavioural adjustment. Thus, the current research included the abilities of both the mother's and child's emotional regulation in the investigation of successful scaffolding-related behaviours.

Another aspect that is closely related to parental emotional regulation is the parent's mentalising capabilities. A small sample of mothers (N=21) were asked to soothe a life-like baby simulator that was crying for a set period (Rutherford, Goldberg, Luyten, Bridgett, & Mayes, 2013). Those mothers who demonstrated more interest in the baby's mental states (reflective functioning) were more persistent in soothing the infant substitute. Rutherford and colleagues concluded that parental tolerance to stress is related to the process of reflective functioning in the process of parenting.

Moreover, there is an extensive amount of research that emphasises the importance of parental use of mental states in day-to-day talk with their children and its role in the development of the child's emotional and general cognitive abilities (Baptista et al., 2017; Dunn, Brown & Beardsall, 1991; Ruffman, Perner & Parkin, 1999; Ruffman, Slade & Crowe, 2002). Parental mental state talk refers to the states of the parent, child or different people in relation to emotions, desire or cognition during a conversation with a child. For example, the seminal work by Dunn and colleagues (1991) identified that extensive use of mental state talk with a toddler led to the child's ability to identify emotions later in life. Through the observations of 41 families with 36-month old children, authors examined the role of parent-child conversation about feelings and its impact on children's emotion recognition (happiness, anger, anxiety and sadness) when the children were six-years-old. Children's success in the identification of emotions was irrelevant to the children's general verbal abilities or amount of conversations at home, but it was linked with the quality of parent-child talks, specifically, conversations about thoughts and feelings.

Furthermore, a recent study by Baptista and colleagues (2017) identified the relationship between parental use of mental states in their speech and children's executive function. The research, which took place in Portugal, longitudinally examined 72 children aged four-years-old during tasks including reading a picture book with their parents. The maternal mental state talk measured at the first time point significantly predicted the level of the child's EF at the second point which was measured approximately ten months later. However, a predictive relationship was valid for only one aspect of EF – set-shifting (i.e. the competency to flexibly shift the focus of cognitive skills and to adjust behaviour accordingly), while the use of mental states among fathers had no significant influence at all.

Also, worth noting is that Ruffman and colleagues (2002) demonstrated that maternal use of mental state talk significantly impacted the child's social understanding, specifically their theory of mind. Similar consistent results were gained across different cultures, different ages of children and various tasks that measured maternal mental state talk (e.g. Ensor, Devine, Marks, & Hughes, 2014; Symons, Peterson, Slaughter, Roche, & Doyle, 2005; Turnbull, Carpendale, & Racine, 2008).

The identified links between maternal mental state talk and the child's development of cognitive and social abilities suggest that the use of mental state utterances could also be a prerequisite for parental tutoring behaviour and was included in the current research. Furthermore, a large body of research noted that the concept of mind-mindedness, which has a theoretical overlap with mental state talk, was established as significant in relation to children's learning. Meins (1997) defined 'mind-mindedness' as the extent of an adult's understanding that children have emotions, desires and self-perceptions, which are intended; children are not just physical entities.

In support of this concept, a study conducted by Degotardi and Sweller (2012) illustrated an association between mind-mindedness and aspects of tutoring behaviour (sensitivity and stimulation). The research engaged 24 early childhood practitioners, who worked with infants aged 9-20 months. The results showed further evidence that both mind-minded descriptions and mind-minded talk were significantly linked with the practitioners' tutoring-like behaviour during free play.

Moreover, evidence linking mind-mindedness to teaching behaviours was proposed by Ereky-Stevens (2008) when she identified that mind-minded mothers with a higher level of mind-minded talk were able to manage training at the correct speed. Through this management of speed, the mothers maintained their children's interest, prompting the level of support required for further engagement in the task. This finding suggests that the skill to scaffold a child's learning is dependent on the adult's ability to engage with the child at the appropriate cognitive level.

In summary, the analyses of literature revealed some maternal person characteristics (for example, education, sensitivity/responsiveness, mind-mindedness), which are proven to be related to the parental tutoring behaviour displayed during learning at home interactions with children (Bernier et al., 2010; Carr & Pike, 2012; Degotardi & Sweller, 2012; Pomerantz et al., 2005). However, there is a limited understanding of patterns between other socio-emotional abilities of the mother and the dimensions of behaviour displayed during scaffolding interactions. The analyses of the importance of teacher's EI and their performance (Corcoran & Tormey, 2013; Cornelius-White, 2007) had mixed results, but there could be an indirect link, suggesting the potential effect of maternal EI and use of scaffolding techniques. Moreover, the conceptual similarity between maternal mind-mindedness and mental state talk could imply that there is a relationship between mental state talk from the mother and her performance during collaborative problem-solving with the child. While these links are unclear, an examination of them could potentially contribute to the existing knowledge about the prerequisites of successful scaffolding.

3.2 Child person characteristics

As a central purpose of the scaffolding process is the development of the child, it is typical for the child's abilities and their capacity to learn is a focal part of any research related to this topic. For the child to fully and meaningfully participate in problem-solving situations, they need to have an appropriate level of ability (Vygotsky, 1930-1934/ 1978; Wood et al. 1976). Mulvaney and colleagues (2006) demonstrated the positive effect of children's cognitive capabilities, measured at 15 and 24 months, on the quality of the scaffolding interaction observed when children were in the first grade. Similarly, the significant relationship between children's verbal mental age (VMA) and maternal contingent behaviour was shown in a study by Carr and Pike (2012). The findings suggested that children's VMA positively predicted maternal use of appropriate scaffolding techniques and therefore, it was included in this study.

To some extent, the process is a reciprocal loop, as successful scaffolding is partly explained by the child's cognitive abilities (Carr & Pike, 2012; Mulvaney et al., 2006) which, in turn, has an impact on the child's cognitive abilities (Bernier et al., 2010; Hammond et al., 2012; Hughes & Ensor, 2009; Landry et al., 2002; Lowe et al., 2014). This phenomenon could perhaps be explained by the strong relationship between the cognitive abilities of both the mother and the child (e.g., Coon, Fulker, DeFries, &

Plomin, 1990).

In recent years, along with cognitive capabilities, the concept of theory of mind has been considered as crucial for the learning process (Hughes & Devine, 2015). Theory of Mind (ToM) is defined as an ability to identify one's own mental states (knowledge, beliefs, attitudes), the mental states of different people and moreover, to comprehend that others have different mental states to one's own (Baron-Cohen, 1991). ToM develops in early childhood and continues to advance with age (Hughes, Lecce, & Wilson, 2007; Sterck & Begeer, 2010).

One of the most important elements of ToM is the ability to understand a false belief, specifically, to comprehend that individuals may hold particular beliefs that are not shared by themselves and may even differ from genuine events. The ability to attribute false beliefs to others occurs between the ages of four and five-years-old (Wellman, 2012). By the age of five-years-old, children can make clear distinctions between cause and effect which increases their understanding of actual events. Their level of understanding has developed to such a stage that they can now recognise that a positive outcome is not always a direct result of a specific action. They also understand that an unfavourable outcome can result following an unintended or failed activity (Astington & Lee, 1991; Joseph & Tager-Flusberg, 1999; Schult, 2002).

Although there has been significant interest in the concept of ToM, the role that it plays in the scaffolding process is currently unclear as little work has directly explored this relationship. There is number of studies that consistently, both longitudinally and cross-culturally, associate child's ToM with executive function (Carlson, Claxton, & Moses, 2015; Carlson, Mandell, & Williams 2004; Hughes & Ensor, 2005, 2007; Wang et al., 2016). There is also evidence to suggest that scaffolding is a significant predictor of children's EF as cited earlier in the Subchapter 2.5 (Bernier et al., 2010; Hammond et al., 2012; Hughes & Ensor, 2009; Landry et al., 2002; Lowe et al., 2014). Thus, it is important to investigate the potential links between ToM and aspects of maternal scaffolding behaviour as it helps to understand more precisely the nature of learning at home and any impact of the child's individual differences on this process.

A study conducted in Spain of parents and their five-year-old children assessed the quality of scaffolding interactions in relation to the child's ToM (Galende et al., 2012). Children were asked to complete a number of ToM and problem-solving tasks (puzzles and pronunciation of tongue twisters) with the assistance of their parents. Scaffolding was measured through the following aspects: contingent strategies, cognitive support, promotion of independence and de-contextualisation. The results suggested that higher quality scaffolding predicted a better ToM. Although this study demonstrated only a one-way relationship between scaffolding and ToM, it does provide grounds for further investigation of children's ToM as a contributor to the scaffolding process.

Furthermore, the scaffolding process has also been used to improve children's ToM abilities. For example, adopting a Vygotskian approach, Sipe (2008) theorised that teachers used scaffolding during shared book-reading to promote children's understanding. The role undertaken by teachers was to scaffold the child's understanding of the story, the development of the character and provide assistance to the child to reflect on their previous personal experience. Through these actions, the teachers could accommodate the children with a framework which defined meaning within the stories, stimulated various interpretations, and thereby prompted cognitive development.

Ziv, Solomon, Strauss and Frye (2016) examined the relation between children's ToM and their understanding of teaching. In the study, 75 children, aged between three and five years, were assessed on their level of ToM and their understanding of teaching tasks during observed role play, where roles were defined as either teachers or learners. The younger children with a lower level of ToM tended to utilise basic teaching techniques such as demonstration, while children with a higher level of ToM used contingent strategies and provided more sophisticated cognitive instructions. While this study addressed the relationship between ToM and an understanding of teaching, it is still unclear whether ToM enhances children's ability for learning.

The established relationship between ToM and EF of the child, and their relation to skills such as the ability to cooperate (Sally & Hill, 2006), suggests that there may be an association between the child's ToM and the mother's scaffolding behaviour. Examining this relationship may elucidate the extent to which the child's social understanding influences the dimensions of behaviour shown during collaborative problem-solving. Moreover, the investigation could specify which dimensions of the scaffolding process are influenced by the child's characteristics.

ToM is often referred to as 'mind reading' (Byrne, 1991) or 'social intelligence' (Baron-Cohen et al., 1999) and acts as an overarching 'umbrella' concept that includes various aspects such as emotion knowledge (i.e. understanding and recognition) and empathic abilities (Baron-Cohen, Wheelwright, Hill, Raste, & Plumb, 2001; Baron-Cohen & Wheelwright, 2004; Cutting & Dunn, 1999). The foundation of emotion knowledge is formed early in life but develops throughout childhood to incorporate advanced functions such as emotion understanding, management and adaptation (Izard, 1971). Emotion knowledge is utilised as a term to define concepts related to "emotion, assessment modalities and levels of complexity" (Trentacosta & Fine, 2010, p.1).

The importance of children's emotion knowledge was investigated by Izard and colleagues (2001) in relation to academic competence. The emotion knowledge was characterised by two domains – the ability to recognise emotion and the ability to label emotions. Children (N=72) from low-income families were assessed at the age of five and then again four years later to establish a predictive relationship between emotion knowledge, behavioural adjustment and academic comprehension. The results suggested that emotion knowledge is not only a predictor of academic competence but that it plays the role of mediator between the child's verbal abilities and their learning success. The authors (Izard et al., 2001) suggest that a lack of emotion knowledge could be damaging to the teacher-learner rapport and decrease the quality of the learning process. Similarly, the scaffolding process may also be affected by the child's inability to identify their mother's emotions.

Furthermore, a study conducted by Trentacosta and Izard (2007) highlighted that it is not only the child's abilities to recognise and identify emotions that are a significant contributor to their academic adjustment, but also how well the child can control and regulate them. Correctly reading the emotions of other people and predicting their reaction to a particular scenario enables the child to establish and modify relationships with teachers and peers (Izard et al., 2001). A crucial facet of regulating emotion is the child's ability to manage frustration, stress and negative emotional arousal (Cole, Martin, & Dennis, 2004) which is essential for successful participation in the learning process.

On the other hand, it has been shown that parental responsiveness during dyadic interaction with children is positively associated with higher levels of children's emotion knowledge (Merz et al., 2015). This finding suggests that through increased levels of responsiveness from the parents, children may be exposed to more interactions that demand emotion regulation, thereby providing children with the knowledge of how to utilise emotions to facilitate support (Raikes & Thompson, 2006).

A recent longitudinal study conducted by Norona and Baker (2017) examined the internal and external factors that impacted the ability of children to regulate emotions. Through the adaptation of the Calkins's model (1994), internal factors were defined as aspects of neuroregulatory mechanisms, specifically cognitive capabilities and behavioural attributes. The external factors were identified as aspects of the family microsystem such as parenting styles or scaffolding strategies. They observed scaffolding interaction within 151 families in their home environment and a laboratory setting. The sample included children with developmental delays and they were scored on three criteria (technical, motivational and emotional scaffolding). The authors suggested that the developmental status of the children was a significant predictor of dysregulating behaviour later in life. However, positive parental behaviour (sensitivity and relevant scaffolding) played a mediating role in this relationship.

Additionally, a study by Clark, Woodward, Horwood & Moor (2008) examined the emotional and behavioural regulation among preterm and full-term children at age two and four-years-old through a series of parental reports as well as structured play sessions with their parents. The results suggested that parental sensitivity and responsive strategies during joint interaction were significant predictors of regulatory capabilities. While both studies examined the relationship between parenting strategies, including scaffolding behaviour, and children's regulation abilities, neither of them focused on the possibility of a bidirectional effect, in particular, what role the children's regulatory capabilities may play during the joint interaction.

Given the bidirectional nature of the parent-child relationship (See Subchapter 2.6), it is not only the parent affecting the child; the child also influences the parent (Bell, 1968). If the behaviour of the child is perceived as challenging, this can result in a harsh and negative parenting style (Benzies, Harrison, & Magill-Evans, 2004; Deater-Deckard, 2005). If the child displays problem behaviours this affects the nature of the parental scaffolding and makes the tutoring process more complicated. Moreover, if the parent previously perceived the child as problematic, then the parent would treat the child as such and, by doing so, subsequently reduce the quality of the problem-solving interaction. At the moment, from existing literature, it is not apparent if and how a child's problematic behaviour affects the scaffolding process and thus, the current study included aspects of the child's behavioural adjustment in the investigation.

To conclude, it is evident that the socio-emotional abilities of the child are an essential part of the learning process because they are related to the establishment of strong social connections with peers, personal well-being, behavioural adjustment and academic achievements (e.g., Denham, 2006; Raver & Knitzer, 2002; Zins et al., 2007). The results of relevant research indirectly indicate that the child's cognitive abilities, social understanding, emotion knowledge and behavioural adjustment may be significant to the tutoring interactions between the mother and child during problem-solving situations, and could even determine aspects of maternal scaffolding behaviour.

3.3 Contextual characteristics

The bioecological model (Bronfenbrenner & Morris, 2006), also referred to as a Process-Person-Context-Time model, signifies that all four elements are essential for a child's development. Along with person characteristics previously discussed, within this bioecological model, it could be suggested that physical environment (*context*) is contributing, to a certain extent, to the process of the development, in particular, proximal processes such as scaffolding. In the ecological model (Bronfenbrenner, 1979) and later in the reworked version, bioecological model (Bronfenbrenner & Morris, 2006), four interconnected systems were discussed: microsystems, mesosystems, exosystems and macrosystems. The microsystem (for example, home, school, neighbourhood) is the closest to the child and to the interactions the child is involved in (Bronfenbrenner, 1979).

Moreover, the support of contextual factors is a central concept of socio-cultural theory, which presumes a child's cognitive ability develops from communication or collaboration with a more experienced person within a cultural context (Cole, 1985; Rogoff, 1990; Vygotsky, 1930-1934/ 1978). Cole (1985) understood that within a culture, the individual's social surroundings would be a prerequisite, not only for personal development but also an important factor in a child's cognitive development.

In support of Cole's notions, there is an extensive body of research which has demonstrated the importance of the individual's social surrounding, specifically the role of the neighbourhood in the child's development (Barnes, Belsky, Broomfield & Melhuish, 2006; Hart, Atkins, & Matsuba, 2008; Leventhal & Brooks-Gunn, 2000). The neighbourhood conditions indirectly impact the child's behavioural and educational outcome (Hart, Atkins, & Matsuba, 2008). For example, a wealthy neighbourhood was linked with the child's successful development (Leventhal & Brooks-Gunn, 2000). On the other hand, a large study conducted by Barnes and colleagues (2006) identified that neighbourhood deprivation and school disorder predicted lower academic achievement among the students from 1,777 primary schools in the most disadvantaged areas of England.

While the role of neighbourhoods is essential in a child's development, it is important to note, that the impact is indirect. Furthermore, a neighbourhood is a representation of the residents and their homes in the area. It might be more beneficial to concentrate on their home environment in relation to parental practices such as scaffolding. The family's home environment is a representation of the microsystem

(Bronfenbrenner & Morris, 2006), which indicates that the child's immediate contextual surroundings impact its development.

There is evidence that home environment and parental involvement impacts the child's school life from a very early age and predicts later academic achievement (Conner & Cross, 2003; Pratt et al., 1988; Swanson, Valiente, & Lemery-Chalfant, 2012; Wood & Middleton, 1975). Additionally, the absence of routine and family rituals are associated with children's behavioural adjustment and general well-being (Fiese et al., 2002; Fiese, 1992; Keltner, 1990).

Furthermore, there is a substantial amount of research that indicates the negative association between the number of siblings in the family and academic success (Downey, 1995, 2001; Kuo & Hauser, 1997; Steelman & Powell, 1989, 1993). Steelman, Powell, Werum & Carter (2002) highlighted that 'the larger the family, the greater the dilution of resources, and in turn the lower the educational progress of the child' (p. 251). In other words, as the mother has a finite amount of time to spend with each child, the more children she has, the lower the amount of direct attention each of them receives from her, which may, in turn, impact both the quantity and quality of scaffolding during the parent-child interaction. It is possible that limited time, or distractions by other children, could lead to the mother's use of less successful tutoring techniques. For example, during the problem-solving interactions with one of her children, the mother is likely to use more directive instructions, over-control and less contingent behaviour in order to complete the task faster and therefore, does not give the child an opportunity for independent, autonomous behaviour. In line with this assumption, Neitzel and Stright stated that 'scaffolding is the product of numerous attributes of the family' (2003, p.147). Therefore, it seemed important to include the number of siblings in the current research.

Matheny, Wachs, Ludwig, & Phillips (1995) proposed an overarching metaphorical term for such disorganisation in the home environment – 'household chaos'. The chaos is characterised by a daily deficiency of routine, over-crowdedness, noisiness and general confusion in the household (Matheny et al., 1995). While evidence of household chaos having a direct impact on the scaffolding process is limited, it was noted that parents are less attentive and responsive to their children when in noisy, unregulated, crowded homes (Wachs, 1993). Valiente and colleagues (2007) examined 188 American families with seven to twelve-year-old children. They revealed that parents who were able to control their emotions were more likely to react to a child's negative emotions positively. Furthermore, a high level of chaos predicted that parents would negatively respond to their children's emotional reactions which is particularly important as a significant part of maternal scaffolding behaviour is an emotional response to a child, specifically, management of the child's frustration.

Moreover, Deater-Deckard (2014) stated that a disruptive environment, with minimal structure and routine, negatively contributed to the child's development across many domains. There is also evidence associating household chaos with school achievement (Hanscombe, Haworth, Davis, Jaffee, & Plomin, 2011; Swanson et al., 2012). In particular, a number of studies have shown the detrimental effect of chaos on a child's cognitive development (Berry et al., 2016; Evans, Kliewer, & Martin, 1991; Hughes & Ensor, 2009; Petrill, Pike, Price, & Plomin, 2004) and behavioural adjustment (Coldwell et al, 2006; Dumas et al., 2005; Valiente et al., 2007). For example, Hughes and Ensor (2009) tested dimensions of scaffolding, maternal planning, positive and negative family characteristics as indicators of social influence that may impact children's EF. They showed that when measured in two-year-old children, scaffolding, household chaos and maternal planning explained 14% of the variance in children's EF when they reached the age of four.

As a part of an extensive twin study (the Twins Early Development Study), with a genetically sensitive methodology, Petrill and colleagues (2004) identified that both, household chaos and socio-economic status (SES), as a part of twins' shared environment, had a small but significant effect on children's cognitive abilities. Furthermore, in the debate about the relationship between socio-economic status and the level of household chaos, poverty is assumed as a prerequisite to disorganisation and irregularity at home (see: Evans, Eckenrode, & Marcynyszyn, 2009; Scarr, 2000). Currently, there is enough evidence that suggest that SES plays a separate or mediating role in the level of chaos and subsequently on the child's development (Deater-Deckard et al., 2009; Shelleby et al., 2014; Vernon-Feagans et al., 2012; Wachs, 2005; Wang, Deater-Deckard, Petrill, & Thompson, 2012). If so, in order to assess the family environment appropriately within the current investigation, in addition to household chaos, it was important to include the aspect of the family's SES.

Numerous studies show a relationship between the parent's level of income and education, single-parenting or larger number of existing siblings and a child's success in a school. Therefore, those children who were middle class or above, part of two-parent families, or where parents had a high level of education, would have a better chance to succeed in school (Astone & McLanahan, 1991; Sputa & Paulson, 1995). Also, various studies (Dauber & Epstein, 1993; Stevenson & Baker, 1987) demonstrate a relationship between maternal education and the level of parental involvement in the child's school life. Furthermore, the authors illustrated that there is an association between the level of parental involvement and a child's academic achievement. Nevertheless, there is no direct evidence in these studies that the level of maternal education affects the child's school success.

On the other hand, Sternberg (1994) argued that the quantity and quality of information parents provide to their children is positively related to parental SES. Deslandes, Potvin & Leclerc (1999) conducted cross-sectional research among 525 adolescents. The dataset represented the students' self-reports of family size and structure, level of education for both parents, parental style dimensions and parental involvement. The results of the study showed parental practices made a greater contribution to school achievement, and so were more beneficial for the child, compared to the characteristics of the family. Family structure and the level of parents' education were associated with school achievement but were also mediated by positive parental styles.

Furthermore, Vernon-Feagans and colleagues' (2008) study of 1,157 families in rural USA assessed factors relating to the complexity and output of maternal language to infant children during joint book reading. The research established that the parenting environment partially mediates the association between the level of SES and the quality of maternal language. Although this study did not precisely measure the constructs of household chaos and scaffolding as such, it did examine similar concepts and showed their importance in relation to the quality of mother-child interaction.

Moreover, the level of maternal education is also relevant to maternal scaffolding as there are numerous studies that identified a link between maternal education and contingent behaviour (Carr & Pike, 2012; Lowe et al., 2013; Neitzel & Stright, 2004). For instance, research by Neitzel and Stright (2004) underlined the importance of the parental level of education as this factor predicts more variation in academic achievement than any other SES factor. Seventy-three mother-child pairs were observed in four tasks (with varying level of difficulty), each of which involved problem-solving situations with a particular focus on the cognitive, emotional and autonomy-based support required from mothers. Most importantly, the study revealed a direct link between the maternal level of education and the use of a metacognitive strategy to share the information with the child. It also showed that mothers with a higher level of education were more likely to understand the child's needs, and so provided the correct approach for children with challenging types of temperament through the increase of support, engagement with the task and controlling the level of difficulty. Interestingly, conscientious mothers demonstrated an overly controlling pattern and, additionally, this type of mother was more likely to reject their children if they were perceived as a problematic type. Therefore, a positive trait such as conscientiousness could have a negative impact on the educational aspect of task solving situation in a mother-child dyad.

On the other hand, parental style and SES variables (for example, level of income, maternal education) are linked with successful maternal scaffolding as shown in several studies (Carr & Pike, 2012; Hart & Risley, 1995). For example, a longitudinal study of 96 mother-child dyads observed in a problem-solving situations, highlighted the relationship between effective maternal scaffolding and the mother's level of education. It was discovered that the parental style positively mediates the association between the level of maternal education and contingent scaffolding behaviour (Carr & Pike, 2012).

Furthermore, parenting stress is another relevant aspect of the home environment that is explored further. The level of parenting stress is a significant contributor to the home environment and consequently to the child's development. In the current study, the concept of parenting stress is understood as emotional pressure, anxiety or inability to cope with the issues related with parent-child interaction in day-to-day life (Abidin, 1990; Deater-Deckard, 2005). However, it is important to note that the amount of parental stress has been shown to be closely related to SES disadvantage. Due to the level of poverty, parents might experience high levels of stress that contribute to the quality of interactions with their children and their level of concern about the child (Perkins, Finegood, & Swain, 2013; Tomalski et al., 2017). The prerequisites of parental stress could relate not only to social factors such lower SES (Tomalski et al., 2017) or living in an unsafe neighbourhood (Abell, Clawson, Washington, Bost, & Vaughn, 1996), but also a family structure such as single parenthood or a large number of children (Fox, Platz, & Bentley, 1995). Furthermore, it was identified that parenting stress is related to inter- and intra-personal processes within the family. Specifically, maternal or child's mental health is strongly related to the level of parenting stress (Baker-Ericzen et al. 2005; Bögels, Hellemans, van Deursen, Römer, & van der Meulen, 2014). For example, due to increased demands on their time and stressful scenarios, parents of children with mental disorders may find it difficult to allocate time and attention to their own personal wellbeing (Baker-Ericzen et al. 2005). For that reason, the parent may be more self-critical as part of the parent-child interaction.

It is typical and adaptive for all parents to experience some level of stress (Crnic, Gaze, & Hoffman, 2005). However, a high level of stress is consistently negatively related to parenting jobs, attitudes and parenting behaviour in general as well as increased externalising behaviour (Crnic & Low, 2002; Deater-Deckard & Scarr, 1996; Smith, Oliver, & Innocenti, 2001), in particular, neglectful, controlling and less responsive behaviour is often displayed by stressful parents (Deater-Deckard & Scarr, 1996; Rousseau et al., 2013).

Crnic and Greenberg (1990) developed a similar idea to the concept of the parenting stress called 'parenting daily hassles'. The notion referred to the theorised view that there are minor events, such as frustrations, occurring on a daily basis or other annoyances that are associated with raising children, often due to behaviour deemed by the parent to be challenging. However, in the literature, it is in unusual to observe both constructs (parenting daily hassles and stress) in the same study. Often, the concept of parenting stress refers to the theoretical background of the problem, while parenting daily hassles are used as a measure of parenting stress (e.g. Clark et al., 2008; Gerstein & Poehlmann-Tynan, 2015).

Belsky (1984) argued that parenting is a process that is determined by assets of the parent, the child and the social context, in which they exist. So, it is assumed that parenting stress is an element of the parenting process, similarly, affected by parent, child and elements of family's social context (Baker et al., 2003; Lecavalier, Leone, & Wiltz, 2006; Neece, Green, & Baker, 2012; Yates, Obradović, & Egeland, 2010). Furthermore, Deater-Deckard (2005) stated that parenting stress is influenced by the quality of interaction with the child who, in turn, is being affected by the parent, and this is subsequently reflected through its problematic behaviour.

Another crucial study was conducted by Gerstein and Poehlmann-Tynan (2015). The authors examined a sample comprising of 173 mother-child dyads with pre-term children to establish a relationship between three elements measured in children at age six. The three elements investigated were the level of parenting stress, maternal-child behaviour (displayed during free play and clean-up task) and finally, the child's externalising behaviour. The results showed, similarly to the previous study, an association between the level of parenting stress, measured when the children were 24 months, and the child's externalising behaviour. Moreover, an insensitive maternal response to the child during free play interaction was a significant mediator. However, the study did not identify any contribution from the child's behaviour to maternal insensitivity or parenting stress.

Thus, the role of the child's behaviour in later parenting stress is not definitive. While studies discussed above argue that parenting stress can have a direct influence on a child's behavioural problems, the extent to which these two influences are reciprocal is still unclear. For example, the child's challenging behaviour causes parenting stress and then, in turn, the parent has a mental perception of their child as 'difficult', and so experiences more parenting stress which leads to even more difficult behaviour displayed by the child. Additionally, both studies measured the child's behaviour later in life through the mother's self-report and, as it was suggested earlier, it is possible that parents who experienced a high level of stress related to their children perceived them as more problematic. It is likely that these parents would use ineffective approaches and fewer contingent strategies during joint problem-solving situations. Also, the study by Gerstein & Poehlmann-Tynan (2015) made an attempt to investigate how parenting stress related to the mother's behaviour in the parent-child interaction. Although the study did not examine the concept of scaffolding, it provides grounding for further investigation into this relationship, but in relation to problem-solving behaviour.

As parenting stress is a child-related process, this concept has mostly been associated with research that was conducted among families that have children with ill-health (Baker, Blacher, Crnic & Edelbrock, 2002) or are disadvantaged such as pre-term children (Gerstein & Poehlmann-Tynan, 2015; Gray, Edwards, O'Callaghan, & Cuskelly, 2012; Spinelli, Poehlmann, & Bolt, 2013), and less often associated with typically developing children (Crnic et al., 2005). Various studies have examined associations between mothers' interactional style, parenting stress and children's behavioural adjustment later in life (Crnic et al., 2005; Feldman, Eidelman & Rotenberg, 2004; Gerstein & Poehlmann-Tynan, 2015; Spinelli et al., 2013). However, none of these examined scaffolding behaviour as a specific context for parent-child interaction in relation to the role of parenting stress. It is possible that parenting stress reduces the quantity and quality of joint problem-solving interactions, while calm parents would nurture their child's development through appropriate responses and contingent strategies. Thus, the inclusion of parenting stress was crucial for the current study.

Along with parenting stress, it was equally important to account for the contribution of maternal warmth and affection on maternal scaffolding behaviour. Darling and Steinberg (1993) stressed that the general emotional climate of the parent-child relationship determines the parents' behaviour and, moreover, the effect this climate has on the child's academic success (Simpkins, Weiss, McCartney, Kreider, & Dearing, 2006). Essentially, the impact of a positive relationship between mother and child may extend beyond the family unit. For example, Sameroff and Seifer (1983) suggested that positive parenting attitudes may mediate the relationship between parenting stress and a child's development through sensitive responsiveness during parent-child interactions.

Furthermore, parental responsiveness is particularly crucial for children with difficult temperaments as it can foster compliance and has also been linked with fewer externalising problems (Kochanska & Kim, 2013).

Maternal sensitivity plays a crucial role in the infant's developmental process according to attachment theory (Ainsworth et al., 1978). A study by Landry, Garner, Swank and Baldwin (1996) examined the relationship between maternal positive mind-sets and scaffolding strategies among mother-child dyads. The research established a positive, significant relationship between mothers' understanding of developmental processes, their warm attitudes about their child and their ability to maintain the child's attention during scaffolding interaction. Also, the authors showed that more sophisticated scaffolding strategies increased the complexity of infants' exploratory play.

The studies above demonstrate the importance of the emotional climate of the relationship between mother and child, which may be affected by adverse experiences and parenting stress but also by positive, affectionate relationships in which mother and child share mutual warmth, interests and activities.

In conclusion, this subchapter has explored the crucial contextual factors of the home environment such as household chaos, SES, parenting stress, and positive affect; each is an important contribution to the child's development. Children who live in dysregulated and disruptive environments may not be exposed to positive learning practices and so may struggle with their ability to concentrate, something that is necessary for the academic process. Therefore, there is a particular value in examining the extent to which these factors contribute to the specific context of parent-child problem solving interactions. A review of the literature has revealed that there are still gaps in this field that require further investigation. In particular, it was identified that the number of siblings a child has, and the general over-crowdedness of the home are related to children's academic success (Downey, 1995, 2001; Steelman et al., 2002). However, the mechanisms through which these factors influence the child are unclear. One plausible line of inquiry is to examine the impact of these broad contextual influences on the specific context of parent-child problem-solving interactions. Furthermore, while parenting stress and home environment (household chaos and SES) are linked to each other (Perkins et al., 2013; Tomalski et al., 2017) and both are linked with child's development (Crnic et al., 2005; Petrill et al., 2004), it is still not clear if any of these contextual factors are related to joint problem-solving processes.

3.4 The role of culture in learning at home

Bronfenbrenner's bioecological theory (Bronfenbrenner & Evans, 2000; Bronfenbrenner & Morris, 2006) also highlights the importance of cultural influences in the child's environment. Within the bioecological model, the context of child development is represented by a large number of social systems that influence the child and each other. Four groups of systems are presented in a nesting order, in particular, microsystems, mesosystems, exosystems and macrosystems (Bronfenbrenner & Morris, 2006; Tudge et al., 2009). Microsystems, mesosystems and exosystems are functioning within a single culture, while a macrosystem was described as the broadest level of influences and represented by cultural practices, values and beliefs.

The macrosystem effects are tested across time, and cultural change is reflected in practices, procedures, and activities, along with societal values and beliefs (Tudge, 2008). Cultural differences in the nature and role of scaffolding in children's learning varies according to specific cultural practices, strategies and values. For example, societies focused on agriculture have different priorities and values in relation to children's learning (Garborino, 1989) such as responsibilities to maintain the land, tending crops and livestock from a young age leaving little time for academic processes. In contrast, industrialised societies may include aspirations that are different and typically a higher level of interventional support is evident throughout childhood (Rogoff, Mistry, Goncu & Mosier, 1993; Vandermaas-Peeler, 2002). Therefore, while the bioecological theory (Bronfenbrenner & Morris, 2006) stipulates that family interactions are central for the child's development, it also recognises the broader cultural context and the role it plays in influencing daily life.

The concept of culture may be characterised as '…a way of life for a society, including the behaviours, values, ways of life, arts, beliefs and symbols that people of the society accept, generally without thinking about them, and that are passed along through communication and imitation from one generation to the next' (Nabuzoka, 2009, p.28). In other words, culture is a process involving the transition of rich cultural features and knowledge between and within generations. The combination of shared knowledge and meanings create a series of everyday routines that help to delineate one culture from another. Culture partly consists of a variety of behavioural patterns (e.g. parenting practices), which are accepted and confirmed by society.

However, Hinde (1987) argued that culture is a way for human practices and beliefs to be labelled to illustrate diversity and distinction between groups. Underpinned by this is a growing tradition of cross-cultural studies proliferated from the beginning to the middle of the last century, expanding the field of cultural psychology, which appeared primarily in the second half of the twentieth century (Bruner, 1990; Cole, 1990; Price-Williams, 1980; Shweder, 1990). Whereas the goal of cultural psychology is to describe the processes and mechanisms of a child's development in a single cultural context, cross-cultural psychology has the objective to explore the variations of factors that determine a child's development across various cultural groups. Also, this discipline attempts to introduce new ideas and test existing theories in different populations (Berry, Berry, Poortinga, Segall, & Dasen, 2002).

Vygotsky's sociocultural theory (1930-1934/ 1978) also holds central the importance of cultural influences on children's learning and argues that learning occurs through interaction and observation of more knowledgeable others within a specific cultural context. Further, he claimed that a child's development could not be examined in isolation from their environment but rather examined alongside the culture in which the child had grows (Shooshtari & Mir, 2014; Tharp & Gallimore, 1988).

Elaborating on the main principals of socio-cultural theory, Rogoff (1990, 1998, 2003) introduced the concept of guided participation, which explained the process of the child's development during participation in daily routines and tasks, guided by more knowledgeable members of culture directly or spontaneously. Through this participation, the child gains knowledge and skills fundamental to their society. In line with socio-cultural theory, the child's abilities are the core of the learning interaction during guided participation with adults or more confident peers.

The individual and their social influences are intrinsically linked (Daniels, 2005). While cultures may differ in their learning tools such as written/spoken language and counting systems, they are all unified as core elements of cognitive development (Rogoff, 2003). Rogoff (1990) suggested that in Western societies, parents often have particular learning goals and the majority of the interactions of guided participation consist of a direct instruction within the range of the child's abilities. Rogoff and colleagues (1993) conducted a number of small-scale studies, examining how children's participation in cultural practices and the process of establishing mutual understanding between parents and children differed across cultures. Guided participation was observed during the exploration of a novel object and dressing-up tasks. The study involved two groups: American middle-class families and Guatemalan Mayan families with a lower SES. Each group was comprised of 14 mother-child (12-24 months) dyads. Analysis of the observations reveal important cross-cultural differences. Specifically, in the Mayan community, it was more common to provide a space for children's learning assuming that the process of learning was their responsibility, while among American caregivers, more verbal instructions were used as opposed to the use of the demonstration techniques. Maternal education in both communities was positively linked to the amount of verbal instructions mother provided, with higher levels of education related to higher levels of verbal instructions.

While Rogoff's works on guided participation and intersubjectivity significantly overlaps with the concept of parental scaffolding (Wood et al., 1976), the primary emphasis of her work was understanding how the nature of collaborative problem-solving varied between cultures. The children's learning occurs as a result of social interaction with a more knowledgeable member of the culture. Parental scaffolding practices may have the same principle but different forms across cultures.

The question of cross-cultural variations in tutoring practices (responsiveness/warmth, interaction type and transfer of responsibility) has not been widely addressed and results are not definitive (Bae, Hopkins, Gouze, & Lavigne, 2014; Laosa, 1980; Rogoff et al.,1993). For example, research has demonstrated that there are some variations in mother's instructional strategies which are culturally determined (Mermelshtine & Barnes, 2016; Rogoff et al., 1993). Specifically, Mermelshtine and Barnes (2016) identified that maternal ethnicity was a significant determinant of maternal scaffolding behaviour during the interaction with their infants. The study revealed that White British mothers were more successful in their scaffolding practices with children as opposed to mothers from minority ethnic backgrounds.

On the other hand, similarities in broad aspects of parenting (for example, responsiveness) have also been demonstrated cross-culturally (Atzaba-Poria & Pike, 2008; Bae et al., 2014; Kermani & Brenner, 2000). For example, Kermani & Brenner (2000) conducted a cross-cultural study with Iranian immigrants (N=20) and Anglo-American mother-child dyads (N=20). Some variations in scaffolding practices between cultures were observed. For example, Iranian mothers used more directive strategies during structured play in comparison to Anglo-American mothers. On the other hand, there were no differences in scaffolding practices during free play. Moreover, mothers from different cultures, in similar ways, adjusted their instructions in line with the child's abilities and task complexity. Finally, the studies did not show any cultural differences in the links between maternal sensitivity and the children's abilities.

A study conducted by Bae and colleagues (2014) focused on the specific characteristics of the participant, such as ethnicity, as opposed to broader cultural context.

The research involved a large sample (N=608) of mothers and children (aged five-years-old) recruited from the same state of Illinois, United States. The sample comprised 96 African American families, 117 Hispanic and the majority, 395 dyads, were from European American ethnical group. The scaffolding provided during a structured task was assessed against the following categories: supportive presence, respect for child's autonomy, stimulation of cognitive development, quality of assistance, hostility and confidence. A factor analyses created a single score of scaffolding behaviour. The results suggested more similarities than variations, specifically in the parenting aspects of support/engagement and hostility/coercion. However, European American mothers were more likely to provide higher levels of scaffolding support than mothers from the other two ethnicities.

To sum up, culture is a conglomerate of shared knowledge, inter-/ intra-generational rituals and culture-specific features that are transferred from one generation to another as a part the process of socialisation. Culture is an essential element of a child's development in the theoretical framework of the current study. However, existing research that focused on cross-cultural or ethnical comparison of scaffolding practises provides mixed findings that identified a space for new research questions and investigations.

3.5 Scaffolding practices in England and Russia

Overall, the current study has the intention to gain a deeper understanding of the nature of parental scaffolding, its internal processes, individual variations and the broader context in which its occurs. In general, parental practices are diverse across cultures as parents have different aspirations accepted by the cultural norms in which the child grows up (Darling & Steinberg, 1993; Hart et al., 2000). To assess the impact of cultural diversity on scaffolding practices, the current study looked at two distinct cultures – England and Russia - and identified three potential cultural differences which may influence scaffolding practices between these two countries: individualistic vs collectivist culture, variations in family-related social policies, and differences in educational and parenting practices.

The concept of parental assistance during problem-solving interactions between the mother and her child is predominantly studied among English-speaking Western societies which suggest that existing knowledge about scaffolding practices is mostly based on how learning at home occurs within this individualistic culture. How the principles and strategies of maternal scaffolding behaviour apply in collectivist cultures, specifically Russian, are less clear. Triandis (1995) noted that members of individualistic cultures are less connected with each others, and the uniqueness of individuals and their independence are prioritised. On the other hand, members of collectivistic cultures give precedence to relatedness and in-group belonging to a community such as families (Oyserman, Coon, & Kemmelmeier, 2002; Triandis, 1995). Aligned to this, Hofstede (2001) defines the United Kingdom as an individualistic country with an index of individualism of 89 out of 100, whereas Russia has much lower score of 39. In contrast, it has been argued that historical events at the beginning of the 1990s have shifted Russia towards 'unbridled individualism' (Triandis, 1995).

It has been debated that English cultural values promote independence, assertiveness and individual achievement in contrast to Russian society where parents tend to value conformity over independence more often (Schwatz & Bardi, 1997; Tudge, 1991). For example, within individualistic cultures it is reported that teenage children are typically viewed as partners by their parents, participating in a relationship that encourages them to express opinions resulting in conflict which is accepted as part of a regular, natural relationship (Trommsdorff & Kornadt, 2003). In contrast, within collectivistic cultures, parent-child relationships are typically hierarchical in nature and so conflict is avoided in favour of establishing a consensus (Rothbaum et al., 2000; Trommsdorff & Kornadt, 2003).

However, it has been argued (Hughes et al., 2014; Ratner, 1999; Wang et al., 2016) that the distinction between individualistic and collectivists cultures is oversimplified. Such a comparison represents a broad categorisation of cultural constructs between West and East that has been criticised theoretically and methodologically (Oyserman et al., 2002; Voronov & Singer, 2002). Each country has variations within its cultural settings. Thus, the cross-cultural comparison, based on the contrast between countries in terms of the social processes and policies that support the 'family institution' is more valid (Matsumoto & Hwang, 2013). For example, maternity leave in Russia consists of 20 weeks paid salary (ten weeks before and ten weeks after labour), followed by 68 weeks of ordinary paid leave and another 78 weeks which could be used as unpaid leave but with the security of a job position. On the other hand, in the UK, women can have up to 52 weeks of maternity leave, only 26 of which are paid. That allows Russian mothers to stay at home with their children longer which may impact the dynamic between them and subsequent learning processes as well.

Additionally, the children's pedagogical experience varies between the two countries. Children in England are introduced to formal schooling at age four, while Russian children start school at age seven. The schooling process is closely related to children's development, including executive functions, behavioural adjustment and regulatory processes. As previously discussed, these aspects of the child's development are closely related with scaffolding processes (Bernier et al., 2010; Hoffman et al., 2006; Landry et al., 2002; Mattanah et al., 2005).

Another, notable difference in relation to the children's pedagogical experience in Russia is that the child's development and tutoring, specifically involvement in homework completion, is a maternal responsibility, whereas the father is minimally involved in the child's rearing (Goodwin & Emelyanova, 1995). Russian mothers might perceive such parental responsibility as a significant pressure and this might impact the dynamic with her child during the collaborative problem-solving situations.

Furthermore, parents in Russia continue to endorse traditional beliefs regarding parent-child relationships. For example, while parents in Russia have a wide range of parenting styles, the authoritarian parenting style would be prevalent (Hart et al., 2000). Zorkaia and Diuk (2004) reported that two-thirds of the young Russian adolescents participating in their study believed that they were not allowed to argue with their parents or teachers and they cannot dismiss parental orders. Mothers were also more likely to use the same directive tutoring practices that their own mothers had previously used (Olsen et al., 1996).

Also, a study conducted in St. Petersburg, Russia (Pallock & Lamborn, 1997) identified that parental respect for the child's autonomy was directly related to the positive outcomes for the child, specifically self-reliance. However, this was not relevant to aspects of behavioural adjustment or children's ability to self-regulate in school. These findings are different to those of similar studies conducted in Western societies (Grolnick & Ryan, 1989; Vasquez, Patall, Fong, Corrigan, & Pine, 2016), which could potentially be attributed to cultural differences or related to the samples and its representatives within each culture. Furthermore, a cross-cultural study (Olsen et al., 2002) investigated parental psychological control across three cultures (Russia, USA and China) and identified variations in the amount of control parents use in Russia and USA. Among Russian parents, the level of control was significantly higher. The authors attributed this difference to parental control which was one of their goals in child-rearing and in socialising their child into Russian culture.

Literature regarding patterns of parent-child interaction in the Russian population is sparse. However, there was a recent exploratory study that observed 75 parent-child dyads during structured activities when children were between four and six-years-old (Shvedovskaya & Archakova, 2015). The tasks provided were a modelling of a Play-Doh figure, jigsaw puzzle and a building block task. The dyad's behaviour was observed and assessed as positive or negative by two criteria: level of activity (structure of interaction, aspects of control, warmth) and emotion (within the continuum of rejection — independence — acceptance). The level of activity was adopted from Wood and colleagues' (1978) concept of scaffolding. A cluster analysis resulted in five dyadic types: conflictual, harmonious, distant, dominant parent-subordinate child and dominant child-indulgent parents. The study results identified the predominance of domination-subordination types of dyads referring to the more common use of directive scaffolding among Russian sample groups as opposed to supportive scaffolding. The authors noted that these findings were culturally related.

On the other hand, scaffolding interaction is primarily language based, as the communication between mother and child relates to specific verbal clues (Carpendale & Lewis, 2004). A comparative study between monolingual Russian and English speakers, conducted by Pavlenko (2002), identified that the Russian language has a wider range of possible linguistic approaches through which emotions could be expressed. This finding could suggest that Russian parents could use richer, more extensive instruction and provide more verbal, emotional support.

At the moment, it is not clear if broad cultural differences such as individualistic vs collectivist cultures, variations in more specific policies such as the duration of maternity leave, or the dissimilarities in the academic set-up and early formal exposure to schooling might be related to variations in scaffolding interactions between the mother and her child. However, the investigation of scaffolding practices during problem-solving situations would benefit from the use of both, research within and across cultures. Previously, English and Russian populations of mother-child dyads have not been compared and so can provide new knowledge about parental scaffolding processes and an opportunity to explore new horizons.

3.6 Research hypotheses

Based on the examination of the literature, nine research hypotheses were formed. Aligned with the bioecological theoretical framework (Bronfenbrenner & Morris, 2006) the core research hypotheses are tested using the following variables: (a) proximal process- scaffolding interaction, specifically exhibited dimensions of behaviour; (b) person characteristics; (c) contextual characteristics - home environment and cultural variation; and (d) time.

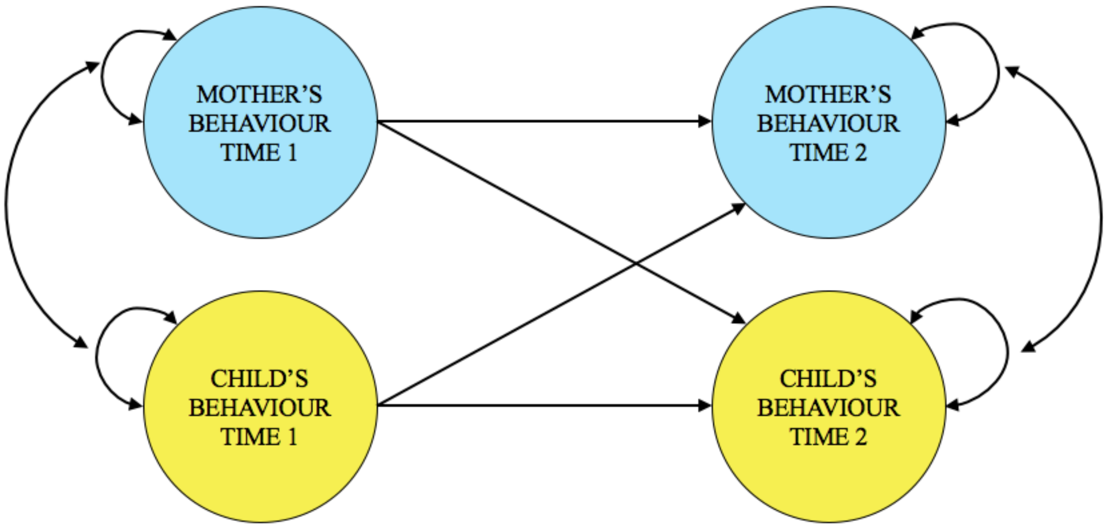

Figure 3.1 Model addressing Hypotheses 1 and 2 by examining the relationship between the dimensions of behaviour displayed by mother and child during scaffolding interaction.

1. Dimensions of maternal scaffolding (quality of instruction, contingency, positive affect, negative affect and over-control) will predict dimensions of the child's behaviour (level of difficulty, amount of help required, autonomy, on task behaviour, positive affect, negative affect, non-compliance behaviour) displayed during joint problem-solving interactions cross-sectionally and longitudinally (see Figure 3.1).
2. Dimensions of the child's behaviour exhibited during joint problem-solving situations will predict dimensions of maternal scaffolding behaviour cross-sectionally and longitudinally (see Figure 3.1).

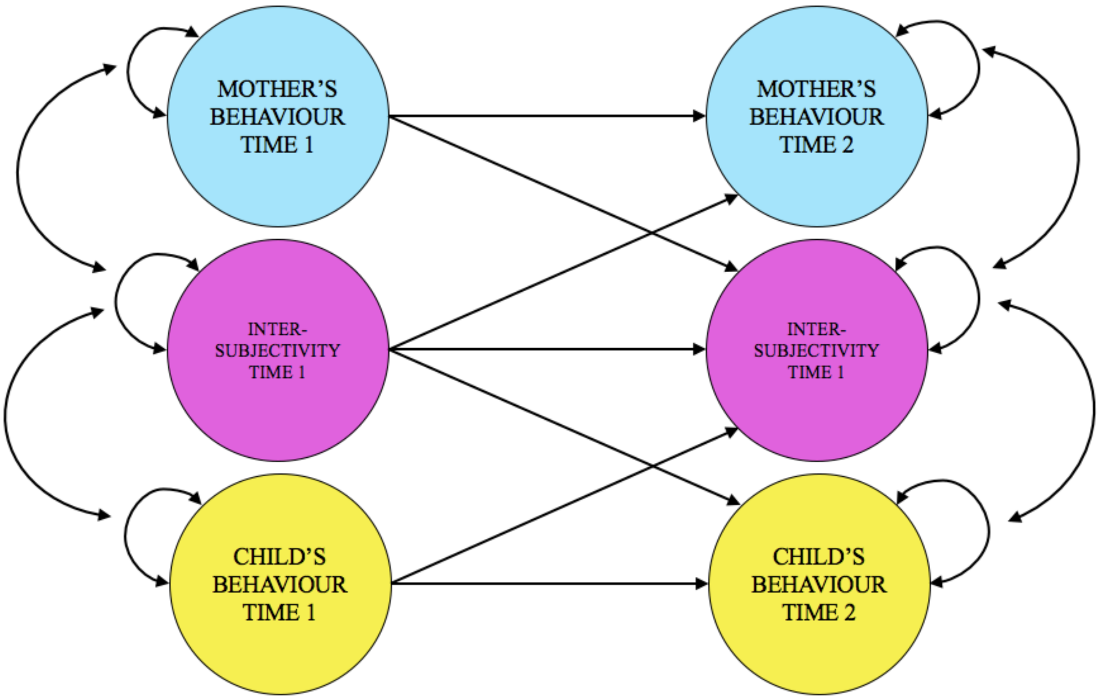

Figure 3.2 Model addressing Hypotheses 3 and 4 by examining the relationship between the dimensions of behaviour displayed by mother, child and dyad's intersubjectivity during scaffolding interaction.

3. Both the mother's and the child's behavioural dimensions will predict the level of intersubjectivity recorded during the scaffolding interaction cross-sectionally and longitudinally (see Figure 3.2).
4. Dyadic intersubjectivity will predict the mother's and the child's behaviour cross-sectionally and longitudinally (see Figure 3.2).

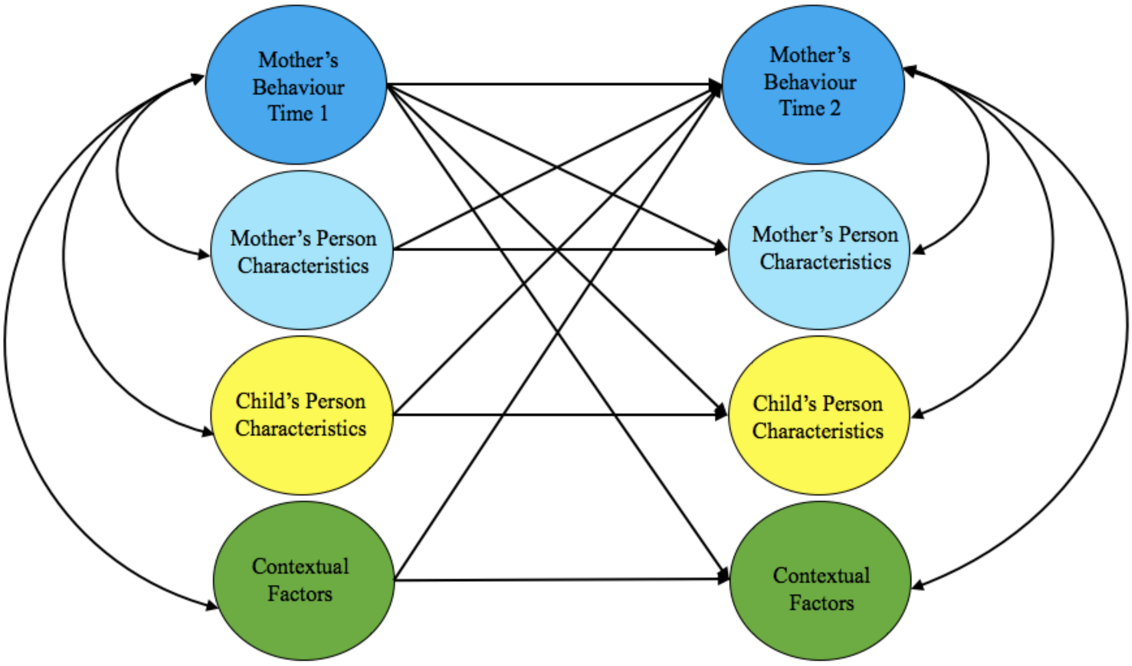

Figure 3.3 Model addressing Hypothesis 5 by examining the relationship between dimensions of maternal scaffolding behaviour and mother, child and contextual characteristics.

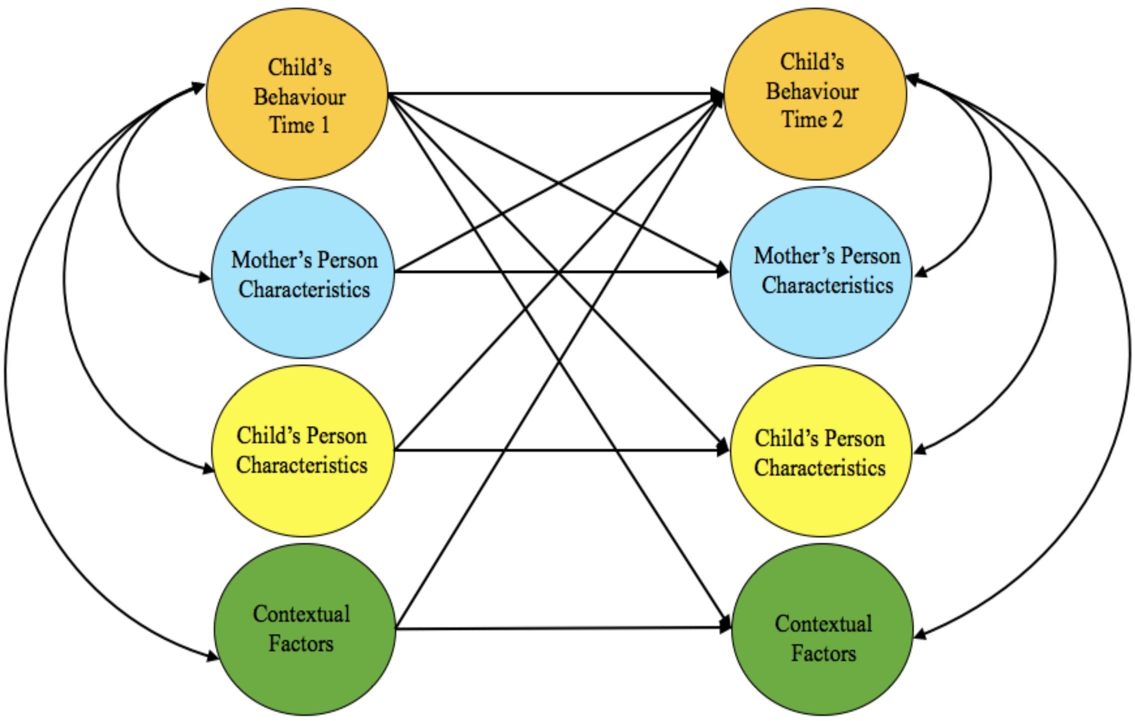

Figure 3.4 Model addressing Hypothesis 6 by examining the relationship between dimensions of child behaviour exhibited during scaffolding interactions and mother, child and contextual characteristics.

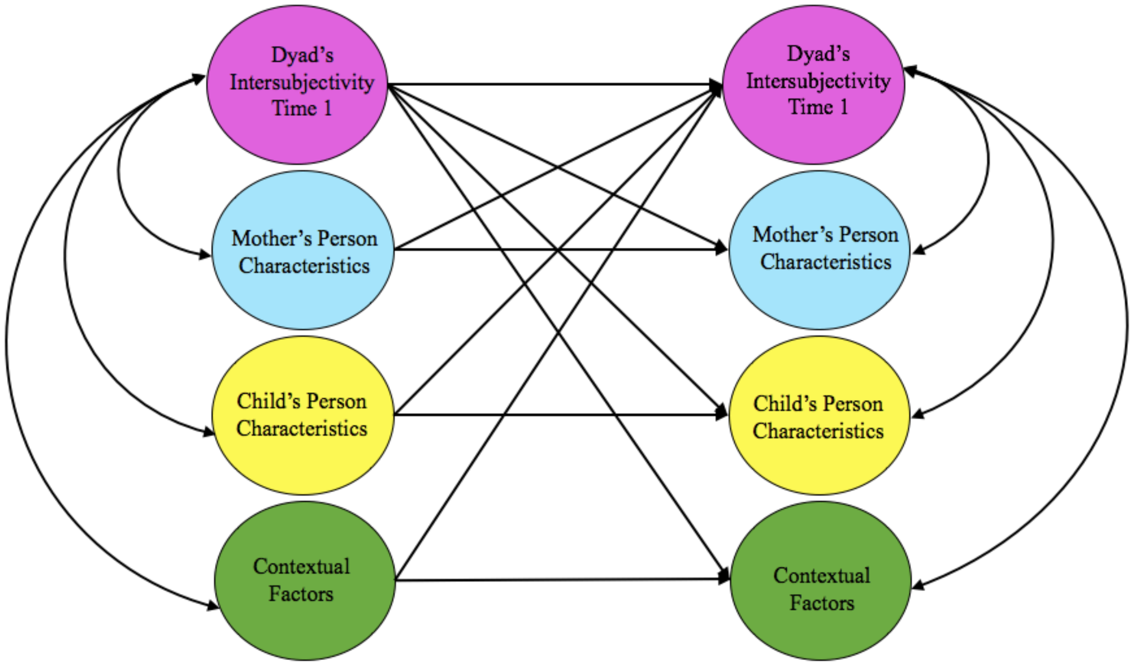

Figure 3.5 Model addressing Hypothesis 7 by examining the relationship between dimensions of dyadic intersubjectivity exhibited during scaffolding interactions and mother, child and contextual characteristics.

5. Person characteristics of both mother (SES, parenting affection/stress, social and emotional abilities) and child (general cognitive abilities, social and emotional abilities, behavioural adjustment) and contextual factors (home environment, over-crowdedness, number of siblings) will predict the variability in dimensions of the mother's scaffolding behaviour cross-sectionally and longitudinally (see Figure 3.3).
6. Person characteristics of the mother and child, along with contextual factors, will predict the variability in dimensions of the child's behaviour displayed during problem-solving situations cross-sectionally and longitudinally (see Figure 3.4).
7. Person characteristics of mother and child, along with contextual factors, will predict the variability in dyadic intersubjectivity displayed during problem-solving situations cross-sectionally and longitudinally (see Figure 3.5).

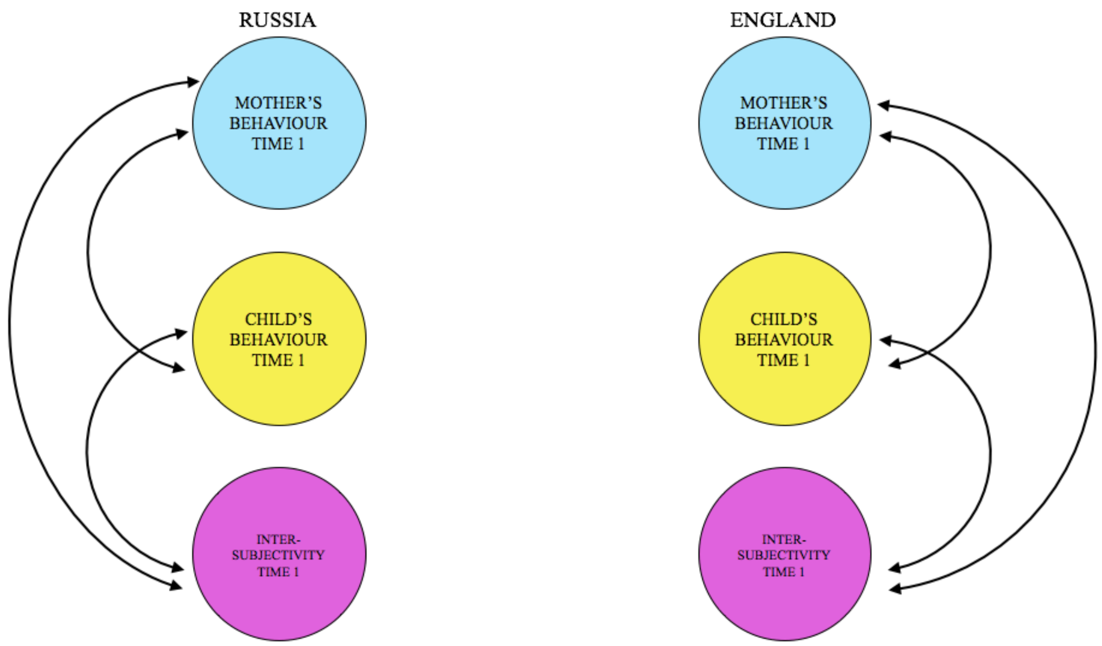

Figure 3.6 Model addressing Hypothesis 8 by examining the patterns of relationship between the dimensions of behaviour displayed by mother and child during scaffolding interaction in Russia and England.

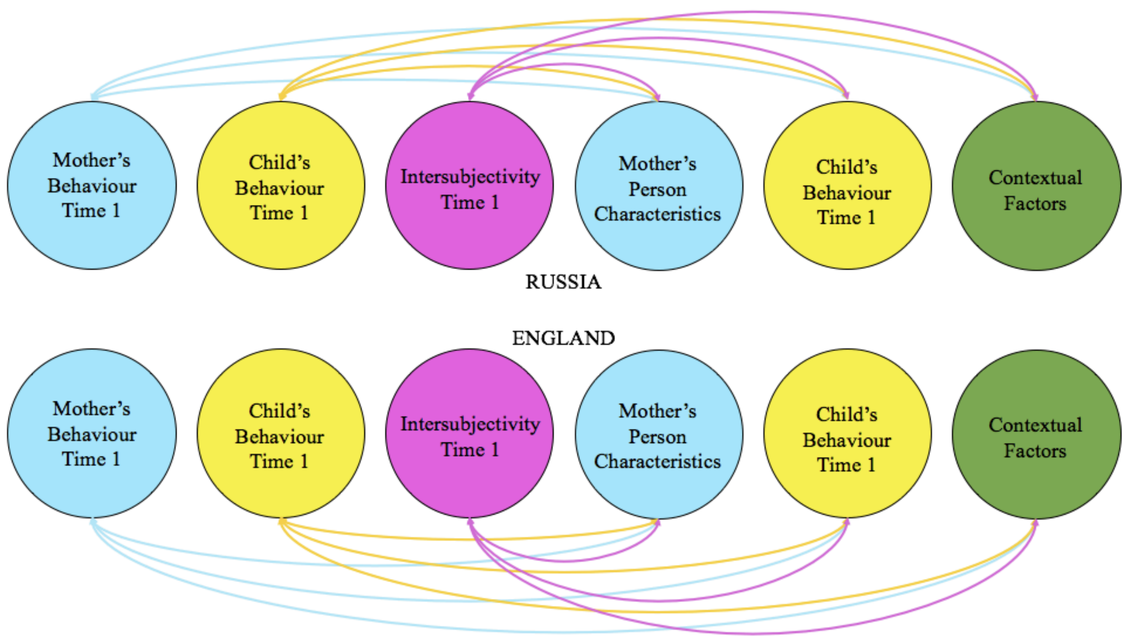

Figure 3.7 Model addressing Hypothesis 9 by examining the patterns of relationship between dimensions of behaviour exhibited during scaffolding interactions and mother, child and contextual characteristics in Russia and England.

8. There will be cross-cultural differences in maternal scaffolding practices, in the child's behaviour and dyadic intersubjectivity displayed during scaffolding interactions among the Russian sample and the English sample at Time 1 (see Figure 3.6).
9. There will be no cross-cultural variations in the patterns of relationships between maternal and child's person characteristics, contextual factors and dimensions of behaviour displayed during scaffolding interactions in each country.

CHAPTER 4. METHODS IN THE ENGLISH STUDY

The current chapter describes the research design and methods that were used to collect data in England. Recruitment procedures and participant demographic information is presented, followed by a discussion of the procedure and measures. The development of the tasks and measures that relate specifically to the scaffolding interactions were tested in a pilot study conducted prior to the main study. The pilot study is discussed in relation to the development of the interaction tasks and the scaffolding coding scheme.

The primary purpose of the research presented in this thesis is to learn how mothers and children cooperate with each other during learning interactions; specifically, those scaffolded by the parent. To achieve this, a conceptual framework was developed that delineates elements of the mother-child interaction. Secondly, a multi-level procedure of data collection was constructed.

4.1 Conceptual framework

This section outlines the methodological structure. In order to examine the multifaceted nature and variability of the types of maternal scaffolding interactions, a *cross-informant methodology* was employed, gathering data from mothers and children, as well as observer ratings. Cross-informant methodology provides the opportunity to capture the unique perspectives held by each informant (Achenbach, McConaughy, & Howell, 1987; De Los Reyes, 2013; Hunsley & Mash, 2007). Often this approach is used in developmental psychology (Grigorenko, Geiser, Slobodskaya, & Francis, 2010; Hughes & Gullone, 2010; Izquierdo-Sotorrío, Holgado-Tello, & Carrasco, 2016), specifically in assessing a child's characteristics (for example, behavioural adjustment), which are evaluated through self-reporting and parental or teachers reports. Additionally, it has been identified that mother-child dyads have a higher level of correspondence in reporting on the same subject compared with father-child or teacher-child dyads (Grigorenko et al., 2010; Weitkamp, Daniels, Rosenthal, Romer, & Wiegand-Grefe, 2013). In the current study, adapting the cross-informant methodology was essential as the understanding of scaffolding as a proximal process and the investigation of individual differences both require assessment from varying perspectives. Specifically, the examination of the impact of the *person characteristics* (cognitive, social and emotional abilities) of both the mother and child, along with the effects of *contextual factors* could succeed only through the assessments of multiple informants (mother, child and researcher) and various measurement approaches (self-reports, developmental tasks / assessments and interactional tasks).

In order to gather data from adult participants, common practice involves the direct collection of information from the person who is being assessed through interviews, questionnaires or tests. Two advantages of self-reporting are accessibility and efficiency (Vazire, 2006). However, there are some issues with this method of data collection such as social desirability bias and lack of focus on the 'bigger' picture of events and interactions (Moskowitz, 1986; Paulhus, 1991). Some of these disadvantages can be addressed by collecting data more than once from the same sample group, specifically, by utilising the test-retest method. While there are limitations to the self-reporting method, it allows the gathering of a large volume of information about the participants in a short space of time and is widely used among parent participants in the field of scaffolding research (e.g. Carr & Pike, 2012; Casey et al., 2014; Landry et al., 2006; Merz et al., 2015).

The current study used a self-report approach to gather data from mothers about their home environment along with their person characteristics: social and emotional abilities. However, the assessment of cognitive, social and emotional abilities through the self-reporting approach is not a suitable method of data collection from children; specifically, to assess their characteristics (for example, emotion regulation) and developmental aspects (for example, theory of mind). The children's testing was multi-modal including developmental tasks, behaviour observation, self-report and mother-report.

Interaction is a dynamic process in which one event influences another (Myers, 2010). Within every new interaction, people adapt their own rules and systems to gain an appropriate response from the other participant within the communication (Kramsch, 1994). Each individual brings their own personality (for example, the ability to communicate efficiently) and life experience to the point of contact. There are also environmental factors, such as verbal, audio and visual distractions, high/low temperatures and unfamiliar surroundings. When people are involved in an interaction, it is hard for them to fully reflect on the events of the interaction and more importantly stay detached and unbiased. Observation by the researcher, who is minimally involved in the interaction, is more appropriate. The filming of behaviour and coding by trained observers avoids any self-reporting bias that can occur through selective recall (Achenbach, Krukowski, Dumenci, & Ivanova, 2005). The observation became a crucial tool in the present research as one of the main aims was to investigate the bidirectional nature of scaffolding interactions that could be achieved only by the separate examination of the mother's and the child's behaviour observed during the interactions by a trained observer.

4.2 Ethical consideration

Ethical practice in research is fundamental and becomes even more critical once groups without the capacity to provide consent become involved, for example, young children (Hitchcock & Hughes, 1995). The process of ethical consideration needs to start in the early stages (Bryman, 2008), such as through the formulation of research questions and planning the research design, continuing throughout each step of the research development: recruitment and participant involvement, data collection, analyses and presentation of the results. The current research was approved by the Faculty of Social and Applied Sciences Research Ethics Committee at Canterbury Christ Church University (Application №14/SAS/190) and was conducted in line with the British Psychological Society's Code of Ethics and Conduct.

A number of ethical issues were identified in the study. Specifically, as the research involved the filming of families with young children, the protection of their confidentiality and data storage was particularly noteworthy. Another ethical issue was related to the inclusion/exclusion of families with children who had learning disabilities as the tasks used in the study could be challenging for them. Finally, the procedure for debriefing had two potential ethical implications. First, as the investigation included measures of each child's general cognitive, emotional and social abilities, parents were likely to want to know about their children's results. Second, disclosing this data to them after the first visit may have had implications on the research results at the follow-up visit. Thus, it was decided to provide the information to parents only after the follow up visit as a part of the debriefing.

The participant information sheet (PIS) and consent form (Appendix B) were usually emailed to parents prior to the initial visit, so they had a chance to familiarise themselves with the documents. In cases where parents did not receive the electronic version before the baseline home visit, they received a copy of the PIS at the baseline visit, enabling them to read and ask any questions concerning them before they signed the consent form. Written consent was obtained from each participating parent via a parental opt-in consent form which was completed at the start of the baseline session. It confirmed that parents fully understood the research purpose, procedure and any possible impact of the participation on them and their child. At the start of the follow-up visit verbal consent was obtained from both parent and child, including consent to video record the session and participants were reminded of their right to withdraw.

Finally, participants were assured that no identifying information, such as participants' names, would be used in the analyses or publication of results. Each participant was assigned an identification number (ID) during the baseline visit. For example, a1L01 (a/b-wave, 1F/1S - indicates the place/method of recruitment (Facebook/ school), 01-indicates the individual participants' number). At any point during the study, all video and questionnaire data would be identified only by ID rather than name. However, a record of names and contact details were kept on a password protected spreadsheet in case the participants wished to withdraw their data at a later date. All data was stored securely, and only the researcher was able to access it. If parents gave consent for the use of images, identifying information such as names were masked or changed.

The results of the research were presented in a written report to all families that participated after the end of the study project. As a thank you for participating each family received a DVD of their recorded interactions and £10 high-street gift voucher.

4.3 Pilot study

Administration of a pilot study is common practice in quantitative research as it gives an opportunity to identify any possible issues with the methodology of the study by testing it on a smaller sample of a relevant group of participants. The outcome enables the correction and improvement of the study design, measures and analysis strategy prior to the actual research (Van Teijlingen & Hundley, 2002). In addition, a pilot study could be used for the preliminary assessment of the potential relationship between variables.

The main aim of the pilot study in the current research was to test the measures and develop appropriate interaction tasks. The data used for the pilot study was gathered as part of the 'Talk about Thoughts and Feelings' project at Canterbury Christ Church University.

Participants. The recruitment of the families took place in a local rural community near the University. Initially, 18 mother-child dyads were recruited. However, in the final analyses, only 11 families took part as seven families dropped out due to various reasons. All children were preschool age (M=4.17, SD=.58 range=3.25-5.25), seven girls (64%) and four boys (36%). All families were from white British ethnic backgrounds with English as their mother tongue. The SES status of families varied from working class to middle class with a wide range of education levels completed by the mothers ranging from a number of GCSEs to postgraduate level.

Procedures. The 'Talk about Thoughts and Feelings' project was a short, three-week intervention with pre- and post–assessments, conducted under the supervision of Dr Amanda Carr, which aimed to identify whether maternal use of MST could be improved after a short training course.

During the intervention, all families were visited at home to provide a comfortable and familiar environment for the mother-child dyads. At the initial visit, participants were assessed in a number of domains, including, children's general cognitive ability, socio-emotional abilities and behavioural adjustment. Aspects of parenting and emotional abilities of mothers were also tested. In addition, the dyads were asked to complete two interaction tasks: a picture describing task to examine the child's and mother's use of MST and an interactive block design task used to examine scaffolding behaviour. The same assessment was conducted after the course of the short intervention as a post-test.

For the intervention course, all mother-child dyads were split into two groups. The first group of dyads received activities related to the use of mental state talk. Specifically, dyads were given sets of pictures and asked to discuss their content. The second group received problem-solving tasks that aimed to help improve maternal scaffolding skills. Each group of mother-child dyad had to complete different interaction tasks once a week for a three-week period. This research design facilitated the aim of the pilot study because it tested a range of problem-solving tasks and allowed an understanding of their appropriateness to the children's age. It also provided interaction data in order to develop and test a range of observation coding schemes examining scaffolding behaviour which is discussed later (see Subchapter 4.7.4).

4.3.1 Mental State Talk

The pilot study of the *Picture task* provided the main thesis research with a thorough understanding of the task itself, its coding scheme and helped to identify any potential issues such as the level of the child's involvement. During the pilot study, it was identified that the Picture Task was accessible enough for the children to participate, however at this age they were more passive in the conversation than mothers. Specifically, it was observed with younger children, parents of whom had to ask a large number of leading questions and expand on them in order to keep the conversation going or to complete the task.

The picture task inter-rater reliability was achieved through the calculation of

Cohen's Kappa for which 33% (N=6) of all pilot data was independently coded by two trained coders, one of which was the primary researcher. The level of inter-rater reliability of Cohen's k varied between .82 and .94. In particular, Cohen's k for cognitive mental states category was .94, for emotion mental states .91, for desire mental states .93, for modulation of assertion .91, for other mental states .82, finally, for non-mental states .94.

4.3.2 Scaffolding interaction. Tasks development

Brick construction, origami and mathematical games were the three tasks tested during the problem-solving sessions in the scaffolding training condition of the pilot study. Observation of the mother-child interactions enabled assessment of the quality, usefulness and relevance of the tasks for the main study. Based on a preliminary observation, the outcomes of the three interaction tasks and recognised issues that required improvement are presented in Table 4.1. During the initial coding, it was detected that all three tasks required some level of improvement in order to accommodate the aims of the main study thoroughly. Specifically, it was important to adjust a number of aspects due to limitations that were identified during the pilot observation such as physical settings (tasks should be completed in a single location to provide clarity of non-verbal clues), differences in participants' abilities (level of difficulty) and finally, type of the tasks (the variability of types of scaffolding behaviour displayed vs simple repetitive instructions). Moreover, it was planned that child participants should be of school age; thus the joint learning activities with parents would likely be relevant to the academic process, e.g. homework relevant activities.

Table 4.1

Pilot problem-solving scaffolding tasks

Task description	Outcome	Conclusion
	Week 1. Brick construction	
This is a classic type of the activity for scaffolding problem-solving tasks (e.g. Wood's pyramid). Participants were asked to replicate the model of a dinosaur using Lego blocks. The instruction given to mothers was to help the child when and as it was necessary.	As this task had only one level of difficulty, some children struggled more than others, and required more parental involvement. Also, parents demonstrated similar types of scaffolding behaviour with an over-reliance on description.	The task would benefit from a variety of options in terms of the level of difficulty so that the mother and child could choose the most appropriate.
	Week 2. Origami	
Dyads were given two pages with printed parts of a doll. They were asked to cut out the shapes and construct them together using glue. The instructions for mothers were the same as at week 1.	Children loved the result of the task as they kept the paper doll toy. However, many children at this age struggled with scissors and the mother completed most of the task. Therefore, the child's involvement was minimal which did not leave much space for the maternal scaffolding behaviour. Also, this task seemed distantly related to school activity and homework.	The scaffolding task needed to be more relevant to the school curriculum and reflect the type of tasks parents and children might do during homework activity. Also, the task relied on the child having the appropriate level of ability to participate in the task and have an opportunity for autonomous task completion.
	Week 3. Mathematical games	
Dyads needed to complete a range of basic mathematical tasks, e.g. find and arrange items in order from the smallest to largest (for example, shoes) or complete a basic number sequence.	Participants found this group of activities engaging and interesting. However, it required much physical action, and some of the games were very simple even for the younger children, which resulted in quick task accomplishment and limited interaction.	This task was generally relevant to school activity. However, it was important to account for the ceiling effect of task. Also, the main study would benefit from more static activity in order to capture the interaction in the best way as possible.

Following the conclusions drawn from observations of the above scaffolding tasks the Reception curriculum was studied extensively and another group of tasks were developed for the main study. The instructions were maintained across all three tasks, so mothers were asked to provide help and assistance to their children only when and as it was necessary.

Tangram puzzle. The brick construction task was replaced with a Tangram puzzle. The Tangram puzzle consisted of a magnetic board and 14 geometrical magnetic shapes. Using the shapes, images could be created based on pre-defined picture-designs of items including a boat, bird and fish. The designs were two-sided, allowing the task to have different levels of complexity. One side of the design was more accessible due to a detailed guide using coloured geometrical shapes while the another was more difficult as it had only the outline of the item in the singular colour blue (see Appendix F). The task was presented with two levels of difficulty and the mother was offered a choice to select the most appropriate level for the child. Level 1 - the dyad would receive the coloured picture-design and an empty magnetic board. The child was then asked to copy the picture on the board. Level 2 - the picture-shape in blue would be placed on the board, and the child would need to fill in with coloured geometrical shapes. The mother could receive the coloured picture-design to provide better support for her understanding of the task but was asked not to share the picture with the child.

The decision about the level of difficulty would be based on their maternal perception of their child's abilities and her own level of comfort with the task in order to provide the necessary scaffolding support. At the beginning of the task, all participants were given a picture of the same design as training, so participants had a chance to practice and ask any questions. This practice interaction was not included in the analyses. Once the task was understood, dyads asked to choose two pictures to complete.

At the follow-up visit, similar picture-designs were selected based on the criterion of the complexity of the picture. The task instructions were preserved along with the procedures such as an opportunity to practice and raise questions, if required, before the task began. However, this time only the second level of difficulty (to fill in the blue design with shapes without the detailed picture) was offered in order to make the tasks more difficult and appropriate for children's age.

Card sorting game. A card sorting game was developed which replaced the origami task of the pilot study. Although it was different in nature, it was developed from observations made during the pilot and in relation to relevance to Reception year activity. Thus, making it accessible to children aged four-five years old.

The task involved mothers and children sorting 12 cards into four groups (animals, vehicles, water & air) categorised along two dimensions (objects & qualities). Two of the groups (animals & vehicles), defined as 'objects,' were revealed to the dyad. However, they needed to guess the other two groups (water and air) based only on the cards. The unknown groups were based on how the objects travelled (by water / by air), defined as 'qualities'.

The Time 2 visit included this game but with an increased level of difficulty. Participants were asked to sort the cards into five different groups which consisted of the same two groups (animals and vehicles) within the dimension of 'objects' but now with three groups within the dimension of 'qualities' (by water, by air and with the addition of objects that travel by land).

Number bond game. The final task was a number bond game which was a replacement for the mathematical games that were piloted earlier. It was also a mathematical game, so it was relevant to school work, but this time the participant did not need to move around the house. Instead, they were given all stimuli necessary to complete the task and could stay at the location of the testing.

At the beginning of this task, ten cards were placed in front of the mother and child in rows or groups of five. The researcher asked the child how many dinosaurs were in the first row/group and then how many in the second. If the child answered correctly, then he/she was asked how many dinosaurs there were in the first and the second rows when combined. If the child made a mistake, the researcher would ask again in order to achieve the child's understanding of the task. Then, the child was asked to find as many possible ways to arrange the cards, using any other grouping, in order to get a combination of 10 dinosaurs again. For example, a row of two cards and a row of eight cards.

At the follow-up visit, families were given the same task, but with a more substantial number of cards (12), which allowed the mother to use not only simple addition as a suggestion, but also simple times tables if the child had any advanced knowledge of mathematics.

After consultation with a primary teacher, these three tasks were approved as age appropriate. It was also confirmed that children in the second half of the school year might be able to complete a similar activity with the parents' assistance so a floor effect would be unlikely. Specifically, the level of the tasks was increased so that as the children aged and gained more schooling experience, they found the activities remained challenging enough to require some parental support but remain within reach of accomplishment. These new scaffolding tasks were tested again on one family (which was unrelated to the pilot or the main sample groups) with a child in reception year to make sure that the issues highlighted earlier were addressed and tasks were improved.

4.4 Recruitment

To recruit the necessary sample for the main study, various approaches were planned and adopted in stages in response to their success rate. The first six months of the recruiting process focused on refining the sampling approach and then selecting the most appropriate methods that proved to be the most successful for recruiting participants.

Based on previous research into mother-child interaction during collaborative problem-solving (Carr & Pike, 2012; Neitzel & Stright, 2003), the decision was made to use a non-random sampling method. Non-random sampling is a method of specifically identifying a sample group from the wider population (e.g., families in Canterbury). Usually, this method is utilised when it is not feasible to approach a random sample representative of the general population due limitations in research resources such as time.

To identify participants from a wide range of socio-economic backgrounds several schools were identified, varying in the proportion of pupils receiving free school meals. Commonly, children from less advantaged socio-economic families are eligible to receive free school meals and so a higher the percentage of meals is indicative of the overall area. Recruiting participants from different socio-economic backgrounds ensures a more representative sample of the population and provides an opportunity to generalise the findings obtained more widely. The first step was to identify local schools in Kent, London and Greater Manchester as major urban areas that attract families, are spread geographically across the UK and represented an opportunity to reach a spectrum of families from various backgrounds. Schools were asked to distribute an invitation letter to the families of children in Reception (school years 2014/15 and 2015/16, children aged four-five years old). Out of the 57 schools targeted and contacted, 9.5% agreed to help by sending the invitation letters to pupils' homes and displaying the recruitment poster (Appendix A) in public spaces within schools where parents would see them. However, only one family was recruited though this method.

Given the approach of recruiting families through schools was not successful, a change of strategy was required and a move was made towards convenience sampling methods such as snowball sampling (Goodman, 1961). While this approach was potentially more successful, it did introduce the risk of a more narrowly defined sample and the potential for less variation on dimensions such as ethnicity, mother's age, socio-economic background and home environment. Although this may bias results and reduce confidence to the extent in which findings can be generalised to the whole population, the practicalities of the current study, as well as the initial unsuccessful attempt at recruiting through schools, resulted in the adoption of a convenience sampling method.

The next step was the development of a website and Facebook page about the research project. Through the use of official advertising on social media (Facebook, Mumsnet), groups of mothers were targeted (by age (20-45), children's age (4-5), interest in Parenting & Research, location Greater London, Greater Manchester, counties of Kent, East Sussex and Surrey). Out of 8,906 advertising impressions to mothers, only three families agreed to take part. Concurrently many other approaches were also being used such as distributing leaflets, local advertising, attendance at parental meetings, presentation to child specialists at a Family Hub meeting at Canterbury Christ Church University and engagement with school governors in Kent and Manchester. No additional families were recruited through these methods.

The final step was the direct engagement with mothers using weekly advertising through dedicated parenting Facebook group, which finally resulted in positive recruitment and snowballing methods. It is believed this approach was more successful than the others due to the context in which the information was presented. Potentially, it may be indicative that mothers who were engaging with each other about the topic of motherhood via social media had more time to process the information about the study as opposed to being pre-occupied with picking children up from school or checking on their performance with teachers. In addition, mothers had an opportunity to directly ask questions as they considered participating, to which the researcher could provide assurance of the study's rigour, raising confidence, thereby driving increased recruitment. Throughout the recruitment process, participants shared information about the research and validated it through personal networks. This resulted in snowball sampling (Goodman, 1961) and seven dyads of additional participants joining the study.

The main inclusion criteria were:

- Children's age: four-five years old.
- In reception year, as children were just starting school (minimal formal academic experience) and potentially required assistance with the problem-solving activities.
- Ability to speak English for both mother and child, but not mandatory as their first language
- Parents needed a basic level of literacy in order to complete questionnaires.

Following the selection procedure, the exclusion criteria were identified as:

- Children outside of the formal education system, for example, those being home educated.
- Children with special education needs (SEN) would not be able to complete a range of tasks measuring their general cognitive abilities.

4.5 Participants

A total of 68 families were initially recruited (Time 1) and 63 participated again seven months later (Time 2) resulting in only a 7% attrition rate. Of the five families that dropped out between the baseline and the follow up visit, two did so due to lack of engagement and three due to lack of time.

The children participants group was comprised of 24 (35%) girls and 44 (65%) boys aged between 4 years 2 months and 5 years 7 months (*M*ean age = 60.3 months; *SD*= 3.99). Mothers had a mean age of 38.1 years (*SD* = 4.65). The ethnic demographics were as follows: 54.4% (*N*= 37) White British, 30.9% (*N*= 21) White Other, 5.9% (*N*= 4) Black British and 8.8% (*N*= 6) South Asian ethnic group. As the majority of families were recruited in Greater London (63.2%, *N*=43), the diversity of the study sample group is reflective of the ethnic distribution in this area. Within the White Other ethnic group, the largest majority were Italian families (5.9%, *N*= 4) which could be explained by the snowballing sampling method across the Italian community in London.

Over a quarter of mothers (26.5%, *N*= 16) did not have English as their first language, and 14.7% (*N*= 10) used their native tongue as the primary language at home. The significant majority of mothers (95.6%, *N*= 65) were married, and only 4.4% (*N*= 3) of families were single-parent families.

Mothers who had a number of GCSE or A-Level qualifications were represented by 16% (*N*= 11) of the sample, 38% (*N*= 26) had an undergraduate degree, 35% (*N*= 24) had a master's degree, and finally, 10% (*N*= 7) of mothers had gained their PhD. Similarly, 18.5% (*N*= 12) of fathers[1] had GCSE or A-Level qualifications, 4.6% (*N*= 3) held a higher national diploma or an equivalent. Almost the same number of fathers had an undergraduate degree and a masters degree, 32.3% (*N*= 21) and 36.9% (*N*= 24) respectively, while 7.7% (*N*= 5) had a postgraduate qualification.

A comparable number of mothers stayed at home to look after the children (44.1%, *N*= 30) or worked part-time (42.7%, *N*= 29) and only 13.2% of mothers (*N*= 9) worked full-time. While fathers predominantly worked full-time (90.8%, *N*= 59) between 40 and 60 hours a week, 9.2% (*N*=6) of fathers worked part-time. The participants' occupations were coded by classification described in a similar study which investigated the role of maternal scaffolding in children's learning (Hughes & Ensor, 2009). Only four mothers (5.9%) were categorised as holding an unskilled labour role, and 13.3%

[1] Fathers (*N*= 65)

(N=9) were classed as skilled labour. Of the mothers in the sample group, 19 (27.9%) held as their most recent occupation technical or administrative roles and finally, the majority of mothers, 52% (N=36), had a managerial or professional occupation. There were similar tendencies with the distribution of the types of the professions observed among fathers. An equal number of unskilled and skilled labour jobs were held by 7.7% of fathers (N=5), 17 fathers (26.1%) had technical or administrative jobs, and finally, 58.5% (N=38) held a managerial or professional position.

The mean number of people living in the participants' household was N=4 (SD= .77) while the number of bedrooms was M= 3.47, SD= .94. Regarding the family structure, 17.6% (N=12) of children did not have any siblings, 64.8% (N= 44) of children had one sibling, and 17.6% (N=12) had two or more siblings.

Overall, the participants in the present study represented a relatively diverse group of ethnic backgrounds; however, the majority of families were White British or White Other. Both parents had higher education or above, and more than half of the parents held a managerial or professional occupation.

4.6 Administration procedure

Once the participants were recruited and a convenient date for them to meet was agreed, the researcher visited each family at home to maintain a familiar environment for both the mother and child. Each meeting started with a brief introduction to the research through familiarisation with the PIS, obtaining the consent form from mothers and verbal consent from children followed by clarification of the participants' questions or concerns that helped to establish the first contact and develop the initial rapport.

The timing of home visits varied between forty minutes and two hours depending on the family and testing dynamic. Often the place of testing was dependent on the family's preference (dining/coffee table, the floor in the playroom or living room). Typically, this place was commonly used in their home for similar sorts of developmental games or homework, but often it was a quiet room to avoid distractions. In cases where the participating family had more than one child, it would usually be agreed prior to the home visit that the younger child or children would be occupied with another parent or relative during the testing time. A similar approach was adopted with families of twin and triplet children as they could only take part as a single mother-child dyad. In rare occasions, siblings were present during the research visit and, in these cases, mothers were asked to keep them involved as minimally as possible to avoid distraction. For example, siblings could be preoccupied with toys or television programs.

The testing procedure was divided into two parts. The first part consisted of the mother-child interactions in which participants were asked to complete a range of experimental tasks together, which were video recorded. The researcher's role was to be an observer with minimal involvement in the experimental procedure. In the second part, the researcher played a more active role through communication with the child; while the researcher assessed the child's cognitive, emotional and social abilities, the mother was asked to complete a booklet of questionnaires (Appendix C-E).

The order in which tasks and activities were presented during each testing session was counterbalanced in order to avoid potential order effects resulting from the testing procedure. The overall testing procedure was determined by the order in which each of the three different phases of the session was presented. These were 1) dyadic interaction tasks, 2) researcher-child testing while the mother worked on self-reports and 3) the collection of demographic information. Tasks within the dyadic interaction phase were also counterbalanced as they were assigned using standardised rotation with the first family starting with Task 1, second family starting with Task 2 and so on. This led to some families starting with the picture task while others began with one of the three other scaffolding tasks. Finally, there were also four types of booklets in which the children's tasks and activities were presented in a different order. The counterbalancing procedures are summarised in Table 4.2.

At the end of the visit, participants had a chance to ask questions and were notified about the follow-up visit in approximately seven months' time.

Table 4.2

Counterbalancing used during data collection

	Types of counterbalancing
Order of testing	1. Demographic information; dyadic interaction tasks; maternal self-reports/ testing the child 2. Demographic information; maternal self-reports / testing the child; dyadic interaction tasks 3. Dyadic interaction tasks; maternal self-reports / testing the child; demographic information 4. Maternal self-reports / testing the child; interaction tasks; demographic information
Interaction tasks order	1. Picture Task / Scaffolding Tasks 2. Scaffolding Tasks / Picture Task
Scaffolding Tasks order	1. Tangram puzzles / Cards sorting game / Number bond game 2. Cards sorting game / Number bond game / Tangram puzzles 3. Number bond game / Tangram puzzles / Cards sorting game
Children's tasks	1. Booklet 1: Working memory, verbal fluency / VMA, ToM, emotion recognition task (ACES). 2. Booklet 2: Verbal fluency / VMA, ToM, emotion recognition task (ACES), working memory 3. Booklet 3: ToM, emotion recognition task (ACES), working memory, verbal fluency / VMA 4. Booklet 4: Emotion recognition task (ACES), working memory, verbal fluency / VMA, ToM

4.7 Quantitative measures

4.7.1 Maternal characteristics

Emotional understanding. Maternal emotional understanding was assessed through two self-report questionnaires measuring emotional intelligence and emotion regulation.

The *Trait Emotional Intelligence Questionnaire Short-Form* (TEIQuE-SF; Petrides & Furnham, 2006), measures adult emotional intelligence (EI) using 15 subscales: adaptability, assertiveness, emotion perception (self and others), emotion expression, emotion management (others), emotion regulation, impulsiveness (low), relationships, self-esteem, self-motivation, social awareness, stress management, trait empathy, trait happiness and trait optimism. The short version consists of 30 items with a 7-point response scale (1= "completely disagree" to 7= "completely agree"). Statements included '*expressing emotions with words is not a problem for me*', and '*I can deal effectively with people*'. A mean score for global trait EI was calculated by summing up the item scores and dividing by the total number of items. Only the global trait EI score was used in the analyses. The internal consistency of the TEIQuE-SF (Cooper & Petrides, 2010) was reported as Cronbach's alpha α= .88- females, α= .89-males. In the current study, it was α= .86 at Time 1 and α= .90 at Time 2.

Maternal emotional regulation was measured using the *Emotion Regulation Questionnaire* (ERQ; Gross & John, 2003). Originally the 10-item scale was designed to measure respondents' tendency to regulate their emotions in two ways: cognitive reappraisal and expressive suppression. The scale was reduced to a 9-item scale in order to improve the validity of the measure (Spaapen et al., 2014) which is used in this study. The mother answered each item on a 7-point Likert scale ranging from 1= "strongly disagree" to 7= "strongly agree". The statements included '*I keep my emotions to myself*' and '*When I am feeling negative emotion, I make sure not to express them*'. Spaapen and colleagues (2014) reported that the internal consistency for their UK sample for the cognitive reappraisal scale was α= .80 and for the expressive suppression scale was α= .74, while in this study Cronbach's alpha at Time 1 was α= .85 and α= .70 respectively. At time 2 the results were α= .82 and α= .73 respectively.

*Social abilities***.** Maternal social abilities were represented by their abilities of mentalisation and examined through the *Picture Task* (Ruffman et al., 2002). The picture task was used to measure the mothers' and children's use of mental state talk (MST) in everyday conversation. For the assessment of the MST among mothers and their children across two time points, two different sets of static pictures of people involved in everyday activities (12 pictures each) with similar content were developed. The content of the second set of pictures was validated by a small group of researchers (*N*=3) in order to provide comparable stimuli at both visits to participants and avoid any task bias. For example, as set 1 comprised of various pictures which illustrated children's emotions (happiness, anger, confusion) in relation to social situations with peers or adults, the second set included pictures which demonstrated an equivalent of the original situations. Thus, both sets would have similar stimuli for the participants to discuss and so would encourage relatively similar conversations in terms of volume and content.

Mothers were asked by the experimenter to look and discuss the content of the pictures with their child as if they were looking at a bedtime story or a magazine. The time to complete the picture task was not limited. The conversational exchange between the mother and her child was recorded using a video camera. Each video was then transcribed. Transcripts of the interaction were then coded for instances of the following categories of mental state terms: cognitive, emotion, desire, other mental states, modulation of assertion and non-mental state (see Table 4.2). The cognitive category included speech referred to memories, thoughts and knowledge. The emotion category consisted of terms referring to an emotional state such as 'cross', 'happy', 'angry', 'scared' and 'sad'. The desire category included terms such as 'want' and 'like'. The other mental states referred to states like 'understand', 'consider' or 'dream'. Other utterances were coded as a non-mental state category. The modulation of assertion category indicated some element of doubt, e.g. 'maybe', 'guess', 'definitely'. For each category, the proportion of mental terms to the total number of utterances was calculated.

To test inter-rater reliability for the picture task, Cohen's Kappa was calculated. Specifically, 20% of all picture task videos (*N*=28) were double-coded to check for inter-rater agreement. The level of inter-rater reliability was high, and Cohen's Kappa fluctuated between .89 and .97 (see Table 4.3).

Table 4.3

Inter-rater reliabilities for MST utterances on the Picture Task

Category	*Example*	*Cohen's κ*
Cognitive mental state	Think, know	.97
Emotion mental state	Happy, sad, angry, scared, excited	.92
Desire mental state	Want, wish, like, hate, love, fancy	.91
Other mental state	Understand, remember, consider, recognise	.89
Modulation of assertion mental state	Maybe, must, probably, perhaps, reckon, bet	.93
Non-mental state	Any other utterances, descriptions, elaborations, facts, along with physical and physical emotion states	.93

Parenting. Positive and negative aspects of parenting were assessed in the current research. Firstly, positive attributes of the mother-child relationship, such as feelings of affection, warmth, and positive attitudes were measured using the *Expression of Affection* (EAF; Hetherington & Clingempeel, 1992). This 18-item scale was adapted from the one developed by Patterson (1982) and requires participants to identify if their behaviour exhibited in the last month matches the statements provided (from "not at all in the past month" to "more than once a day"). Items were grouped into two subscales: expressive affection and instrumental affection. Expressive affection measures items such as spending time alone together, laughing, talking, praising, or giving a hug, while instrumental affection measures joint activities with the children such as shared recreational activities, homework, going for walks, watching television, eating, or going shopping. The original scale was developed to measure the expression of affection from both parents, but in this study, only maternal self-reporting was used. Also, instead of two subscales, the total mean score was calculated in the current research, similarly to Hetherington and Clingempeel (1992), who reported the level of internal consistency of composite for mothers-participants α= .72. Cronbach's alpha of the composite score across both data collection points were similar, at Time 1 was α= .70 and at Time 2 α= .71.

Secondly, negative parenting experiences are represented in the current study by the level of parenting stress experienced and measured using the *Parenting Daily Hassles* (PDH; Crnic & Greenberg, 1990). This questionnaire aims to assess the frequency and intensity of 20 experiences that can be difficult for parents and are indicative of their ability to cope with the issues related to parent-child interactions in day-to-day life. Parents were asked to rate the potential hassles in two different ways - for frequency (from 1= “rarely” to 4= “constantly”) and intensity (from 1= “low” to 5= “high”). Items included ‘*continually cleaning up messes of toys or food*’ or *‘the kids interrupt adult conversations or interactions’*. The authors report internal consistency reliabilities for frequency α= .81 and intensity α= .90 (Crnic & Greenberg, 1990). Cronbach’s alpha of the frequency and intensity subscales for the current sample was at Time 1 α = .70; α = .82; Time 2 α= .68; α= .81 respectively.

4.7.2 Child characteristics

General cognitive abilities. Several aspects of general cognitive abilities were chosen for measurement in the current study: working memory, verbal mental age (VMA) and verbal fluency.

Working memory refers to the parallel processes of temporarily remembering a number of facts during problem-solving and being able to mentally operate on those facts (Hill et al., 2010; Sattler, 2008). Working memory in the current study was assessed by the number recall task which is a subtest of the *Kaufman Assessment Battery for Children* (KABC-II; Kaufman & Kaufman, 2004) and represents a variation of the forward digit span task which assesses children’s working memory and auditory verbal attention span. The forward digit span task requires the child to repeat a series of single digit numbers of increasing length. Once the child is unsuccessful, the experimenter offers another series of numbers the same length as the previous unsuccessfully recalled numbers. The numbers in the series are presented orally at a rate of one per second. The score equals the length of the last number series that the child was able to repeat successfully. The series of numbers on the KABC II ranged from two to nine. The same procedure was utilised when the backwards digit span task was introduced to children with one notable difference. After the number sequence was presented, children had to repeat it in reverse order.

VMA was measured by the *British Picture Vocabulary Scale* (BPVS III; Dunn, Dunn, & Styles, 2009) which tests children’s receptive vocabulary and specifies a standardised verbal IQ score. The BPVS is commonly used in research with children in the UK. The BPVS III comprises 156 items separated into nine age-ranked sets of 12 items. Participants are shown a choice of four pictures and asked to point to the word that is spoken aloud by the experimenter. The test commences with the set considered appropriate for the child's age. A basal score is established when a whole set with one or no errors is completed; if more than one error occurs at the age-appropriate level, the preceding set is administered. The task is terminated when the participant makes eight or more errors in one set. Participants receive a raw score, which is calculated by subtracting the total number of errors from the ceiling item. Standardised scores are obtained from norms tables in the BPVS III manual.

Finally, another verbal fluency measure was used to examine the categorical verbal fluency. The measure was introduced in order to make the cross-cultural comparison of verbal abilities feasible across two samples of children. *The verbal fluency task* is a short and straightforward measure of verbal functioning (e.g., Lezak, Howieson, Bigler, & Tranel, 2012). It typically consists of two tasks: category fluency (Benton, 1968) and letter fluency (Newcombe, 1969). However, for the purpose of this study, only the category fluency task was used. Children were given one minute to name as many unique words as possible within a semantic category, e.g. animals, food or colours. The participant's score was the sum of the number of unique correct words in each category.

Behavioural adjustment. The behavioural adjustment of the child was assessed with *The Strengths and Difficulties Questionnaire* (SDQ; Goodman, 1997). SDQ is a 25-item questionnaire designed to measure emotional and behavioural adjustment in children aged 3-16 years old. Parents are asked to rate each statement from 0= "Not True" to 2= "Certainly True" in relation to their child. The SDQ provides scores on five subscales by summing five items per scale. The scales include: hyperactivity/inattention (e.g. restless, overactive cannot stay still for long), emotional symptoms (e.g. 'has many fears, is easily scared'), conduct problems (e.g. 'often has temper tantrums or hot tempers'), peer problems (e.g. has at least one good friend) and pro-social behaviour (e.g. considerate of other people's feelings). The hyperactivity-inattention, emotional symptoms, conduct and peer problem scale combine to form a total difficulties score.

The internal consistency of SDQ in the current research for the hyperactivity/inattention subscale was α= .79 at Time 1, α= .75 at Time 2, for emotional symptoms subscale was α= .51 at Time 1, α= .68 at Time 2, for conduct problem subscale α= .79 at Time 1, α= .75 at Time 2, for peer problem subscale α= .55 at Time 1, α= .74 at Time 2, for pro-social behaviour subscale α= .67, α= .62 at Time 1 and Time 2 respectively. These results are generally similar to the literature that assessed psychometric properties of this questionnaire across different samples (Mieloo et al., 2012; Stone et al., 2015).

Social understanding. In the current study, the child's social understanding is examined through assessment of Theory of Mind (ToM) and Mental State Talk (MST).

The ability to recognise one's own mental state, the mental states of others or the differences between them is identified as Theory of Mind. ToM was measured by two tasks: *Unexpected Transfer Task* (UTT; Wimmer & Perner, 1983) and *Unexpected Contents Task* (UCT; Perner, Leekam, & Wimmer, 1987). UTT (Wimmer & Perner, 1983) measures a child's ability to identify a false-belief held by a story character about the location of an object. It is used extensively in the literature as a measure of ToM with children in this age group. The story is simple, age-appropriate and demonstrated with the use of props (e.g. dolls, cups and a ball). Each doll was placed in their separate bags on each side of the table with two bowls located in front of the participant. The child-participant was asked to check whether those bowls were empty and to place the lids on the top of each bowl. Then, one of the dolls (Sally) was introduced, and it was explained that the ball is her favourite toy and that she was going to play with it. Once the researcher had demonstrated how Sally had played with the ball, it was explained that she was tired and would tidy her toy away in the *blue* bowl before she would go to sleep. The ball was placed in the blue bowl, then covered with the lid. Sally was placed in the bag, and the researcher explained that she was asleep so deeply that she could not hear or see them. The next doll, Anne, was introduced out of the second bag. It was explained that Anne wanted to play with the ball, so she found it in a *blue* bowl and played with it. Then she got bored and put the ball in the *red* bowl, covered it with a lid and went away to her bag. Finally, Sally woke up and again wanted to play with her toy ball.

At the end of the story, children were asked two test questions and then two control questions about the characters in the story and their beliefs about the location of the object. The test questions were: '*Where will Sally look first?' (*correct answer- *blue)* and '*Why will she look there first?' (*correct answer- *she left it there).* Responses are scored as 0 (incorrect), or 1 (correct) with a maximum total score equals two points. The control questions were developed to justify the child's general understanding of the task ('*Where did Sally put the ball in the beginning?'* and *'Where is the ball now?'*), if the child failed to answer the control questions then the test answers were considered as incorrect.

UCT (Perner et al., 1987) measures a child's ability to predict the false-belief of a fictitious character in relation to the contents of a Smarties box. It is used as another measure of Theory of Mind with children in this age group. Children are shown a Smarties box and asked what they think is in the box. After answering correctly, they are shown that what is in the box is, in fact, something unexpected, e.g. crayons. They are then introduced to a doll who has not seen the Smarties box yet and asked what 'John' thinks is in the box. Finally, they are asked what they first thought was in the Smarties box, as a control question. Followed by three test questions: '*When we first show Jack this box, before he looks inside, what will he say is in there?', 'Remember Jack didn't see or hear what was inside. Will Jack say there are Smarties or pencils in the box?'* and *'Why will Jack say there are ... in there?'.* The responses are scored as 0 (incorrect) or 1 (correct) with a maximum total score of 3 points.

MST is the child's actual use of mental state utterances in regular speech and was assessed through *The Picture Task* (Ruffman et al., 2002), which was discussed earlier (see Subchapter 4.6.1).

Emotional understanding. Two aspects of emotional understanding were examined: emotion recognition and emotion regulation. The availability of the psychometric tools that measures emotional abilities in children that could be used directly with children themselves are more limited than those developed for adults. However, in order to assess the child's ability to recognise emotions, one subtest of *The Assessment of Children's Emotion Skills* (ACES; Schultz, Izard, & Bear, 2004) measure was used while children's emotion regulation was investigated by maternal reports based on the *Emotion Regulation Checklist* (ERC; Shields & Cicchetti, 1998).

The *ACES* (Schultz et al., 2004) evaluate children's emotional skills such as emotion attribution accuracy and emotion biases in three subtests that cover social behaviours, social situations and facial expressions. For the purposes of this study, only the facial expressions subtest was used, which consisted of 26 photographs of primary-aged children with six facial expressions (happy, sad, angry, scared, no feeling and mixed feeling). 16 of the photographs present prototypical happy, sad, angry, or scared expressions. To elicit children's biases toward anger attributions, ten of the photographs present faces with a mixture of sad and angry cues. After presenting a photograph, the examiner asked, "Does s/he feel happy, sad, angry, or scared?" For each correct emotion recognition, the child would be scored with 1 point; thus the potential score range varied between 0 and 16 points. However, the ten images containing mixed emotions were not included in total score because the bias towards anger was not the primary focus of the study. Previous research that also used only the facial expressions subtest demonstrated a high level (Cronbach's α= .83) of internal consistency (Mavroveli, Petrides, Sangareau, & Furnham, 2009). Cronbach's alpha in the present research was somewhat lower, α= .52, α= .66 at Time 1 and Time 2.

The *ERC* (Shields & Cicchetti, 1998) was completed by the mother to assess her child's ability for emotion regulation. The scale is comprised of 24 items, each using a 4-point Likert scale from 1= "Never" to 4= "Almost Always". Mothers were asked to rate how often their child displays certain behaviours that are related to developmentally appropriate reactions during positive and negative emotions, (e.g. "Displays exuberance that others find intrusive or disruptive" or "Takes pleasure in the distress of others"). The ERC provided scores on two subscales: Lability/Negativity and Emotion Regulation, with higher scores indicating a greater ability to regulate emotions. In addition, a total score was calculated by reverse scoring the items on the Lability/Negativity subscale and adding all the checklist items together. Previous research shows the ERC to have good psychometric properties; Shields and Cicchetti (1997) reported high internal consistencies of .96 for the Lability/Negativity subscale and .83 for the Emotion Regulation subscale. The internal consistency of ERC in the current research for Lability/Negativity subscale α= .71, α= .69, for the Emotion Regulation subscale α= .65, α= .52 at Time 1 and Time 2 respectively.

4.7.3. Contextual Factors

Home environment. Home environment was judged by two criteria: over-crowdedness of the house measured by *Crowdedness index* and household chaos assessed by C*onfusion, Hubbub, and Order Scale (*Matheny et al., 1995).

Crowdedness index was calculated based on the number of people living in the household and the number of bedrooms in the house. The overall number of people continually living in the household was divided by the total number of bedrooms.

Confusion, Hubbub, and Order Scale (CHAOS- SF; Matheny et al., 1995) was used as a measure of household chaos. This questionnaire assesses the mothers' perception of how calm or otherwise they view their home environment. This scale is a short version of the CHAOS scale. The questionnaire consisted of 6 items. Mothers rated how true each item is of their home using a 5-point Likert scale from 1= "definitely untrue" to 5 = "definitely true". Items included 'It's a real zoo in our home'. Higher overall scores indicated higher levels of chaos and disorganisation within the home. Overall, the level of internal consistency for the short version of the CHAOS scale reported across the literature is consistently relatively low, for example, in Coldwell and colleagues (2006) Cronbach's α= .56, in Hart and colleagues (2007) was Cronbach's α= .68. For this scale, the level of internal consistency in the present sample was α= .50, α= .62 at Time 1 and Time 2.

4.7.4 Interaction measures: the development of the scaffolding coding scheme

Three collaborative problem-solving tasks were developed as the outcome of the pilot study (see Subchapter 4.3). These tasks aimed to provide the opportunity for mother and child to display the behaviour relevant to the scaffolding interaction.

As a next step, a coding scheme was developed in order to capture the amount and type of behavioural dimensions of the scaffolder and scaffoldee during the joint problem-solving tasks. The development of the final coding scheme occurred through a series of steps. Firstly, it was essential to weigh the benefits of a fine-grained scheme against a global coding scheme. Secondly, two established scaffolding coding schemes were chosen and tested (Mulvaney et al., 2006; Neitzel & Stright, 2003). The next step was to identify how the child's behaviour could be assessed along with the dimensions of maternal behaviour during the scaffolding interactions. Finally, it was necessary to refine the compilation of the behavioural coding schemes into one reliable tool in order to measure mother, child and dyadic behaviour.

The theoretical issues relating to how scaffolding interactions are measured were discussed in the literature review (see Chapter 2, Subchapter 2.3). There are typically two types of behavioural coding schemes described in the scaffolding literature – fine-grained and global schemes. The classic research in scaffolding uses fine-grained schemes (micro-coding) which allows the precise capture of the level of mothers' physical and verbal interventions in relation to the child's actions (Carr & Pike 2012; Conner & Cross, 2003; Mattanah et al., 2005; Meins, 1997; Pratt et al., 1992; Wood & Middleton, 1975,1978). The benefits of fine-grained schemes are in the rigorous analyses of the necessary and sufficient steps of task-solving required from both mother and child. The sensitivity of this type of behavioural coding is that it measures even slight variations in the mother's behaviour in response to the child with each intervention. Within these types of analyses, maternal scaffolding is viewed as a dynamic process that is ongoing and continuously changing.

The fine-grained coding scheme described by Carr and Pike (2012) was adopted as the first step in developing a coding scheme in the current study. The individual mother's interventions were assessed according to increasing levels of specificity (from 0= 'simple feedback' to 5= 'demonstration'). The levels of maternal scaffolding intervention were specified earlier in Chapter 2 (Meins, 1997; Wood et al., 1978). The child's task performance was scored as incorrect or correct in response to each of the mother's scaffolding behaviour. A correct response was appropriate and led to task accomplishment, and an incorrect response was categorised as either inappropriate or dismissive of the mother's intervention.

The notable benefits of this method of observation are that it enables capturing of any immediate change in maternal scaffolding behaviour as well as identifying its' success based on the child's subsequent action. However, due to the aims of the current study and the expressed goal of measuring child input into the interaction, this type of coding scheme was not considered suitable due to its focus on mothers' behaviour. It is more difficult to capture the bidirectional nature of scaffolding interactions using this approach. Fine-grained scaffolding coding schemes tend to account only for the child's performance (correct/incorrect response to mother's instructions) rather than the assessment of the child's behaviour displayed during the problem-solving situations.

Furthermore, such fine-grained methods of analysis could be considered reductionist in nature as the method priorities the quantity of maternal involvement over its quality as it is focused on the assessment of only one dimension of maternal behaviour, which is level of intervention. While this is effective and appropriate in measuring contingency, it does not capture broader dimensions of the interaction such as emotional support or transfer of responsibility (Grolnick et al., 2002; Landry et al., 2006; Pianta & Harbers, 1996). These dimensions are simultaneously displayed during scaffolding interactions and require a different method of evaluation that is not accommodated within a fine-grained coding scheme.

Finally, fine-grained coding methods which measure each of the participants' behaviour individually, ignores the dynamic that exists within the interaction between the mother and her child reflected, for example, by the levels of intersubjectivity or conflict.

The alternative to fine-grained coding schemes are ones that measure more global dimensions of behaviour and thus overcome some of the limitations outlined. The next step was therefore to identify and test global coding schemes measuring scaffolding in order to make a judgement on the extent to which these would provide the required data to test the study hypotheses. A global system (macro coding) of measurement includes observation and evaluation of maternal scaffolding behaviour across the whole problem-solving interaction (Aksan, Kochanska, & Ortmann, 2006; Deater-Deckard et al., 1997; Mulvaney et al., 2006; Neitzel & Stright, 2003).

This type of coding measures the quality of a behavioural dimension across an entire observation. This method does not measure any specific, discrete behaviour within the interaction (Bell & Bell, 1989). A global system of measurement includes observation and evaluation of scaffolding behaviour across the whole problem-solving interaction. Usually, behavioural dimensions within this methodology are measured using a 3-, 5- or 7-point Likert scale, giving a higher rating based on the degree of occurring behaviour. Global coding schemes used in scaffolding research consistently demonstrate their validity by producing results similar to fine-grained systems, including predicting scaffolding behaviours' impact on a child's cognitive and academic success (Leith, Yuill, & Pike, 2018; Razza & Raymond, 2013).

A key advantage of this type of coding is the assessment of various dimensions of behaviour (for example, quality of instruction, emotional support or transfer of responsibility) that characterise problem-solving interactions and that are represented by a single score rated across the whole scaffolding interaction (Darling & Steinberg, 1993). Moreover, this approach also allows dimensions of the child's behaviour to be assessed in the same way. Therefore, the child becomes a pro-active participant in the collaborative problem-solving interaction (Hammond et al., 2012; Mascolo, 2005; Pianta et al., 1991) and it is therefore feasible to investigate the reciprocal relationship between the individual dimensions of the mother's and child's behaviour. Furthermore, the single score of the whole interaction provided the opportunity to assess the mutual dyadic processes such as intersubjectivity or conflict.

Global schemes do not reject the original conceptualisations of scaffolding evidence in Wood's seminal work (Wood & Middleton, 1975) but include an additional principle of their measurement. For example, the appropriate challenge scale (Mulvaney et al., 2006) reflects the concept of contingent shift developed by Wood and Middleton (1975) but measures it with a single score for the whole interaction rather than an individual maternal intervention within the interaction. Thus, within the global coding scheme, a range of maternal, child and dyad behaviours during scaffolding interactions can be examined. Moreover, it allows testing of how these dimensions of behaviour influenced each other.

However, this type of scheme also has a disadvantage. If the description of the behavioural dimension is vague, then the level of reliability of the scheme is significantly lower, and so a high level of inter-rater agreement is particularly important. Based on the theoretical framework of the current research, it was decided that a global coding scheme would be more appropriate and would allow investigation of the range of behavioural dimensions of interest.

The final coding scheme consists of three assessment points: mother, child and mutual dyadic behaviour. The process of the scheme's development involved a number of testing steps, and itself represented a compilation of several coding schemes through an add-on method. During the process of developing the coding scheme, three key global coding schemes were analysed with consideration given to their theoretical and methodological features, some of which were integrated into the final coding scheme.

As the study was developed on the foundation of the work by Wood and colleagues (1976) and the significance of the mother's role in the scaffolding process, it was essential to establish the variability of dimensions of maternal behaviour in problem-solving situations. The literature consistently identifies three critical dimensions of parental scaffolding behaviour: cognitive support, emotional support and transfer of responsibility (Hoffman et al., 2006; Neitzel & Stright, 2003, 2004; Pianta & Harbers, 1996). Based on these three dimensions Neitzel and Stright (2003) developed a coding scheme to assess maternal behaviour during problem-solving interactions with their children. Specifically, maternal cognitive support was assessed by degree to which the mother provided the quality of information in relation to the general explanation of the task, management of the task with recommendations of strategies and techniques on how to complete it, along with her manner of instruction. Emotional support was examined through two behavioural dimensions: rejection and encouragement. Rejection was reflected in disapproval, negative attitude toward the child, while encouragement was assessed by the rating of the positive comments, supportive and praising statements. Finally, two aspects of the transfer of responsibility (over-control and encouragement of the child's active cognitive involvement) were examined. Over-control behaviour was graded in relation to maternal attempts to complete the task for the child and provide an amount of support over and above that which was required. Also, the extent that mothers encouraged children's pro-active involvement in the task through comments, open-ended questions, hints and prompts was rated as a dimension of transfer of responsibility (encouragement of child's active cognitive involvement).

All dimensions of maternal scaffolding behaviour were rated on a 5-point scale ranging from 1-low to 5-high. All three behavioural aspects were included in the final version of the scheme.

The next step taken was to recognise the child's involvement in the scaffolding process by measuring dyadic behaviour. The idea of capturing the interaction with an account of mutual demonstration of a certain type of behaviour (for example, intersubjectivity), from both mother and child, was particularly crucial for the purposes of the current study as it recognised the active role of the child in the problem-solving situation. Mulvaney and colleagues' (2006) coding scheme focused on the dyadic nature of the scaffolding interaction and measured the mutual demonstration of behavioural dimensions: attention maintenance, appropriate challenge, intersubjectivity.

Consistent with the rating system in the original Mulvaney and colleagues' (2006) coding scheme, all dimensions were rated on a 4-point scale ranging from 1-very minimal to 4-high.

Each of these global coding schemes were tested by coding the interactions observed during the pilot study and the data gathered was tested for association between them using Spearman's rho correlation coefficient.

Table 4.4

Bivariate correlations between maternal and dyadic scaffolding behaviour (N=11)

Coding scheme by Neitzel & Stright (2003)	*Coding scheme by Mulvaney and colleagues (2006)*		
	Attention Maintenance	*Appropriate Challenge*	*Intersubjectivity*
Metacognitive Information	.69*	.99**	.98**
ES: Rejection	.06	.02	.09
ES: Encouragement	.77**	.98**	.98**
TR: Over-control	.87**	.29	.46
TR: Encouragement of child's active cognitive involvement	.89**	.71**	.89**

ES- emotional support, TR- transfer of responsibility; *p<.05, ** p<.01 (two-tailed)

Table 4.4 was developed to illustrate a preliminary investigation of any possible correlations between Neitzel and Stright (2003) coding scheme based on the mother's behaviour and Mulvaney and colleagues (2006) coding scheme based on dyadic behaviour. From this initial analysis, it is evident that there are correlations between the mother's scaffolding behaviour and the aspects of mutuality between the mother and her child. It is possible that the correlation could be explained solely by maternal behaviour. However, it is also possible that dimensions of maternal scaffolding were associated, to some extent, with the child's behaviour as a part of the dyad. This assumption is further supported by numerous theoretical works (Griffin & Cole, 1984; Litowitz, 1997; Mascolo, 2005; Wertsch et al., 1980) that suggest a bidirectional nature in scaffolding interactions.

These relationships clearly indicated that there are aspects that measure relevant types of behaviour in scaffolding interactions. Moreover, while developed by Mulvaney and colleagues (2006), the coding scheme did not assess independently the child's direct involvement in the scaffolding process. It is possible that the strong associations with maternal scaffolding behaviour suggested the importance of separating out the individual child's behaviour and coding it independently in order to learn about the interrelationship during the scaffolding interaction.

Working coding scheme. Version 1

Based on theoretical background, the discussed coding schemes were compiled to develop the first working version of the coding scheme used in the main study. An assessment of maternal scaffolding behaviour consisted of nine behavioural dimensions, seven of which (positive content, negative content, positive affect, negative affect, responsiveness to the child, on task and verbalisation) were adopted from the PARCHISY scheme (Deater-Deckard et al., 1997). Some of them had a conceptual overlap with dimensions from Nietzel & Stright's (2003) coding scheme. For example, positive and negative content reflected the dimension of metacognitive information, while positive and negative affect corresponded closely to the dimensions of emotional support: encouragement and rejection. However, transfer of responsibility: over-control is not captured by PARCHISY and was the only dimension to be adopted from Nietzel & Stright (2003).

Furthermore, the corresponding examination of the literature identified the importance of the use of contingent strategies by the mother during learning interactions with their child and, more importantly, the opportunity to measure contingency with the global coding scheme (Casey et al., 2014; Hoffman et al., 2006; Landry et al., 2006; Maslin-Cole & Spieker, 1990; Merz et al., 2015). Thus, the contingency dimension was included in the first working version of the coding scheme for the current study. Similar to the utilisation of maternal behavioural dimensions, all eight of the child's aspects of behaviour during dyadic interactions were adopted from the PARCHISY scheme, with only one addition – the level of difficulty to measure how easy it was for the child to complete the task. Finally, two dimensions of dyadic behaviour used in PARCHISY scheme (cooperation and conflict) were employed along with inter-subjectivity introduced in the coding scheme by Mulvaney and colleagues (2006). The scaffolding behaviour of the mother, child and their dyad were measured on a 7-point scale ranging from 1-never to 7-always to align with the PARCHISY scheme.

Once all relevant dimensions were incorporated into the coding scheme, it was evaluated and tested with 20 interactions from the main sample group coded by two observers. Firstly, the observers coded four videos together in order to identify potential issues with the coding scheme and develop a mutual understanding. Another eight videos were then coded independently, followed by a discussion of the results and, in case of significant disagreement, the footage would be examined again, and a joint decision would be made. Finally, the last eight interactions were coded, and the same procedure of mutual discussion about the results was employed by the coders.

To evaluate the similarity of behavioural rating between coders, intraclass correlation (ICC) was used as a measure of inter-rater reliability. ICC examines rating reliability by assessing ranges of different values of the interaction in comparison to the total variation of all observations and all subjects (Shrout & Fleiss, 1981). 'ICCs incorporate the magnitude of the disagreement to compute inter-rater reliability estimates, with larger-magnitude disagreements resulting in lower ICCs than smaller - magnitude disagreements' (Hallgren, 2012, p.9). The calculation of the inter-rater reliability of the behavioural dimensions, through the identification of the consistency in agreement by ICC, was more appropriate and beneficial for the purposes of this study instead of an all-or-nothing agreement, that is usually achieved by Cohen's Kappa.

The Spearman correlation between the two coders for the twenty codes ranged from .11 to .79. Specifically, the most problematic dimensions were: child's negative affect, maternal transfer of responsibility: over-control and dyadic conflict.

Such a wide range of results highlighted some issues with the coding scheme, possibly due to the fact that PARCHISY was not developed as a coding scheme for scaffolding interaction. It was clear that the first version required further improvement with perhaps less reliance on the PARCHISY.

Working coding scheme. Version 2

In order to resolve the issue of reliability, two principal modifications in the coding scheme were undertaken. Firstly, it was decided to reformulate the definitions for several dimensions that were the most problematic due to the lowest agreement between the raters. For example, it was essential to code the conflict as occurring only when both mother and child displayed some negativity against of each other through verbal or non-verbal clues as opposed to when only one of the participants of the interaction displayed negativity. Thus, this particular aspect of mutual behaviour was recorded in the description of the dimension in the new version of the coding scheme.

Secondly, to improve the inter-rater agreement the 7-point scale adopted from PARCHISY was reduced to the more traditional 5-point scale ranging from 1- low to 5-high (Hammond et al., 2012; Leerkes et al., 2011; Pianta & Harbers, 1996). Additionally, during the collaborative coders' discussion of the coding scheme, it was identified that the maternal behaviour displayed through the dimension of negative content was comparable with another maternal dimension- transfer of responsibility: over-control. Therefore, negative content was excluded. Another dimension that was also excluded was the dyadic cooperation as the inter-subjectivity between the mother and child, which reflected the cooperation between scaffolding participants to some extent.

Another 11 videos that captured the mother-child scaffolding interaction were rated based on a reduced version of the coding scheme (see Table 4.5), which included eight mother' scaffolding dimensions, nine child's behavioural dimensions and finally, two dyadic dimensions.

Table 4.5

Working coding scheme for scaffolding interaction. Version 2

Participant	Behavioural dimension
Maternal scaffolding	1. Metacognitive information 2. Contingency 3. Positive affect 4. Negative affect 5. Responsiveness to the child 6. On task behaviour 7. Verbalisation 8. Transfer of responsibility: over-control
Child's behaviour	1. Positive affect 2. Negative affect 3. Responsiveness to mother 4. On task 5. Noncompliance 6. Autonomy / independence 7. Activity 8. Verbalisation 9. Level of difficulty
Dyadic behaviour	1. Intersubjectivity 2. Conflict

The same approach as the first trial was adopted - prior to coding, both coders were familiarised with the scheme, then part of data was coded separately by two raters and then discussed. This time the inter-rater reliability calculated with Spearman correlation test ranged between .25 to 1. This suggested some improvement in the coding scheme; however, it was still lower than the required reliability level for the dimensions of maternal transfer of responsibility, child's level of difficulty, negative affect, autonomy and dyadic conflict.

During observations, it was identified that the dimension of responsiveness assessed in both mother and child's behaviour overlapped with inter-subjectivity. This was indicated as mutual understanding was reflected during the demonstration of responsiveness between participants. Furthermore, the on task behaviour, measured as an aspect of maternal scaffolding behaviour, was redundant as mothers volunteered to participate in the current research and were entirely focused and keen on completing scaffolding tasks. Therefore, it was decided to evolve the coding scheme by eliminating the dimensions of responsiveness in both scaffolding participants and maternal on task behaviour.

It was also identified that there was a need for a precise definition of the maternal over-control behaviour and the child's autonomy as it could be difficult to identify if this was due to the child's inability to be autonomous or if it happened due to the mother's control behaviour during the task accomplishment. That was resolved through rephrasing of the descriptions of these types of behaviour. The level of difficulty was then divided into two aspects: the first was physical time measuring how long it took to complete the actual task and the second assessed the amount of help required by the child in order to finish the task. Finally, it was defined that any evidence of mutual disagreement, display of aggression or negativity would be measured as conflict.

Final coding scheme

The final coding scheme is presented in Table 4.6, the reliability of which was tested by coding 20% (*N*=105) of all the scaffolding interactions across both time points from the main sample group. A new coder was familiarised and trained to use the coding scheme and then independently rated 105 videos along with the primary researcher. A similar procedure of double coding that been described earlier was utilised. However, at this time, the number of coded videos was relatively large and in order to calculate interclass correlations, as a measure of inter-rater reliability, Pearson's correlation analysis was used. The Pearson correlation between two independent coders for all 14 codes was between good and excellent (Cicchetti, 1994), statistically significant and above .71 (see Table 4.6).

Table 4.6

Final coding scheme for scaffolding interaction

	Mother's Dimension		ICC
1	*Quality of instruction: metacognitive instructions*, explanation of techniques or strategies, open-ended questions. This dimension measured the information and the range of the quality of the content presented by the parent. A lower score would be given for simple instructions and higher scores allocated for more sophisticated ways of introducing the content, e.g. open-ended questions.	1. no metacognitive content given. 2. poor quality of the content given; reliance on explicit instructions (e.g. directions "up, down, stop"). 3. moderate quality of content given; reliance on explicit instructions with at least one instance of explanation or questioning. 4. substantial use of explanation, questioning and few explicit instructions. 5. exclusive use of explanation and questioning.	.73**
2	*Positive affect: warmth* (smiling, laughing), use of praise, emotional support and encouragement. Positive commentary from mothers included praise or words of support focused on the task or the ability of the child.	1. no positive affect demonstrated. 2. little/minimal of positive affect was given. 3. moderate amounts of positive affect – smiling, laughing and/or some use of praise to encourage the child. 4. substantial amounts of positive affect, use of praise, positive encouragement; only one or two instances of non-positive affect. 5. constant positive affect – demonstrating warmth, lots of encouraging comments, praising throughout the task.	.80**
3	*Negative affect: rejection*, frowning, cold/harsh voice, use of aggressive physical control of shapes (cards) - snatching, tussling or child's hand/arm/body, use of criticism and disapproval.	1. no negative affect displayed. 2. little/minimal of negative affect shown. 3. moderate amounts of negative or inappropriate reaction to the child. 4. substantial amounts of negative affect- criticism, and physically 'taking over' task ("give it to me", "stop it"). 5. constant negative affect - always scowling/frowning, voice always in harsh tones, exclusive use of criticism (can include shaming) and aggressive physical control of the items.	.88**

	Mother's Dimensions		*ICC*
4	*Contingency: flexibility and appropriateness*. This aspect refers to how well the child was supported by the mother as they work on the task. A high score was given when the mother allowed the child to attempt to complete the task by themselves. The amount of maternal support in the task should be appropriate to the child's ability; not too little when the child was struggling with the task and not too much when the child was able which would lead to the mother completing the task instead of allowing the child to do so. For example, when a mistake was made, the mother should have given the smallest amount of information needed for the child to continue in order to complete the task successfully. However, if further mistakes were made, then the mother needed to increase her help and provide more guidance as appropriate.	1. no flexibility in relation to the support provided is demonstrated by mother. Unnecessarily low/ high level of support given by mother throughout the task. 2. little demonstration of appropriate support was given, with too little/ much information given to complete the task successfully. 3. moderate amount of appropriate support was given, with some instances of giving too lower/ higher level of support. 4. substantial use of contingent behaviour was shown. An appropriate level of support given by mother throughout the task, with numerous attempts to adapt the level of help/support according to the child's ability/performance. 5. constant contingent behaviour, low/ high level of support given by the mother throughout the whole task appropriate to the child's ability/performance – for example, help provided only when it is needed. Constant attempt to adapt help provided according to child's ability/performance.	.75**
5	*Over-control*: *transfer of responsibility and respect for child's autonomy***.** Higher scores would be given when the mother demonstrated controlling behaviour over the child's attempts to complete the task. Mother gets involved over and beyond what appears to be necessary. For example, physical control of items (stimuli) or the child's body must be with intention, not accidental or momentary. Touching the shapes (cards) is not necessarily an instance of over control. Touching the shapes (cards) and placing them implies intention and would be coded as over control, even if it was done very quickly. If the child is struggling with the task or unable to complete the task without mum's supervision, it should not be counted as controlling. Only when the mother is involved more than is required.	1. none, mother minimally involved in the task accomplishment. 2. little/ minimal instances of over control. 3. moderate amounts of over control, about half of the time the interactions the mother attempted to complete the task. 4. substantial amount of over control. 5. constant over control by mother.	.71**

	Child's Dimensions		*ICC*
1	*Positive affect: warmth*, smiling, laughing, positive attitude towards mother/ task/ etc.	1. no positive affect displayed. 2. little/minimal positive affect was given. 3. moderate amounts of positive affect - smiling, laughing for about half of interaction. 4. substantial amounts of positive affect; only one or two instances of non-positive affect. 5. constant positive affect – smiling and laughing throughout the task.	.75**
2	*Negative affect: rejection*, frowning, cold/harsh voice tones, physical aggression (e.g. snatching).	1. no negative affect displayed. 2. little/minimal of negative affect shown. 3. moderate amounts of negative affect – negative or inappropriate reaction to the parent for about half of interaction. 4. substantial amounts of negative affect with physical aggression; only one or two instances of non-negative affect. 5. constant negative affect - always scowling/frowning, voice always in harsh tones, some elements of physical aggression.	.75**
3	*On task:* persistence/energy. Persistence is with respect to the task that has been provided – playing another game or creating a new design (tangram) does not qualify as completing the task.	1. demonstrates no initiative; does not begin the task. 2. begins the task with initiative, but does not attempt to complete the task with mother. 3. moderate interest, displays initiative, completes task with mother. 4. persistent; only one or two instances of off-task behaviour. 5. constant persistence; always on task.	.79**
4	*Amount of help required*: This dimension helps to capture the amount of help needed to enable the child to complete the tasks.	1. no help required to complete the task. 2. little/minimal help required to complete the task. 3. moderate amount of help required to complete the task. 4. substantial amount of help required to complete the task. 5. child unable to complete the task without help.	.78**

Child's Dimensions		ICC
5 *Noncompliance.* Child's dismissive or ignorant behaviour to mother's suggestions/ recommendations.	1. always does what is asked by mother during task. 2. at least one or several instances of noncompliance. 3. moderate amounts of noncompliance - during about half of the interaction. 4. substantial amounts of noncompliance; only one or two instances of compliance. 5. noncompliant throughout task; always refuses or does something contrary to that which is asked of him/her; no instances of compliance.	.78**
6 *Autonomy/independence*. Child leads and controls task; does not include off-task behaviours.	1. no evidence of autonomy/independence; mother leads throughout task. 2. little/minimal amount of child's autonomy. 3. moderate amounts of autonomy; controls task about half of the time. 4. substantial autonomy - one or two instances of following mother's lead. 5. completely independent - controls entire task from beginning to end.	.72**
7 *Level of difficulty.* The duration of the interaction was an indication of how difficult the task was for the child.	Time of the interaction in seconds.	.98**

	Dyadic Dimensions		ICC
1	*Intersubjectivity*. This dimension referred to how well the mother and child seemed to be able to understand each other's perspectives and actions in relation to the task. Demonstration of a conversation-like dialogue, with shared gazes and an understanding of how the other viewed the task, are high indicators of inter-subjectivity. Synchronous communication on the task being completed and having a common set of goals would incur a high score.	1. no conversation-like dialogue or shared gazes, with no demonstration of understanding how the other viewed the task. Mother and child displayed no synchronous communication on the task being completed and had no common set of goals. 2. a low level of conversation-like dialogue and/or shared gazes, with some demonstrated understanding of how the other viewed the task. Mother and child displayed some synchronous communication on the task being completed and sometimes had a common set of goals. 3. moderate amount of conversation-like dialogue and/or shared gazes, with an average level of demonstrated understanding of how the other viewed the task. 4. substantial amount of conversation-like dialogue and shared gazes with a lot of demonstrated understanding of how the other viewed the task. 5. conversation-like dialogue and shared gazes throughout the whole task with continuously demonstrated understanding of how the other viewed the task.	.71**
2	*Conflict.* Minor or major disagreement - mutual or shared negative affect; arguing, tussling over a toy, etc.	1. no evidence of conflict during task. 2. little/minimal level of conflict. 3. moderate amounts of conflict - about half of the interaction is conflictual. 4. substantial conflict throughout, with only one or two instances of no conflict. 5. highly conflicted interaction for the entire task.	.81**

To sum up, the tasks for the main study were original as they were not tested in previous research and were designed by closely relating them to the children's potential homework. Through the pilot study, observations of a number of potential problems were identified with the first set of problem-solving activities, for example, the level of difficulty. The conclusions about the scaffolding tasks were drawn from the pilot observation which facilitated the grounds for the improvement and development of the appropriate, challenging activities for children and provided an opportunity for mothers to provide assistance to their children.

Simultaneously, several coding schemes measuring relevant scaffolding behaviours were tested. The limitation in the literature about the child's involvement in the scaffolding process and interrelationships between the mother and child's behaviour within this process had an impact on the availability of the measuring tools for such interactions. Therefore, the scheme to capture the behaviour of the mother, child and both of them as a dyad had to be developed. The compilation of three existing, previously well-established and reliable schemes was completed (Deater-Deckard et al., 1997; Mulvaney et al., 2006; Neitzel & Stright, 2003). However, the first version of the coding scheme had a too broader range of rating scale and it had to be reduced to the more conventional 5-point Likert scale. The second version was an improvement, but for some dimensions, the coders were not in agreement, potentially due to a number of conceptually over-lapping scaffolding dimensions. The reduction of some repetitive behavioural dimensions and rephrasing of the descriptions of other helped to improve the reliability and achieve the acceptable level of agreement. While the development of the coding scheme was an extensive process, it was one of the essential elements of the methodology as it was crucial to foster a reliable measure for the scaffolding process as it is the central concept of the current research.

The final version of coding scheme was the first attempt to assess the mother's and child's behaviour along with both of them as a dyad. The scaffolding interaction is a complex process and over-reliance on only the mother's action is a narrow view, while the acknowledgement of the child's involvement as a pro-active participant and as part of mutual behaviour as a dyad is essential.

The validation of the current coding scheme is evidenced by the range of assessed maternal behavioural dimensions established by numerous studies, focused on scaffolding interactions. On the other hand, aspects of the child's behaviour has had less support in previous research suggesting potential issues, for example, an examination of an irrelevant dimension of the child's behaviour within a scaffolding interaction. However, the strong level of inter-rater reliability verified the developed coding scheme as a robust tool for the assessment of behavioural dimensions exhibited by both mother and child in collaborative problem-solving.

4.9 Plan of analyses

4.9.1 Required sample size

To test the research hypotheses 1 to 7 (see Subchapter 3.6) and determine any assumed relationships, it was critical to establish the required sample size that would assure the statistical power of the analyses. A prior sample size calculation was conducted to confirm the statistical power of the results obtained through multiple regression analyses. G*Power 3.1 calculator was used for the sample size estimation (Cunningham & McCrum-Gardner, 2007). The required sample size for the main study of the current research project was 110 dyads. The sample size calculation was based on a small anticipated effect size (.30), a conservative level of significance (p = .05) and a total number of predictors n= 32. The desired statistical power level was .80, a level commonly accepted as a good statistical power (Aberson, 2010). Due to the difficulties in the recruiting process (see Subchapters 4.3- 4.4), the actual sample size of the main study is smaller (N=68). Thus, there were implications for the statistical analyses and interpretation of the results as discussed further in this subchapter.

As additional research was conducted in Russia, which had the nature of preliminary and exploratory research, the calculation of the power was not required.

4.9.2 Drop out information

The following step conducted prior to the analyses was to test if the small group of participants (N=5) that dropped out from the main study at Time 2 had any characteristics that were significantly different from the remaining sample group across all measures, including dimensions of scaffolding behaviour, person and contextual characteristics. To test the differences between the two groups, the Mann-Whitney U test was performed by analysing the data of the first home visit (Time 1). The results suggested a significant difference in the children's VMA (U = 26.5, p = .01) and emotion regulation (U = 56.5, p = .02), revealing that the children from the 'drop-out' sample scored lower for both characteristics. Also, differences were identified in the mother's emotional intelligence (U = 60.5, p = .02), as mothers who remained in the study possessed a higher level of emotional intelligence.

Table 4.7

The Mann-Whitney U test examining differences in two groups (N=5; N=63)

Variables	*Drop Out Participants*		*Main Study Participants*		*U*	*Z*	*p-value*
	Mean Ranks	*Sum of Ranks*	*Mean Ranks*	*Sum of Ranks*			
Child's Scaffolding Behaviour							
Level of difficulty (time)	31.80	159.00	34.18	2119.00	144.00	-0.26	.81
On Task	23.50	117.50	34.85	2160.50	102.50	-1.28	.22
Autonomy	37.50	187.50	33.72	2090.50	137.50	-0.42	.69
Positive Affect	36.40	182.00	33.81	2096.00	143.00	-0.29	.79
Negative Affect	38.30	191.50	33.65	2086.50	133.50	-0.54	.62
Non-compliance	33.90	169.50	34.01	2108.50	154.50	-0.01	.99
Child's Person Characteristics							
Working memory	44.00	220.00	33.19	2058.00	105.00	-1.21	.25
VMA	9.13	36.50	35.07	2174.5	26.50	-2.63	.01
Hyperactivity/ inattention	47.50	237.50	32.91	2040.50	87.50	-1.63	.11
Emotional symptoms	37.50	187.50	33.72	2090.50	137.50	-0.43	.69
Conduct problems	37.60	188.00	33.71	2090.00	137.00	-0.44	.69
Peer problems	35.50	177.50	33.88	2100.50	147.50	-0.19	.86
Pro-social behaviour	18.60	93.00	35.24	2185.00	78.00	-1.88	.07
Emotion recognition	42.40	212.00	32.77	1999.00	108.00	-1.09	.30
Lability/Negativity	47.80	239.00	32.89	2039.00	86.00	-1.66	.10
Emotion Regulation	14.30	71.50	35.59	2206.50	56.50	-2.37	.02
Theory of mind	37.90	189.50	33.69	2088.50	135.50	-0.50	.65
Cognitive MS	35.70	178.50	33.86	2099.50	146.50	-0.21	.84
Emotion MS	21.30	106.50	35.02	2171.50	91.50	-1.52	.13
Desire MS	27.50	137.50	34.52	2140.50	122.50	-0.78	.45
Modulation of assertion MS	42.60	213.00	33.31	2065.00	112.00	-1.07	.32
Other MS	30.40	152.00	34.29	2126.00	137.00	-0.55	.69
Mother's Scaffolding Behaviour							
Scaffolding Strategy	28.10	140.50	34.48	2137.50	125.50	-0.71	.49
Positive Affect	32.00	160.00	34.16	2118.00	145.00	-0.24	.83
Negative Affect	41.40	207.00	33.40	2071.00	118.00	-0.97	.40
Over-control	31.00	155.00	34.24	2123.00	140.00	-0.36	.74
Mother's Person Characteristics							
Education	41.80	209.00	33.37	2069.00	116.00	-0.98	.37
Occupation	44.60	223.00	33.15	2055.00	102.00	-1.39	.22
Expression of affection	34.10	170.50	33.99	2107.50	154.50	-0.01	.99
Parenting stress freq.	37.20	186.00	33.74	2092.00	139.00	-0.38	.72
Parenting stress intensity	38.00	190.00	33.68	2088.00	135.00	-0.48	.65
Emotion Intelligence	15.10	75.50	35.52	2202.50	60.50	-2.26	.02
Reappraisal	20.10	100.50	35.12	2177.50	85.50	-1.66	.10
Suppression	46.80	234.00	32.97	2044.00	91.00	-1.53	.13
Cognitive MS	22.50	112.50	34.93	2165.50	97.50	-1.37	.18

Variables	*Mean Ranks*	*Sum of Ranks*	*Mean Ranks*	*Sum of Ranks*	*U*	*Z*	*p-value*
Emotion MS	20.60	103.00	35.08	2175.00	88.00	-1.60	.12
Desire MS	37.30	186.50	33.73	2091.50	138.50	-0.39	.70
Modulation of assertion MS	43.00	215.00	33.27	2063.00	110.00	-1.07	.30
Other MS	42.10	210.50	33.35	2067.50	114.50	-0.98	.35
Dyad's scaffolding behaviour							
Intersubjectivity	31.60	158.00	34.73	2188.00	143.00	-.34	.75
Contextual factors							
Household chaos	33.80	169.00	34.02	2109.00	154.00	-0.02	.99
Crowding index	36.10	180.50	33.83	2097.50	144.50	-0.26	.81
Younger siblings	30.10	150.50	34.31	2127.50	135.50	-0.54	.65
Older siblings	38.70	193.50	33.62	2084.50	131.50	-0.74	.59
Total number of siblings	33.90	169.50	34.01	2108.50	154.50	-0.01	.99

4.9.3 The interrelationship between mother and child behaviour in scaffolding interaction. Analytical structure

In order to test Hypotheses 1 to 4 (see Subchapter 3.6), a number of statistical tests were utilised and presented in Chapter 5. First, the descriptive statistics were examined through establishing the means. Standard deviation and the range of the variables were measured during the scaffolding interactions at both time points. Then, the assumption that all variables were distributed normally was tested. These preliminary statistical tests provided the base for the following analyses.

Second, differences in the mother's and child's behaviours were tested by child gender. This approach helped to established whether there were differences in key variables according to gender and, therefore, whether to include the child's gender as a factor in further analyses.

Finally, following the preliminary analyses, an investigation directly relevant to the aim of the primary study and to test Hypotheses 1 and 2, was undertaken. The Actor-Partners Independent Model (APIM) is a model developed specifically for the investigation of bidirectional relationships within a dyad using a number of appropriate analytical tools (Cook & Kenny, 2005). Although the APIM model is conceptually in line with the current study, the statistical techniques that the model utilises (e.g. structural equational model) are not suitable. The modest size of the sample and not-normally-distributed variables precluded the use of APIM in this study. To address the bidirectional relationship in the scaffolding process, i.e. to establish the relative roles of the maternal scaffolding dimensions in predicting each aspect of the child's behavioural dimensions and vice versa, an adaptation of a cross-lagged design with a series of hierarchical multiple regressions was examined.

The principles of cross-lagged design are based on testing the same multiple (dependent and independent) variables across time, which enables an investigation of the causal relationship between them (Crano, Kenny, Campbell, 1972; Kenny, 1975). Therefore, as the current study had multiple points of measurement of several independent variables and outcome variables, it was decided the autoregressive cross-lagged model (Bollen & Curran, 2006) would be followed by testing the predictive relationship between the variables and by using a number of multiple regressions across time, with an account of the autoregressive effects (Cole & Maxwell, 2003; Gollob & Reichardt, 1987; Selig & Little, 2012).

The first step was a cross-sectional study to identify the relationship between the mother's and child's behavioural dimensions observed at the baseline visit. The second step replicated the cross-sectional study by testing the impact of the behavioural dimensions displayed by mother and child on each other, but this time at the follow-up visit. This step was conducted not only to test the consistency of results obtained at Time 1 but also to identify any new or changing relationships between the variables. The following step was to test the autoregressive effects through an examination of the stability of the behaviour of the mother and child across the time points. In the next step, the causal relationship across time were tested. Specifically, this tested whether maternal scaffolding observed at Time 1 predicted the child's behaviour at Time 2 and vice versa (see Figure 3.1). Finally, the same approach with the four groups of analyses to build up the variation of the cross-lagged model was used to test Hypotheses 3 and 4 (see Figure 3.2).

It is crucial to note, that the data set available could not meet all the required assumptions to perform the hierarchical multiple regression analyses. As some variables had not been distributed normally, it was decided to use bootstrapped multiple regressions with 1,000 samples (with a confidence interval of 95%) and bias-corrected acceleration. Bootstrapping methods in statistics are often recognised as a robust method as they involve independent distribution (Mooney & Duval, 1993) and increase the validity of research with a small sample size (Field, 2013). This method is also used to control and examine the stability of the results. The process of bootstrapping is achieved though replication (with replacement) of a certain number of samples based on the existing data set, and examining them by calculating standard errors and confidence intervals. These are then assessed together with p-values in order to identify statistical significance (Efron & Tibshirani, 1993; Wright, London, Field, 2011). Although, the bootstrapping method accommodated the required assumptions for adaptation of multiple regressions analyses such as normality and homoscedasticity (Field, 2013), it was also essential to test the multicollinearity by testing the variance inflation factors (VIF). VIF indicates the potential increase in the degree of the explained variance due to multicollinearity issue.

It was identified that neither the dimensions of maternal scaffolding, while they were independent variables, nor the child's behavioural dimensions, when they played the role of independent predictors, highly correlated with each other, suggesting that there was no issue with multicollinearity.

4.9.4 The contribution of the person and contextual factors to mother and child behaviour in scaffolding interaction. Analytical structure

To investigate the role of individual differences in the mother and child's behaviour in problem-solving interactions and address Hypotheses 5 to 7 (see Subchapter 3.6), the same analytical strategy, that was discussed in Subchapter 4.9.3, was adopted and is presented in Chapter 6. Specifically, the first step was a preliminary analyses that consisted of the examination of the descriptive statistics (means, standard deviation and range) of person characteristics and contextual factors. The second step, the parenting variables, child characteristics and contextual factors, represented by household chaos, were tested for gender differences. Other contextual factors - crowding index and the number of siblings - are non-gender relevant. The third step, cross-sectional and longitudinal correlations were carried out with all behavioural dimensions, person characteristics and contextual variables. Finally, in order to test the cross-sectional and longitudinal effects of independent variables (mother's and child's person characteristics and contextual factors) on dependent variables (each dimension of the mother's and child's behaviour) a cross-lagged design was adopted. An autoregressive cross-lagged model (Bollen & Curran, 2006) examined to what extent the independent variables predict the dependent variables, by utilising a series of multiple regressions longitudinally across a period of seven months. This model controlled for autoregressive effects, that is the effect of a dependent variable on itself observed at a later time (Gollob & Reichardt, 1987; Selig & Little, 2012).

The first step of a cross-lagged autoregressive model was a cross-sectional analysis that examined the relationship between independent variables and dependent variables observed at Time 1. The second step was to test the consistency of the relationship that was identified in Step 1 within the Time 2 data. The next step was to test the autoregressive effects for independent variables, as autoregressive effects for dependent variables were tested earlier in Chapter 5 (see Subchapter 5.2.3). Finally, the cross-lagged effects were examined to identify the longitudinal predictive relationship between the outcome variable observed at the follow-up visit and person characteristics of both the mother and child, along with contextual factors gathered at the baseline. Furthermore, the cross-lagged effect of the dependent variables exhibited at Time 1 on the independent variables measured approximately seven months later were examined.

In order to accommodate the cross-lagged design and establish what individual differences predict dimensions of behaviour displayed during scaffolding interaction, Hierarchical Multiple Regression Analysis was selected. Multiple Regression analysis was used to investigate the unique contributions of person and contextual characteristics in predicting maternal scaffolding behaviour at each time point and their cross-lagged effects.

Furthermore, as the foundation of the cross-lagged model is consistency, the same variable must be measured for each step of the model (cross-sectional or longitudinal), and this stability enabled an examination of the predictive relationship over time (Crano, Kenny, Campbell, 1972; Kenny, 1975). Due to the exploratory nature of the current research, a wide range of potential predictors were measured (total number: 32). It was noted that the inclusion of such a high number of variables in the hierarchical multiple regression for the sample size (Time 1: N=68, Time 2: N=63) could lead to an increase of Type II error. Moreover, the results of the a-priory sample size calculation (N=110) provided the ground to treat a large number of predictors with caution due to the potential lack of statistical power.

To reduce the number of variables, it was decided to test if there was an opportunity for the dimension reduction (Floyd & Widaman, 1995) and a parallel analysis was calculated. The parallel analysis is a statistical method that determines the number of factors in exploratory factor analyses (O'Connor, 2000). The parallel analysis was based on the comparison of the actual eigenvalues against the randomly generated data eigenvalues. The parallel analyses were calculated by the generation of 1,000 random sets, with an account of 95% of the distributions of random data eigenvalues, separately for the child's and mother's person characteristics and contextual variables. The results of this analysis were not definitive. Specifically, while the parallel analysis identified two potential factors in each group of variables, the scree plot suggested very little difference in the actual eigenvalues and means, suggesting an absence of statistical significance (Appendix H: Figures H.1- H.2). A representation of the child's or mother's characteristics in a single factor would provide a solution to the reduction of variables if the child's or mother's person characteristics contributed to the behaviour exhibited during the problem-solving situation. However, this would not specify whether these characteristics were related to cognitive, social or emotional abilities and therefore, defeat the purpose of the current study.

Thus, to keep the consistency required for each step of the autoregressive cross-lagged model and minimise Type II error, it was decided to calculate the independent cross-lagged model for each dimension of behaviour observed during a collaborative problem-solving situation. In particular, to test Hypothesis 5, four cross-lagged autoregressive models were conducted, based on each dimension of maternal behaviour (scaffolding strategy, positive affect, negative affect and over-control) as a dependent variable (see Figure 3.3). Five autoregressive models based on the dimensions of the child's behaviour (level of difficulty, on task behaviour, autonomy, positive affect, non-compliance) were used to test Hypothesis 6 (see Figure 3.4) and another model, based on the dyad's intersubjectivity, were utilised to test Hypotheses 7 (see Figure 3.5).

Furthermore, instead of testing the impact of a whole range of independent predictors on each of the behavioural dimensions, the cross-lagged model included only variables which significantly correlated with the outcome variable. The Pearson correlation analyses were performed beforehand (see Tables 6.4-6.6). Specifically, all significant relationships (at each time point and longitudinally) between maternal scaffolding dimensions and the mother's and child's person characteristics and contextual factors were identified, along with all the significant relationships between the dimensions of the child's behaviour and the same variables.

While this approach had a reductionist nature, the correlations identified had a theoretical grounding in the research literature (see Chapter 3) and allowed the statement that the hierarchical multiple regressions provide reliable results for the available modest sample size. However, given the number of regressions conducted as part of this analysis strategy, it was useful to start with a summary of the key outcomes and findings in order to guide the interpretation and reading of the following sections. In addition, it should be noted that variables that have not been included in the regression analyses might still have an indirect relationship (as mediators or moderators) with outcome variables, but examination of these relationships are beyond the scope and capacity of the current research given the limited sample size.

Summary of key findings:

Firstly, the following analysis demonstrates that over and above other variables, contextual factors predicted mother's use of appropriate scaffolding strategies and positive affective behaviour toward their children. Secondly, results showed that the child's cognitive and emotional abilities predicted specific child behaviours displayed during collaborative problem solving. Finally, the results demonstrated that dimensions of maternal scaffolding, along with the child's autonomous behaviour, make unique contributions to children's theory of mind. Further, it is detailed how these results were achieved.

4.9.5 A preliminary investigation of the cultural differences in Russia and England

The final stage of the analyses was a cross-cultural comparison of the patterns identified in the English study at Time 1 but within the Russian set of data. Firstly, in order to conduct such comparison, all measures were adapted for the Russian population through the procedures of back-translation, testing the validity and reliability (see Chapter 7).

Secondly, in Chapter 8, a simple exploratory analysis was applied to test the inter-relationship between the mother and child's behaviour displayed in collaborative problem-solving, along with the individual differences of these behaviours among Russian families. The following actions were undertaken in order to conduct the analyses: consistent with the previous chapters (See Chapters 5-7), the analyses began with descriptive statistics (means, standard deviation and range) of behavioural dimensions displayed during scaffolding interactions, person characteristics of both mother and child and contextual factors. Next, all variables (excluding the number of siblings and crowding index) were tested against the child's gender. Thirdly, due to the small sample size (N= 16), the non-parametric methods were used; however, the availability of appropriate statistical tools was quite limited. Therefore, it was decided to use the Spearman correlation analyses to test the relationship between mother's, child's and dyadic dimensions of behaviour in scaffolding interaction. The same statistical method was applied to identify the relationship between the behavioural dimensions, person variables and contextual factors.

Finally, the appropriate non-parametric method to compare the Russian (N= 16) and English (N= 68) samples would utilise the U Mann-Whitney test. However, the vast differences in the size of the sample groups would be reflected in the reduction of the statistical power that enables distinction between the cross-cultural differences; thus, U Mann-Whitney test was not appropriate. At this stage of the preliminary investigation, it was decided to compare the patterns between correlational analyses in each country.

CHAPTER 5. THE INTERRELATIONSHIP BETWEEN MOTHER AND CHILD BEHAVIOUR IN SCAFFOLDING INTERACTION

Many theorists have suggested that the scaffolding process is bidirectional in nature (Granott, 2005; Rogoff, 1990; Stone, 1993; Wood et al., 1976). It has also been proposed that the child's involvement could be significant for the learning process and may impact the use of scaffolding strategies implemented by the mother (Granott, 2005; Rogoff, 1990). Several empirical studies have accounted for the child's input; however, none of them explored the interrelationship between the mother and her child within a scaffolding interaction (Hammond et al., 2012; Pianta et al., 1991). Also, it was noted that dyadic intersubjectivity is a crucial element in the process of learning at home (see Chapter 2). However, empirical evidence of its presence is also limited.

Therefore, the following hypotheses are tested:

1. Dimensions of maternal scaffolding (quality of instruction, contingency, positive affect, negative affect and over-control) will predict dimensions of the child's behaviour (level of difficulty, amount of help required, autonomy, on task behaviour, positive affect, negative affect, non-compliance behaviour) displayed during joint problem-solving interactions) cross-sectionally and longitudinally.
2. Dimensions of the child's behaviour exhibited during joint problem-solving situations will predict dimensions of maternal scaffolding behaviour cross-sectionally and longitudinally.
3. Both mother's and child's behavioural dimensions will predict the level of intersubjectivity recorded during the scaffolding interaction cross-sectionally and longitudinally.
4. Dyadic intersubjectivity will predict mother's and child's behaviour cross-sectionally and longitudinally.

Figure 5.1 illustrates autoregressive cross-lagged design required to test Hypothesis 1 and 2. Similarly, Figure 5.2 demonstrates autoregressive cross-lagged design that addresses Hypothesis 3 and 4.

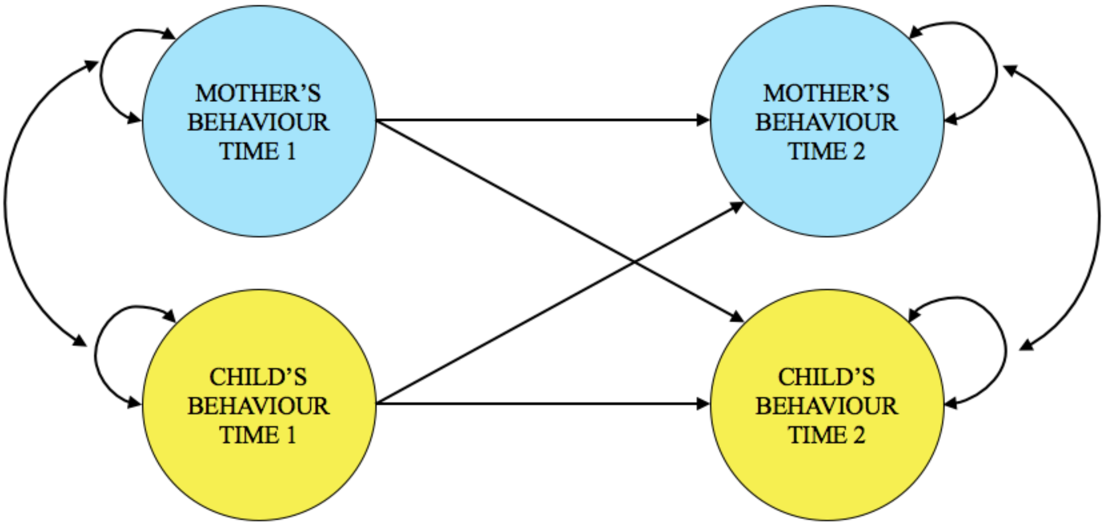

Figure 5.1 Cross-lagged autoregressive model examining the relationship between the dimensions of behaviour displayed by mother and child during scaffolding interaction based on the multiple regression analyses

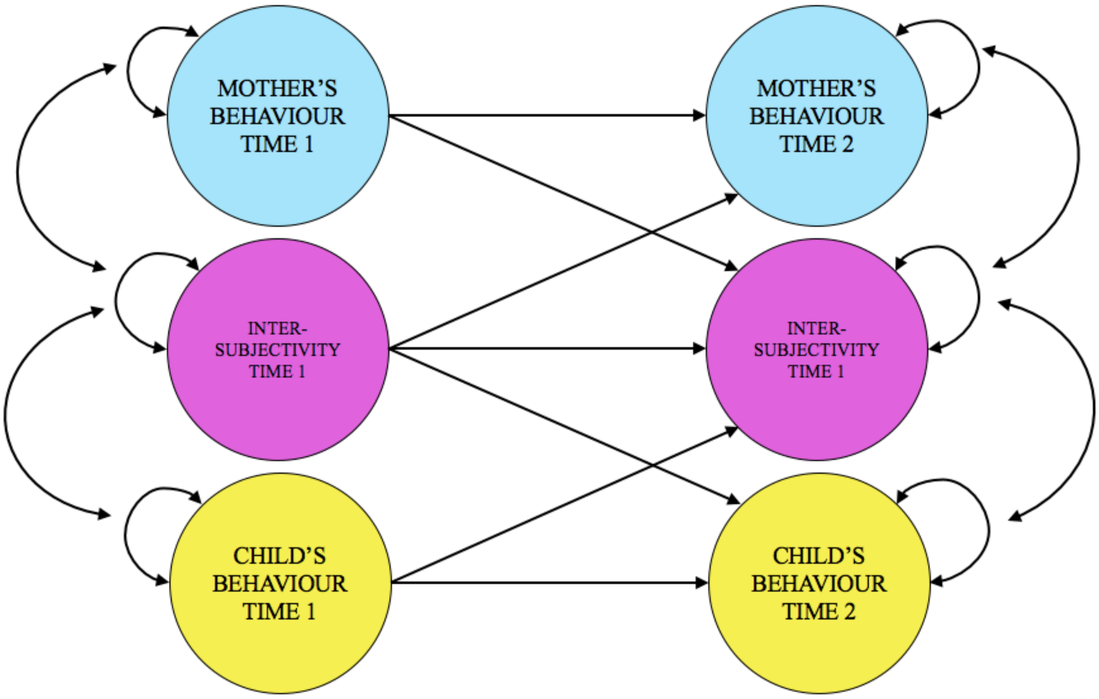

Figure 5.2 Cross-lagged autoregressive model examining the relationship between the dimensions of behaviour displayed by mother, child and dyad's intersubjectivity during scaffolding interaction based on the multiple regression analyses

5.1 Preliminary analyses

The total sample size at Time 1 was $N = 68$ and $N = 63$ at Time 2 due to participant drop out. Table 5.1 shows the means, standard deviations and range values for the four dimensions of the mother's behaviour, six dimensions of the child's behaviour and dyadic intersubjectivity measured across both time points. The scaffolder's behavioural variables are scaffolding strategy, positive affect, negative affect and over-control. The child's behaviour is represented by the level of difficulty, positive and negative affect, autonomy, on task behaviour and non-compliance.

Originally, five dimensions of maternal scaffolding behaviour were examined, including the quality of instruction and contingency. However, during further development of the coding scheme, the Pearson correlation analyses (see Table 5.2) identified some strong correlations between the dimensions of scaffolding behaviour. Specifically, there was a strong association between the quality of instruction and contingency ($r = .56$, $p < .01$) as well as the correlation between contingency and over-control ($r = -.61$, $p < .01$). As the dimensions of quality of instruction and contingency overlap in their theoretical backgrounds (Wood & Middleton, 1975), it was decided to calculate a composite score labelled the scaffolding strategy by averaging these two dimensions.

Also, the Pearson correlation analyses identified a strong relationship between two of the child's dimensions – the amount of help required and autonomy ($r = -.60$, $p < .01$). This link could potentially be explained as an overlap in the definitions of those dimensions. One dimension aimed to record how difficult the task is for the child, indicated through the amount of help from the parent that was required by the child to complete the task. The other considered the child's ability to act independently and autonomously. Therefore, a composite score was computed by reversing one of the scales before averaging the scores of the two dimensions to gain a new variable but which retains and be referred to using the same name of 'child's autonomy'.

Table 5.1

Descriptive statistics for behavioural dimensions of scaffolding. Time 1 (N=68) and Time 2 (N=63)

Variables	*Time 1*			*Time 2*		
	Mean	*SD*	*Observed range*	*Mean*	*SD*	*Observed range*
Mother's Scaffolding Behaviour						
Scaffolding Strategy	3.82	.50	2.50-4.75	3.89	.46	2.67-4.75
Positive Affect	2.80	.70	1.50-4.50	2.54	.74	1.0-4.67
Negative Affect	1.21	35	1.00-2.67	1.16	.30	1.0-2.67
Over-control	1.97	.71	1.00-4.50	1.78	.57	1.0- 3.67
Child's Scaffolding Behaviour						
Level of difficulty (time)	211.63	62.19	112.50-402.00	206.70	68.47	99.75-416.50
Autonomy	3.48	52	2.38-4.50	3.48	.36	2.67-4.38
On Task	4.53	.44	3.50-5.00	4.74	.36	3.75-5.00
Positive Affect	2.11	.67	1.00-3.75	2.03	.64	1.0-4.00
Negative Affect	1.30	.38	1.00-3.00	1.17	.30	1.0-2.33
Non-compliance	1.40	.35	1.00- 2.67	1.39	.36	1.0-2.67
Dyad's Scaffolding Behaviour						
Intersubjectivity	3.69	.56	2.00- 4.75	3.73	.59	2.25-5.00

Table 5.2

Bivariate correlations between behavioural dimensions of scaffolding. Time 1 (N= 68)

	Variables	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*
1	Maternal Quality of instruction	-												
2	Contingency	.56**	-											
3	Positive Affect	.22	.04	-										
4	Negative Affect	-.43**	-.31**	-.28*	-									
5	Over-control	-.33**	-.61**	.11	.16	-								
6	Child's level of difficulty (time)	-.03	-.29*	.12	.31*	.18	-							
7	Amount of help required	-.35**	-.38**	.05	.22	.38**	.52**	-						
8	Autonomy	.25*	.34**	.01	-.19	-.56**	-.28*	-.60**	-					
9	On Task	.16	.16	.04	-.29*	-.26*	-.24*	-.37**	.43**	-				
10	Positive Affect	.09	-.23	.43**	.11	.12	.33**	.12	-.16	-.18				
11	Negative Affect	.06	.11	-.01	-.01	.09	0	.05	-.15	-.39**	-.25*	-		
12	Noncompliance	.12	.01	.03	.09	.14	.14	.20	-.17	-.41**	-.03	.49**	-	
13	Dyad Intersubjectivity	.53**	.40**	.42**	-.37**	-.26*	-.17	-.36**	.26*	.25*	.31*	-.13	-.16	-

**p<.05, ** p<.01*

Next, a set of primary analyses was performed with the aim of identifying if there were differences in scaffolding behaviour based on the child's gender. Each variable was tested for normal distribution using Kolmogorov-Smirnov and Shapiro-Wilk tests, by an assessment of skewness and kurtosis (Appendix G: Table G.1). A majority of them did not meet the assumptions. Therefore, in order to compare independent, not normally distributed variables, the Mann-Whitney U test was adopted.

Firstly, all dimensions of maternal scaffolding behaviour in relation to the child's gender were tested across two time points, but no statistical differences were revealed as $p > .05$. Similar results were gained by examination of the gender differences in dimensions of the child's scaffolding behaviour. The results suggested no statistical gender differences between any aspect of the child's behaviour ($p > .05$) apart from on task behaviour which was measured at Time 2 ($p < .05$). The dyadic behaviour was no different between dyads with sons and dyads with daughters.

Secondly, as part of the sample that included mothers who had English as their second language, it was decided to test whether the scaffolding behaviour differed from mothers who had English as their first language. In order to achieve this, the mean of the variables was compared by the Mann-Whitney U test which showed no statistical differences in scaffolders ($p > .05$), child's and dyadic behaviour in relation to the maternal native tongue.

5.2 Examining scaffolding interaction as bidirectional

Existing knowledge of the interrelationship between maternal and child behaviour in collaborative problem-solving is limited. Thus, it was decided that data obtained in the current study could provide an understanding of not only which behavioural dimensions could be significant predictors, but also which behaviours impact the particular behavioural dimension of other partners in the scaffolding interactions through a series of hierarchical multiple regression analyses. However, due to not normally distributed data, the required assumptions could not be met in order to perform the hierarchical multiple regression analyses. Thus, it was decided to use bootstrapped multiple regressions with 1,000 samples (with a confidence interval of 95%) and bias-corrected acceleration.

5.2.1 Time 1: Cross-sectional examination. How dimensions of maternal scaffolding impact child behaviour and vice versa?

Each dimension of the child's scaffolding behaviour (level of difficulty, autonomy, on task behaviour, positive affect, negative affect and non-compliance) was a dependent variable, while the mother' behaviour (scaffolding strategies, positive affect, negative affect and over-control) were independent variables. The independent variables were entered as independent steps in the regression.

The order of the steps was identified based on the literature in the field - cognitive (tutoring) support, emotional support (positive and negative affect) and transfer of responsibility (Neitzel & Stright, 2003). First and foremost, the maternal quality instructions and appropriate manner of their presentation to the child, while assisting in mutual task accomplishment (Vygotsky, 1930-1934/ 1978; Wertsch, 1985; Wood et al., 1976) were represented by scaffolding strategies and entered in Step 1. Once the fundamental dimension of scaffolding behaviour was accounted for, Step 2 was recorded as positive affect as the appropriate emotional response to the child's behaviour in scaffolding interaction. It was suggested that a positive attitude towards the child, warmth and responsiveness demonstrated by the mother was related to the children's higher performance in problem-solving situations (Dennis, 2006; Grusec & Goodnow, 1994; Landry et al., 2006). As such, maternal negative affect was entered in Step 3. Finally, once the child was provided with appropriate instructional and emotional support, the encouragement of the child's autonomy is essential (Bernier et al., 2010; Grolnick et al., 2002; Rogoff, 1990). Thus, the dimension of over-control behaviour was entered in Step 4.

The first regression investigated the amount of variance accounted for by the mother's behaviour in relation to the child's autonomy (see Table 5.3). Maternal use of appropriate scaffolding strategies accounted for 16% of the variability in the child's autonomy (F= 14.15; p< .001) while the addition of positive and negative affect, Step 2 and Step 3 respectively, had no significant influence. Entering over-control in Step 4 accounted for a further 13% of the variance (Adjusted R^2= .29, F= 7.94, p< .001) while the scaffolding strategy behaviour lost its significance. Children of mothers who displayed less controlling behaviour were more likely to act independently and autonomous.

In relation to the child's positive affect (see Table 5.4), Step 1 did not significantly predict the child's positivity during the process of learning at home. The dimension of the mother's positive affect entered in Step 2 became a predictor of positive affect displayed by the child (Adjusted R^2= .18, F= 8.35, p< .001); children were more likely to be positive, warm and connected with positive and warm mothers. The addition of further steps did not increase the amount of variance explained.

Finally, none of the maternal scaffolding dimensions explained any variation in the child's level of difficulty, on task behaviour, negative affect or non-compliance (see Appendix G: Tables G.2-G.5).

Table 5.3

Hierarchical regression analysis of maternal scaffolding behaviour predicting child's autonomy. Time 1 (N= 68)

Variables	*Model 1*			*Model 2*			*Model 3*			*Model 4*		
	B	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Scaffolding Strategy	.43	.11	.42**	.44	.11	.43**	.41	.12	.39**	.14	.12	.13
Positive Affect				-.06	.08	-.08	-.07	.07	-.10	-.01	.08	-.02
Negative Affect							-.15	.26	-.10	-.16	.23	-.11
Over-control										-.34	.09	-.46**
Adjusted R^2		.16			.16			.15			.29	
F for change in R^2		14.15***			7.26**			5.01**			7.94***	

B- unstandardised beta coefficient; SE- standard error; β- standardised beta;

**p < .05. **p < .01. ***p < .001*

Table 5.4

Hierarchical regression analysis of maternal scaffolding behaviour predicting child's positive affect. Time 1 (N= 68)

Variables	*Model 1*			*Model 2*			*Model 3*			*Model 4*		
	B	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Scaffolding Strategy	-.11	.16	-.08	-.19	.16	-.15	-.08	.18	-.06	-.08	.23	-.06
Positive Affect				.43	.11	.45**	.48	.12	.50**	.48	.13	.50**
Negative Affect							.43	.32	.23	.43	.32	.23
Over-control										.00	.15	.00
Adjusted R^2		-.01			.18			.21			.20	
F for change in R^2		.41			8.35**			6.90***			5.09**	

B- unstandardised beta coefficient; SE- standard error; β- standardised beta;

*$p < .05$. **$p < .01$. ***$p < .001$

The next step was to identify the relative roles of the child's scaffolding behaviour (level of difficulty, autonomy, on task behaviour, positive affect, negative affect and non-compliance) for predicting each of the maternal scaffolding dimensions (scaffolding strategies, positive affect, negative affect and over-control) within the interaction by conducting four independent hierarchical multiple regressions at Time 1 (See Table 5.5-5.7).

To assess these predictions, each dimension of the child's behaviour was entered as an additional step in the regression model. The level of difficulty was measured as the amount of time the child had spent to accomplish the tasks with the mother and was entered as a control variable in Step 1. The available empirical literature of child's behaviour in problem-solving interactions with the mother is very limited, however, there is enough theoretical knowledge about children's learning in general to develop the order of the hierarchical regression.

According to Vygotsky (1930-1934/ 1978) children are active participants of the learning process through the process of internalization. Regardless of the mother's effort, the involvement of children in the learning process and their persistence is essential, therefore on task behaviour would be entered in Step 2.

The next critical element of the learning process was the child's autonomy, which was conceptualised within the self-determination theory (Deci & Ryan, 1985), and entered in Step 3. Autonomous behaviour is essential for the child's individual ability to master the task and solve problems independently (Grolnick & Ryan, 1987). These are consistent with findings highlighted earlier, specifically the importance for the mother to promote autonomous behaviour (Grolnick & Ryan, 1989; Neitzel & Stright, 2003).

Furthermore, the significant role of the child's academic emotions was identified in relation to the use of learning strategies, self-regulation and academic achievement (Crick & Dodge, 1994; Pekrun, Goetz, Titz, Perry, 2002). Thus, the child's positive affect was entered in Step 4.

Finally, while the child's emotions during the tutoring process and the ability to regulate them is important for learning in general (Baker et al., 2007; Cole et al., 1994), previously it was suggested that the child's dysregulation of emotions was negatively associated with the quality of maternal scaffolding (Hoffman et al., 2006). Then, the dimension of child's negative affect was entered in Step 5 and non-compliance in Step 6. The steps were entered in the order of significance for the learning process as related to each specific type of child's behaviour within the process of problem-solving, specifically engagement, independence, emotional response.

The results of the first regression (see Table 5.5) suggested that the autonomy displayed by the child during task solving explains 14% of the variance in the type of the scaffolding strategy used by the mother (Adjusted R^2 = .14, F= 4.58, p< .01). Model 3 is the best fitting model as the addition of positive affect, negative affect and non-compliance variables did not significantly improve the prediction.

In relation to the mother's positivity (see Table 5.6), neither Steps 1, 2 or 3 significantly predicted maternal positive affect. However, in Step 4, the child's positive affect accounted for 15% of the variance of the mother's positive affect (F= 3.87, p< .01). It was also revealed that the child's observed scaffolding dimensions did not predict maternal negative affect as no significant relationships were found (see Appendix G: Table G.7)

Table 5.7 demonstrated that the level of difficulty entered in the first model was not a significant predictor of maternal over-control, while a significant amount of variance (Adjusted R^2 = .27, F= 9.37, p< .001) in the mother's controlling behaviour, as demonstrated during the shared task activity, was determined by the child's ability to work independently (autonomy). The best fit was provided by Model 3 as inclusion of further steps decreased the effect size (Model 6: Adjusted R^2 *change*=-.03, F= 4.57, p< .01).

Table 5.5

Hierarchical regression analysis of child behaviour predicting maternal scaffolding strategy. Time 1 (N= 68)

Variables	*Model 1*			*Model 2*			*Model 3*			*Model 4*			*Model 5*			*Model 6*		
	B	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Level of difficulty	.00	.00	-.18	.00	.00	-.12	.00	.00	-.01	.00	.00	.00	.00	.00	-.01	.00	.00	-.02
On Task				.16	.14	.15	-.01	.15	-.01	-.01	.16	-.01	.08	.17	.07	.12	.17	.11
Autonomy							.43	.12	.42**	.41	.12	.42**	.40	.12	.42**	.41	.12	.42**
Positive Affect										-.02	.10	-.02	.03	.10	.04	.03	.10	.04
Negative Affect													.25	.21	.19	.17	.25	.13
Non-compliance																.20	.23	.14
Adjusted R^2		.02			.15			.14			.13			.14			.14	
F for change in R^2		2.24			6.97**			4.58**			3.39*			3.15*			2.81*	

B- unstandardised beta coefficient; SE- standard error; β- standardised beta;

*$p < .05$. **$p < .01$. ***$p < .001$

Table 5.6

Hierarchical regression analysis of child behaviour predicting maternal positive affect. Time 1 (N= 68)

Variables	*Model 1*			*Model 2*			*Model 3*			*Model 4*			*Model 5*			*Model 6*		
	B	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Level of difficulty	.00	.00	.12	.00	.00	.13	.00	.00	.14	.00	.00	-.01	.00	.00	-.01	.00	.00	-.02
On Task				.11	.22	.07	.10	.23	.06	.19	.21	.12	.33	.23	.21	.35	.22	.22
Autonomy							.02	.17	.01	-.01	.15	-.01	-.02	.15	-.01	-.02	.16	-.01
Positive Affect										.47	.14	.45**	.54	.14	.52**	.54	.15	.52**
Negative Affect													.36	.25	.19	.32	.31	.17
Non-compliance																.11	.36	.06
Adjusted R^2		.00			-.02			-.03			.15			.16			.15	
F for change in R^2		.89			.58			.39			3.87**			3.60**			2.98*	

B- unstandardised beta coefficient; SE- standard error; β- standardised beta;

**p < .05. **p < .01. ***p < .001*

Table 5.7

Hierarchical regression analysis of child behaviour predicting maternal over-control. Time 1 (N= 68)

Variables	*Model 1*			*Model 2*			*Model 3*			*Model 4*			*Model 5*			*Model 6*		
	B	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Level of difficulty	.00	.00	.18	.00	.00	.13	.00	.00	-.06	.00	.00	-.07	.00	.00	-.07	.00	.00	-.08
On Task				-.37	.21	-.23	-.03	.19	-.02	-.02	.20	-.01	.00	.21	.00	.02	.20	.01
Autonomy							-.77	.17	-.56**	-.78	.17	-.57**	-.78	.17	-.57**	-.78	.17	-.57**
Positive Affect										.06	.15	.06	.07	.15	.07	.07	.15	.07
Negative Affect													.06	.24	.03	.04	.25	.02
Non-compliance																.07	.38	.04
Adjusted R^2		.02			.05			.27			.26			.25			.24	
F for change in R^2		2.31			2.91			9.37***			7.02***			5.55***			4.57**	

B- unstandardised beta coefficient; SE- standard error; β- standardised beta;

**p* < .05. ***p* < .01. ****p* < .001

To sum up the predictive relationship between mother and child across Time 1, both sets of regressions showed a similar pattern in relation to positivity and the effect of controlling behaviour (see Figure 5.3). Positive affect displayed by the mother was predicted by the child's positive effect and vice versa. Moreover, the child's ability to work on problem-solving situations independently was explained by less controlling mothers, while over-control was negatively determined by the child's autonomy.

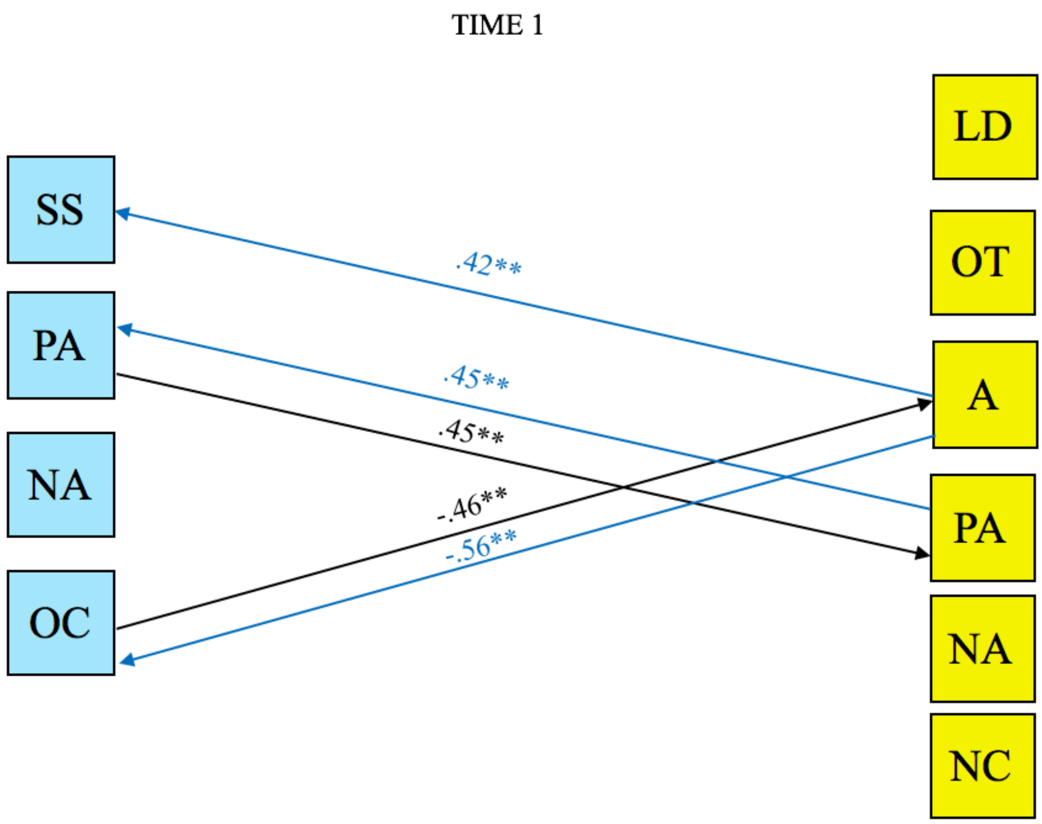

Figure 5.3 Cross-sectional examination. Predictive relationship between dimensions of the mother and child behaviour at Time 1 (N= 68).*Maternal dimensions: SS-Scaffolding Strategy, PA- Positive Affect, NA- Negative Affect, OC- Over-Control, Child's dimensions: LD- Level of Difficulty, OT- On Task behaviour, A- Autonomy, PA-- Positive Affect, NA- Negative Affect, NC- Non-compliance*

5.2.2. Time 2: Cross-sectional examination. How dimensions of maternal scaffolding impact child behaviour and vice versa?

The patterns described earlier retained similarities when the relationship was observed approximately seven months later during the second time point (See Table 5.8-5.11). For example, consistent with findings at Time 1, the child's negative affect and non-compliance observed at the follow up visit had no significant predictive relationship with the dimensions of maternal scaffolding (see Appendix G: Tables G.7-G.8).

Additionally, new patterns occurred that could be explained through the child's growth and ability to demonstrate a wider spectrum of behavioural variability during the problem-solving, or perhaps gained through formal academic experience to better understand problem-solving situations. Alternatively, these new patterns could be due to maternal factors such as better familiarity with the type of the tasks or process of testing. In this section, these new patterns are discussed.

The results of the regression analyses showed that the level of difficulty was predicted by two dimensions of scaffolding behaviour (see Table 5.8). Neither Model 1 nor Model 2 provided statistical significance in explanation of variability of the child's level of difficulty. However, the addition of the dimension of maternal negative affect explained 17% of the variance (F= 5.27, p< .01). Furthermore, scaffolding strategy became a significant predictor (β= .27, t= 2.10, p< .05). Model 3 was considered as the most suitable as Model 4 did not provide any new significant predictors.

In relation to on task behaviour (see Table 5.9), similar to the previous regression, the first two Models were not statistically significant. However, the negative affect explained 16% of the overall variability in the child's on task behaviour (F= 4.85, p< .01), suggesting that less controlling mothers are more likely to have children who display higher on task behaviour during joint problem-solving activity.

In relation to the child's autonomy displayed during the scaffolding interaction at Time 2 (see Table 5.10), the maternal scaffolding strategy was a significant predictor across the first three Models, which was consistent with the identified predictive relationship at Time 1. However, the entrance of maternal negative affect observed at the follow up visit in Step 3 explained a further 4% of the variability in the child's autonomy (Adjusted R^2= .24, F= 7.34, p< .001). Model 3 was chosen as the best fitting and suggested that mother's use of appropriate scaffolding strategies in conjunction with a low level of negativity led to the child's ability to independently work on the task. Finally, in relation to the child's positive affect at Time 2 (see Table 5.11), Models 1, 2 and 3 demonstrated similar patterns as described at Time 1. While the addition of the Scaffolding Strategies variable in Model 1 was not a statistically significant predictor of the child's positive affect, Model 2 explained 26% of variance with mother's positive affect (F= 12.11, p< .001). Model 3 did not provide any significant predictor to the dependent variable, while Model 4, with an addition of the fourth independent variable (over-control), explained a further 12% of the variability in the child's positive affect (Adjusted R^2= .38, F= 10.44, p< .001). Beta coefficients for two predictors were maternal positive affect (β= .50, t= 4.66, p< .01) and over-control (β= .44, t= 3.54, p< .01). Specifically, mothers with more positive attitudes towards their children were more likely to have a child who displayed higher positive affect during the scaffolding interaction. Interestingly, more controlling mothers were also likely to have more positive children.

Table 5.8

Hierarchical regression analysis of maternal scaffolding behaviour predicting child's level of difficulty. Time 2 (N= 63)

Variables	*Model 1*			*Model 2*			*Model 3*			*Model 4*		
	B	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Scaffolding Strategy	10.97	22.18	.07	11.30	22.55	.08	39.39	18.07	.27*	28.54	18.67	.19
Positive Affect				-1.28	11.87	-.01	13.81	11.29	.15	14.01	11.50	.15
Negative Affect							118.55	30.38	.53**	116.40	30.24	.52**
Over-control								18.07		-13.97	17.07	-.12
Adjusted R^2		-.01			-.03			.17			.17	
F for change in R^2		.34			.17			5.27**			4.09**	

B- unstandardised beta coefficient; SE- standard error; β- standardised beta;

$^*p < .05$. $^{**}p < .01$. $^{***}p < .001$

Table 5.9

Hierarchical regression analysis of maternal scaffolding behaviour predicting child's on task behaviour. Time 2 (N= 63)

Variables	*Model 1*			*Model 2*			*Model 3*			*Model 4*		
	B	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Scaffolding Strategy	.09	.11	.11	.10	.10	.12	-.05	.09	-.06	-.07	.11	-.09
Positive Affect				-.03	.07	-.06	-.11	.07	-.22	-.11	.07	-.22
Negative Affect							-.59	.21	-.50*	-.60	.21	-.50*
Over-control										-.04	.09	-.06
Adjusted R^2		.00			-.02			.16			.15	
F for change in R^2		.76			.49			4.85**			3.63**	

B- unstandardised beta coefficient; SE- standard error; β- standardised beta;

**p < .05. **p < .01. ***p < .001*

Table 5.10

Hierarchical regression analysis of maternal scaffolding behaviour predicting child's autonomy. Time 2 (N= 63)

Variables	*Model 1*			*Model 2*			*Model 3*			*Model 4*		
	B	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Scaffolding Strategy	.35	.10	.46**	.36	.09	.47**	.28	.09	.37**	.16	.13	.20
Positive Affect				-.04	.05	-.07	-.08	.06	-.16	-.08	.06	-.16
Negative Affect							-.33	.16	-.28*	-.36	.15	-.30*
Over-control										-.16	.09	-.26
Adjusted R^2		.20			.19			.24			.27	
F for change in R^2		16.00***			8.12**			7.34***			6.65***	

B- unstandardised beta coefficient; SE- standard error; β- standardised beta;

**p < .05. **p < .01. ***p < .001*

Table 5.11

Hierarchical regression analysis of maternal scaffolding behaviour predicting child's positive affect. Time 2 (N= 63)

Variables	*Model 1*			*Model 2*			*Model 3*			*Model 4*		
	B	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Scaffolding Strategy	.12	.18	.09	.00	.15	.00	.05	.16	-.03	.34	.17	.24
Positive Affect				.46	.12	.54**	.44	.13	.51**	.43	.10	.50**
Negative Affect							-.18	.22	-.09	-.11	.22	-.05
Over-control										.49	.14	.44**
Adjusted R^2		-.01			.26			.26			.38	
F for change in R^2		.46			12.11***			8.15***			10.44***	

B- unstandardised beta coefficient; SE- standard error; β- standardised beta;

**p < .05. **p < .01. ***p < .001*

The next set of regressions identified the predictive relationship of the child's behaviour displayed during the interaction at Time 2 in relation to aspects of maternal scaffolding (See Table 5.12- 5.15).

The results at Time 1 and Time 2 were consistent. Specifically, Table 5.12 illustrated that at Time 2, 23% of the overall variance in maternal use of scaffolding strategies was explained by the child's autonomy (F= 7.28, p< .01). These findings corresponded with the results obtained at the baseline visit. Furthermore, maternal positivity (see Table 5.13) was predicted by the child's positive attitude displayed during collaborative problem-solving (Adjusted R^2=.25, F= 6.19, p< .001).

On the other hand, the results of the regression analyses (see Table 5.14) showed that two dimensions of the child's behaviour (on task behaviour and positive affect) explained the variability in mother's negativity (Adjusted R^2= .36, F= 9.89, p< .001). While Models 1, 2 and 3 were, significant and explained 22% of the variance, neither of them provided a significant independent predictor. However, entering the child's positive affect explained an additional 14% of the variability along with on task behaviour. In other words, children who demonstrated off-task behaviour or lower positive affect were more likely to have mothers with higher negativity. Beta coefficients for two predictors were lower on task behaviour (β= -.37, t= -3.17, p< .01) and decreased child's positive affect (β= -.40, t= -3.78, p< .05). Interestingly, the negative affect dimension was also measured and entered as Model 5 but it was not significant, while lower positive affect was. Model 4 was chosen as the best fit as the further addition of the independent predictors were insignificant and did not change Adjusted R^2.

Table 5.15 demonstrated that there were three predictors that explained 32% of the variance of the mother's over-control behaviour (Adjusted R^2= .32, F= 8.21, p< .001). The child's level of difficulty entered in Step 1 was not a significant predictor and explained only 1% of the variance. In Model 3, the length of interaction time, represented by the child's level of difficulty, and lower level of autonomy together explained 24% (p< .01), while the addition of the child's positivity in Model 4 explained a further 8% of the variance (p< .05) in maternal controlling behaviour. Further steps did not contribute to the over-control behaviour. This analysis demonstrated that the more positivity was displayed by the child, the more likely this led to the mother's controlling behaviour. Moreover, less autonomy displayed by the child also led to over-control from mother. And finally, a lower level of difficulty suggested that mothers had used more over-control during the interaction.

Table 5.12

Hierarchical regression analysis of child behaviour predicting maternal scaffolding strategy. Time 2 (N= 63)

Variables	*Model 1*			*Model 2*			*Model 3*			*Model 4*			*Model 5*			*Model 6*		
	B	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Level of difficulty	.00	.00	.07	.00	.00	.11	.00	.00	.25	.00	.00	.24	.00	.00	.25	.00	.00	.25
On Task				.17	.17	.14	-.09	.17	-.07	-.06	.18	-.05	-.07	.19	-.05	-.05	.19	-.04
Autonomy							.74	.19	.57**	.73	.19	.56**	.73	.19	.57**	.73	.19	.56**
Positive Affect										.07	.10	.09	.06	.10	.09	.06	.10	.09
Negative Affect													-.02	.25	-.02	.10	.24	-.02
Non-compliance																-.04	.26	.03
Adjusted R^2		-.01			-.01			.23			.23			.22			.20	
F for change in R^2		.34			.70			7.28***			5.58**			4.39**			3.61**	

B- unstandardised beta coefficient; SE- standard error; β- standardised beta;

$*p < .05$. $**p < .01$. $***p < .001$

Table 5.13

Hierarchical regression analysis of child behaviour predicting maternal positive affect. Time 2 (N= 63)

Variables	*Model 1*			*Model 2*			*Model 3*			*Model 4*			*Model 5*			*Model 6*		
	B	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Level of difficulty	.00	.00	.00	.00	.00	-.01	.00	.00	-.01	.00	.00	-.05	.00	.00	-.04	.00	.00	-.04
On Task				-.09	.29	-.05	-.11	.33	-.05	.19	.27	.09	.13	.30	.06	.21	.33	.10
Autonomy							.05	.34	.02	-.01	.29	.01	.00	.30	.00	-.02	.30	-.01
Positive Affect										.66	.12	.57**	.64	.13	.55**	.63	.14	.54**
Negative Affect													-.15	.26	-.06	-.22	.29	-.09
Non-compliance																.21	.29	.10
Adjusted R^2		-.02			-.03			-.05			.25			.24			.24	
F for change in R^2		.00			.06			.05			6.19***			4.92**			4.17**	

B- unstandardised beta coefficient; SE- standard error; β- standardised beta;

**p < .05. **p < .01. ***p < .001*

Table 5.14

Hierarchical regression analysis of child behaviour predicting maternal negative affect. Time 2 (N= 63)

Variables	*Model 1*			*Model 2*			*Model 3*			*Model 4*			*Model 5*			*Model 6*		
	B	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Level of difficulty	.00	.00	.36	.00	.00	.29	.00	.00	.24	.00	.00	.27	.00	.00	.25	.00	.00	.25
On Task				-.27	.12	-.33	-.22	.12	-.26	-.31	.10	-.37**	-.26	.12	-.32*	-.30	.14	-.35*
Autonomy							-.16	.13	-.18	-.14	.11	-.16	-.15	.11	-.17	-.14	.11	-.17
Positive Affect										-.19	.07	-.40*	-.18	.07	-.37*	-.17	.07	-.36*
Negative Affect													.10	.11	.10	.13	.12	.13
Non-compliance																-.08	.15	-.10
Adjusted R^2		.12			.21			.22			.36			.36			.36	
F for change in R^2		9.28**			9.13***			6.86***			9.89***			8.02***			6.74***	

B- unstandardised beta coefficient; SE- standard error; β- standardised beta;

**p < .05. **p < .01. ***p < .001*

Table 5.15

Hierarchical regression analysis of child behaviour predicting maternal over-control. Time 2 (N= 63)

Variables	*Model 1*			*Model 2*			*Model 3*			*Model 4*			*Model 5*			*Model 6*		
	B	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Level of difficulty	.00	.00	-.15	.00	.00	-.18*	.00	.00	-.32*	.00	.00	-.34*	.00	.00	-.35*	.00	.00	-.35*
On Task				-.19	.18	-.12	.14	.21	.09	.26	.21	.16	.31	.23	.20	.31	.24	.20
Autonomy							-.91	.23	-.57**	-.93	.22	-.58**	-.95	.22	-.59**	-.95	.22	-.59**
Positive Affect										.26	.11	.29*	.28	.11	.31*	.28	.12	.32*
Negative Affect													.14	.24	.07	.15	.27	.08
Non-compliance																-.02	.24	-.01
Adjusted R^2		.01			.00			.24			.32			.31			.30	
F for change in R^2		1.43			1.12***			7.68***			8.21***			6.56***			5.37***	

B- unstandardised beta coefficient; SE- standard error; β- standardised beta;

**p < .05. **p < .01. ***p < .001*

To conclude, the findings from the two sets of regressions that investigated the relationship between the mother's and the child's scaffolding behaviour at Time 2 (see Figure 5.4), firstly, replicated the relationship highlighted during analyses of the interaction at Time 1, and secondly, suggested that the child's on task behaviour was influence by maternal negativity and vice versa.

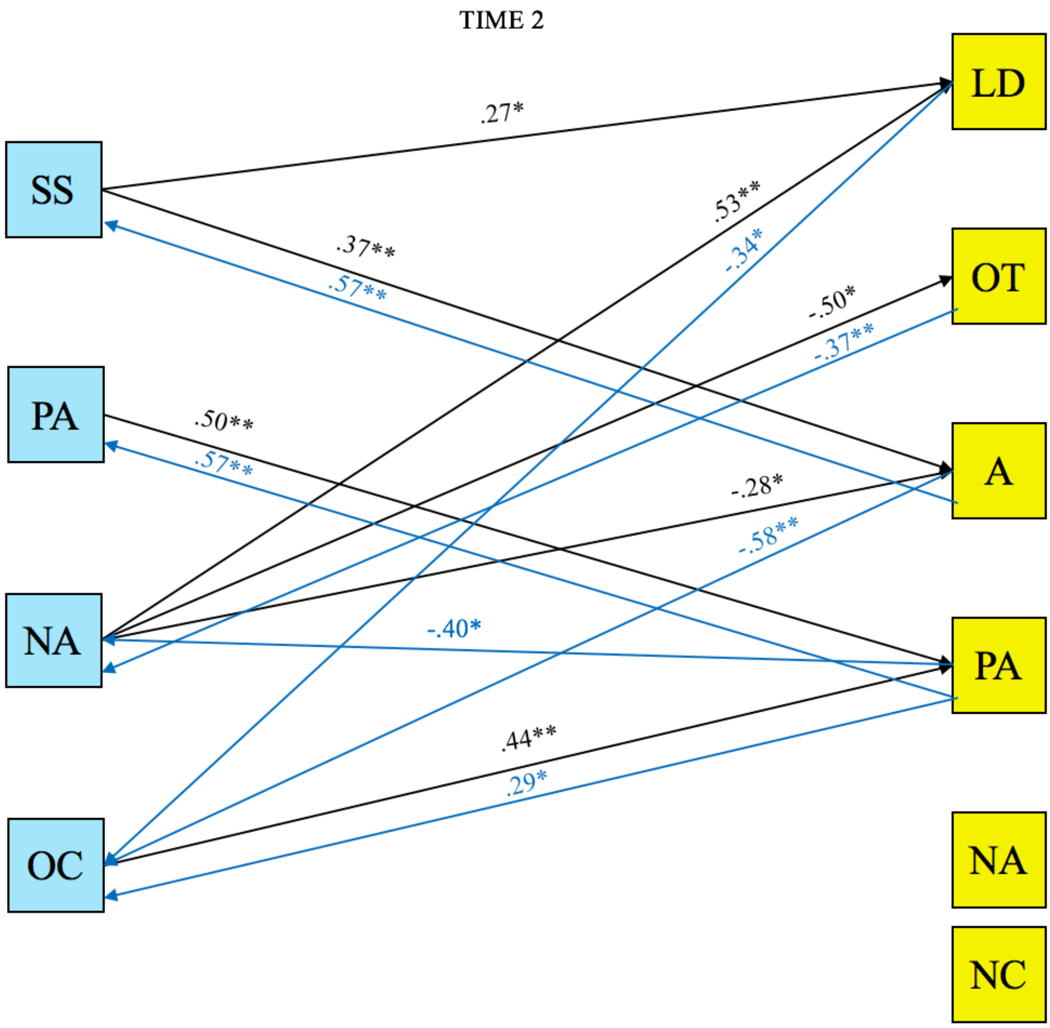

Figure 5.4 Cross-sectional examination. Predictive relationship between dimensions of the mother and child behaviour at Time 2 (*N*= 63). *Maternal dimensions: SS-Scaffolding Strategy, PA- Positive Affect, NA- Negative Affect, OC- Over-Control, Child's dimensions: LD- Level of Difficulty, OT- On Task behaviour, A- Autonomy, PA-- Positive Affect, NA- Negative Affect, NC- Non-compliance*

5.2.3 Longitudinal investigation: stability of mother and child behaviour over time

In order to establish the autoregressive effects that suggest the stability of scaffolding behaviour displayed by the mother and the child across two time points, two sets of regressions were conducted. Generally, a low autoregressive coefficient would suggest that the observed behaviour had fluctuated over time, while a high autoregressive coefficient was an indicator of the repetition of the same behaviour at the next measurement point (Selig & Little, 2012).

The first set of hierarchical multiple regressions was conducted between maternal scaffolding dimensions displayed at Time 1 and Time 2 (Table 5.16- 5.19). Across the whole four dimensions, the maternal behaviour remained consistent and the behaviour demonstrated at Time 1 was likely to be repeated at Time 2. Across all four hierarchical regressions the first Step was the dimension of behaviour the autoregressive effect was tested on (the same behaviour observed at Time 1). For example, to test the longitudinal impact of maternal behaviour at Time 1 and autoregressive effect on the maternal positive affect displayed at Time 2, in Step 1 a maternal positive affect at Time 1 was entered. Then, according to the previously established order of entrance (see Subchapter 5.2.1), scaffolding strategy was entered in Step 2, negative affect in Step 3 and finally, over-control in Step 4.

The variability in dimensions of maternal positive affect (Adjusted R^2= .22, F= 18.57, p<.001) and negative affect (Adjusted R^2= .39, F= 39.97, p<.001) were explained only by autoregressive effect (Tables 5.17- 5.18).

In relation of the maternal scaffolding strategy (see Table 5.16), Step 1 significantly predicted the mother's use of scaffolding strategy at the second time point and explained 73% of the variance (F= 165.91, p< .001). The addition of the dimension of positive affect in Model 2 was not significant. Model 3 was statistically significant and the inclusion of negative affect explained only an additional 0.5% of the variability in scaffolding strategies (F= 57.32; p< .001). Beta coefficients for two predictors were scaffolding strategy behaviour (β= .80, t= 10.92, p< .01) and lower child's negative affect (β= -.13, t= -1.66, p< .05). These predictors indicated that maternal negativity was most likely to lead to poorer choices in relation to scaffolding strategy during the joint task accomplishment. Model 4 retained similar results to Model 3.

Finally, Table 5.19 illustrates that the overall variance in the over-control behaviour displayed at Time 2 was 35%, explained by the autoregressive effect on Model 1 (F= 33.75, p<.001). The addition of the scaffolding strategy dimension observed at Time 1 explained a further 2% of the variability in over-control behaviour at Time 2 (Adjusted R^2= .37, F= 19.46, p< .001). The addition of positive and negative affect variables at Model 3 and Model 4 respectively did not increase the present of the variability explained. Thus, Model 2 was the most fitting and suggested that mothers who were using appropriate scaffolding strategy at Time 1 were less controlling at Time 2.

These findings suggested that maternal use of scaffolding strategies and level of negative affect remained stable and almost did not change, while the autoregressive coefficients for maternal emotional support (positive affect) and controlling behaviour were more modest, suggesting some behavioural shift at Time 2 (see Figure 5.5).

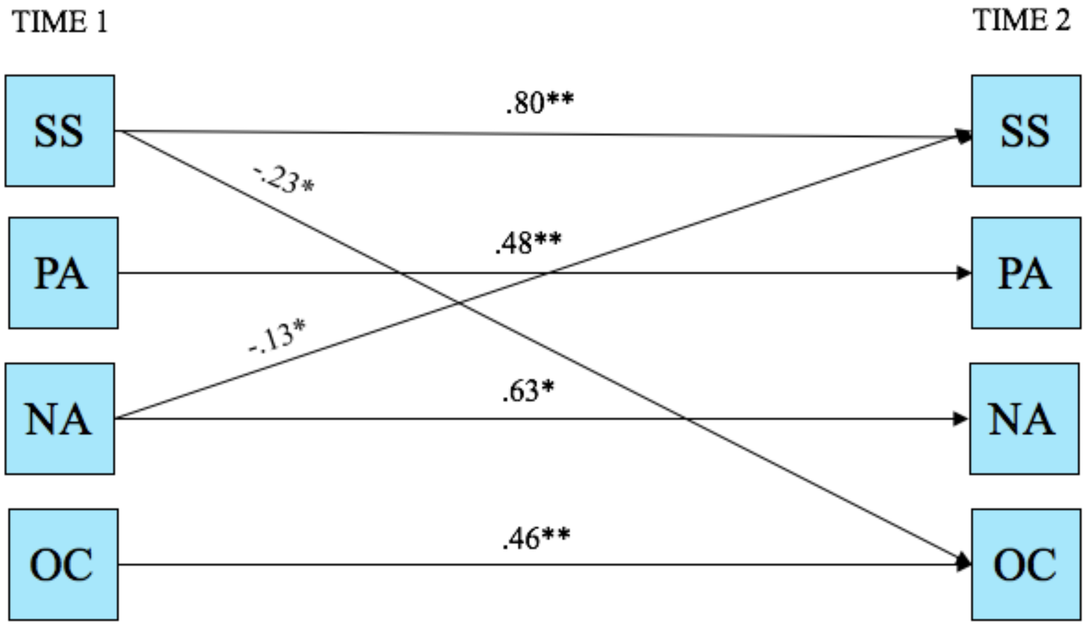

Figure 5.5 Longitudinal examination. Autoregressive relationship between dimensions of the mother behaviour at Time 1 and Time 2 (N= 63). *Maternal dimensions: SS-Scaffolding Strategy, PA- Positive Affect, NA- Negative Affect, OC- Over-Control,*

Table 5.16

Autoregressive hierarchical regression analysis of maternal scaffolding behaviour at Time 1 predicting maternal scaffolding strategy at Time 2 (N=63)

Variables	*Model 1*			*Model 2*			*Model 3*			*Model 4*		
	B	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Scaffolding Strategy	.78	.08	.86**	.86	.08	.85**	.73	.09	.80**	.72	.09	.79**
Positive Affect				.77	.04	.04	.01	.04	.01	.01	.04	.01
Negative Affect							-.18	.09	-.13*	-.18	.09	-.13*
Over-control										-.01	.05	-.02
Adjusted R^2		.73			.72			.73			.73	
F for change in R^2		165.91***			82.18***			57.32***			42.30***	

B- unstandardised beta coefficient; SE- standard error; β- standardised beta;

**p < .05. **p < .01. ***p < .001*

Table 5.17

Autoregressive hierarchical regression analysis of maternal scaffolding behaviour at Time 1 predicting maternal positive affect at Time 2 (N=63)

Variables	*Model 1*			*Model 2*			*Model 3*			*Model 4*		
	B	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Positive Affect	.45	.11	.48**	.42	.12	.47**	.46	.12	.49**	.46	.13	.49**
Scaffolding Strategy				.10	.19	.07	.14	.21	.09	.15	.24	.10
Negative Affect							.14	.27	.06	.14	.28	.06
Over-control										.01	.18	.01
Adjusted R^2		.22			.21			.20			.19	
F for change in R^2		18.57***			9.36***			6.23**			4.59**	

B- unstandardised beta coefficient; SE- standard error; β- standardised beta;

**p < .05. **p < .01. ***p < .001*

Table 5.18

Autoregressive hierarchical regression analysis of maternal scaffolding behaviour at Time 1 predicting maternal negative affect at Time 2 (N=63)

Variables	*Model 1*			*Model 2*			*Model 3*			*Model 4*		
	B	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Negative Affect	.60	.21	.63**	.58	.22	.61*	.58	.22	.61*	.58	.22	.61*
Scaffolding Strategy				-.03	.07	-.05	-.03	.07	-.05	-.08	.09	-.13
Positive Affect							.00	.04	.00	.01	.04	.02
Over-control										-.06	.05	-.15
Adjusted R^2		.39			.38			.37			.37	
F for change in R^2		39.97***			19.79***			12.98***			10.19***	

B- unstandardised beta coefficient; SE- standard error; β- standardised beta;

*p < .05. **p < .01. ***p < .001

Table 5.19

Autoregressive hierarchical regression analysis of maternal scaffolding behaviour at Time 1 predicting maternal over-control at Time 2 (N=63)

Variables	*Model 1*			*Model 2*			*Model 3*			*Model 4*		
	B	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Over-control	.83	.20	.60**	.37	.13	.46**	.38	.13	.47*	.38	.14	.48*
Scaffolding Strategy				-.26	.14	-.23*	-.25	.15	-.22	-.22	.17	-.19
Positive Affect							-.05	.08	-.06	-.04	.08	-.04
Negative Affect										.12	.21	.07
Adjusted R^2		.35			.37			.37			.36	
F for change in R^2		33.75***			19.46***			12.93***			9.66***	

B- unstandardised beta coefficient; SE- standard error; β- standardised beta;

**p < .05. **p < .01. ***p < .001*

The second set of regressions were calculated to investigate the stability of the child's scaffolding behaviour across two time points (see Table 5.20- Table 5.24). Almost all dimensions of the child's behaviour remained consistent across Time 1 and Time 2 apart from the child's negative affect (see Appendix G: Table G.9). Thus, the child's negative affect is excluded from any further analyses. The order of the entry used for this set of hierarchical regressions was similar to the group of regressions that tested the stability of the mother's behaviour across two time points.

The overall variance in the child's dimensions of on task behaviour (Adjusted R^2=.16, F=12.90, p<.01), positive affect (Adjusted R^2=.16, F=12.77, p<.01) and non-compliance (Adjusted R^2=.17, F=13.58, p<.001) observed at Time 2 was explained exclusively by autoregressive effects (see Tables 5.21, 5.23-5.24).

The results of the first regression analysis (see Table 5.20) suggested that there were two of the child's dimensions at Time 1 that predicted the level of difficulty displayed at Time 2. The level of difficulty observed at Time 1 explained 24% of the variance of the child's level of difficulty at Time 2 (F= 20.82, p<. 001), suggesting stability across two time points. Model 2 explained a further 3% of variance with the addition of the variable of child's autonomy in Step 2 (Adjusted R^2=.27, F=12.16, p<.001). The child's on task behaviour displayed at Time 1 positively related to the interaction time, represented by level of difficulty, at Time 2. Model 2 was considered as the best fitting as the further addition of independent variables did not identify any new significant predictors.

In relation to the child's autonomy (see Table 5.22), in Step 1 the autoregressive effect explained 53% of the overall variance in the child's autonomy displayed at Time 2 (F=72.07, p<. 001). The entry of child's level of difficulty displayed at Time 1 explained a further 1% of the variance (Adjusted R^2=.54, F=37.46, p<. 001). Further models did not contribute anything additionally to the variance explained, thus Model 2 was the best fit. The results suggested that children who experienced a greater level of difficulty and spent more time completing the task at Time 1 were slightly less autonomous and independent during the problem-solving interaction at Time 2.

The results of this group of regressions identified that the child's level of difficulty and autonomy showed greater stability over time (see Figure 5.6). Although dimensions of the child's behaviour such as non-compliance, positive affect and on task behaviour were significant in predicting themselves at Time 2, the autoregressive coefficient was relatively modest, which suggested some level of fluctuation in these aspects of the child's behaviour in problem-solving situations. Finally, the child's negative affect did not remain stable across the two time points.

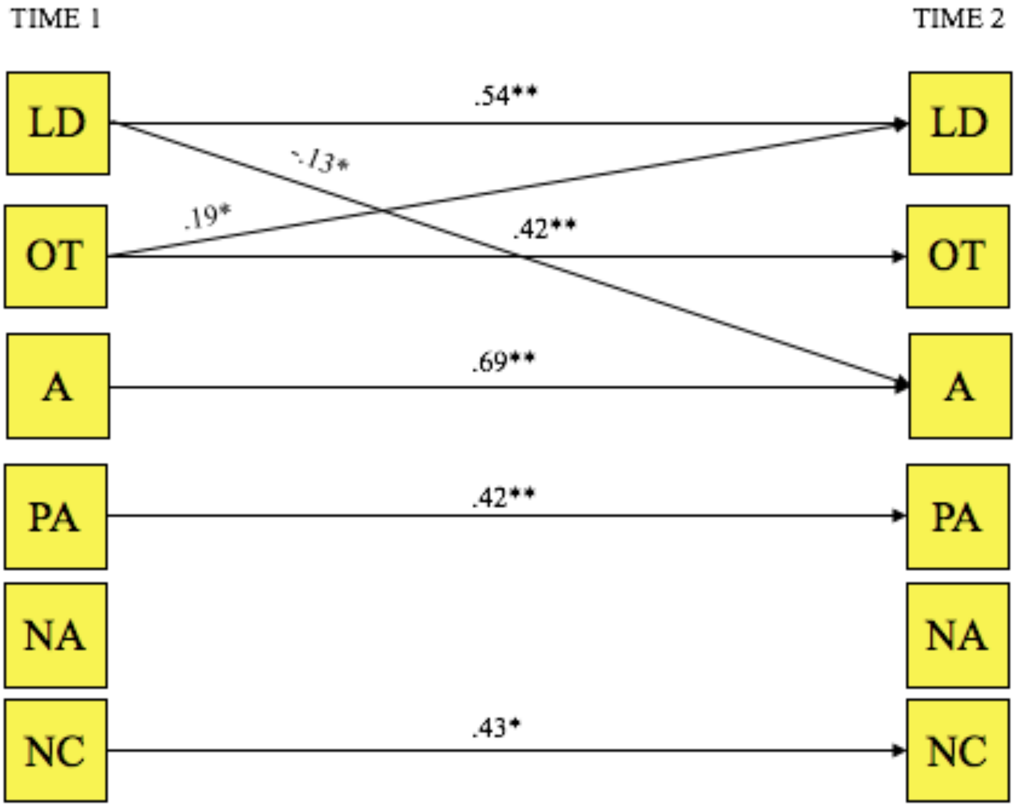

Figure 5.6 Longitudinal examination. Autoregressive relationship between dimensions of the child behaviour at Time 1 and Time 2 (*N*= 63). *Child's dimensions: LD- Level of Difficulty, OT- On Task behaviour, A- Autonomy, PA-- Positive Affect, NA- Negative Affect, NC- Non-compliance*

Table 5.20

Autoregressive hierarchical regression analysis of child behaviour at Time 1 predicting child's level of difficulty at Time 2 (N=63)

Variables	*Model 1*			*Model 2*			*Model 3*			*Model 4*			*Model 5*			*Model 6*		
	B	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Level of difficulty	.57	.12	.50**	.66	.13	.54**	.66	.14	.59**	.62	.14	.55**	.60	.13	.53**	.58	.14	.52**
On Task				30.07	16.13	.19*	20.35	18.34	.13	23.79	18.94	.15	40.19	23.28	.25	48.09	24.84	.30
Autonomy							20.83	14.50	.16	19.22	14.38	.14	17.83	14.50	.13	17.60	15.06	.13
Positive Affect										15.38	13.29	.15	22.02	13.79	.22	21.91	13.67	.21
Negative Affect													36.80	29.47	.20	22.77	26.76	.13
Non-compliance																36.73	26.09	.20
Adjusted R^2		.24			.27			.27			.28			.30			.32	
F for change in R^2		20.82***			12.16***			8.67***			7.03***			5.75***			5.75***	

B- unstandardised beta coefficient; SE- standard error; β- standardised beta;

*$p < .05$. **$p < .01$. ***$p < .001$

Table 5.21

Autoregressive hierarchical regression analysis of child behaviour at Time 1 predicting child's on task behaviour at Time 2 (N=63)

Variables	*Model 1*			*Model 2*			*Model 3*			*Model 4*			*Model 5*			*Model 6*		
	B	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*
On Task	.36	.10	.42**	.35	.11	.40**	.32	.11	.37**	.31	.12	.37*	.39	.14	.46*	.37	.14	.43*
Level of difficulty				.00	.00	-.07	.00	.00	-.05	.00	.00	-.04	.00	.00	-.05	.00	.00	-.04
Autonomy							.06	.09	.08	.06	.09	.08	.05	.09	.07	.05	.10	.08
Positive Affect										-.02	.06	-.04	.01	.06	.02	.01	.06	.02
Negative Affect													.18	.14	.18	.22	.13	.23
Non-compliance																-.12	.18	-.12
Adjusted R^2		.16			.15			.14			.13			.14			.14	
F for change in R^2		12.90**			6.56**			4.44**			3.30*			3.02*			2.61*	

B- unstandardised beta coefficient; SE- standard error; β- standardised beta;

*$p < .05$. **$p < .01$. ***$p < .001$

Table 5.22

Autoregressive hierarchical regression analysis of child behaviour at Time 1 predicting child's autonomy at Time 2 (N=63)

Variables	*Model 1*			*Model 2*			*Model 3*			*Model 4*			*Model 5*			*Model 6*		
	B	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Autonomy	.51	.07	.74**	.48	.07	.69**	.48	.08	.69**	.48	.08	.69**	.48	.08	.69**	.48	.08	.70**
Level of difficulty				.00	.00	-.13*	.00	.00	-.13	.00	.00	-.12	.00	.00	-.11	.00	.00	-.11
On Task							.00	.09	.00	.00	.09	.00	-.03	.11	-.04	-.04	.11	-.05
Positive Affect										-.02	.05	-.03	-.03	.06	-.05	-.03	.06	-.05
Negative Affect													-.07	.12	-.07	-.04	.13	-.04
Non-compliance																-.07	.10	-.07
Adjusted R^2		.53			.54			.53			.53			.52			.52	
F for change in R^2		72.07***			37.46***			24.56***			18.16***			14.47***			12.00***	

B- unstandardised beta coefficient; SE- standard error; β- standardised beta;

**p < .05. **p < .01. ***p < .001*

Table 5.23

Autoregressive hierarchical regression analysis of child behaviour at Time 1 predicting child's positive affect at Time 2 (N=63)

Variables	*Model 1*			*Model 2*			*Model 3*			*Model 4*			*Model 5*			*Model 6*		
	B	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Positive Affect	.40	.12	.42**	.43	.12	.45**	.43	.12	.44**	.42	.12	.45**	.43	.12	.44**	.42	.13	.44**
Level of difficulty				.00	.00	-.11	.00	.00	-.12	.00	.00	-.14	.00	.00	-.14	.00	.00	-.14
On Task							-.14	.21	-.05	-.04	.22	-.03	-.06	.28	-.04	-.05	.27	-.03
Autonomy										-.07	.19	-.05	-.06	.14	-.05	-.06	.15	-.05
Negative Affect													-.04	.25	-.02	-.05	.31	-.03
Non-compliance																.04	.28	.02
Adjusted R^2		.16			.16			.15			.13			.12			.10	
F for change in R^2		12.77**			6.82**			4.53**			3.38*			2.66*			2.18*	

B- unstandardised beta coefficient; SE- standard error; β- standardised beta;

**p < .05. **p < .01. ***p < .001*

Table 5.24

Autoregressive hierarchical regression analysis of child behaviour at Time 1 predicting child's non-compliance at Time 2 (N=63)

Variables	*Model 1*			*Model 2*			*Model 3*			*Model 4*			*Model 5*			*Model 6*		
	B	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Non-compliance	.42	.17	.43*	.43	.17	.45*	.42	.18	.43*	.42	.18	.43*	.42	.18	.43*	.44	.19	.45*
Level of difficulty				.00	.00	-.12	.00	.00	-.13	.00	.00	-.14	.00	.00	-.13	.00	.00	-.13
On Task							-.03	.09	-.03	-.02	.10	-.02	-.02	.10	-.03	-.04	.11	-.05
Autonomy										-.02	.07	-.04	-.02	.10	-.03	-.02	.08	-.03
Positive Affect													-.02	.06	-.04	-.03	.06	-.06
Negative Affect																-.07	.17	-.07
Adjusted R^2		.17			.17			.16			.14			.13			.12	
F for change in R^2		13.58***			7.35**			4.84**			3.59*			2.84*			2.37*	

B- unstandardised beta coefficient; SE- standard error; β- standardised beta;

$*p < .05$. $**p < .01$. $***p < .001$

5.2.4. Longitudinal investigation: cross-lagged effect of mother and child behaviour

The longitudinal effect of the child's behaviour at Time 1 on their mother's behaviour at Time 2 was tested as well as the longitudinal effect of the mother's behaviour on the child's behaviour during scaffolding interactions.

The first set of hierarchical multiple regression analyses investigated the cross-lagged effect of the mother's behaviour at Time 1 on the child's behaviour exhibited at Time 2 (see Table 5.25-Table 5.27). The order of the input of independent predictors in hierarchical multiple regressions showed similarities with the previous cross-sectional analyses (see Subchapter 5.2.1) with one notable difference. Specifically, in order to reduce bias in calculation of cross-lagged effect, it was essential to control for autoregressive effects (Cole & Maxwell, 2003; Gollob & Reichardt, 1987; Selig & Little, 2012). The addition of the autoregressive effects explained the variability in the child's behavioural dimensions at Time 2, which was predicted by dimensions of maternal scaffolding behaviour as a residual variability with control of previously displayed dimensions of maternal behaviour. Therefore, each of six regressions would include in Step 1, a control variable which is represented by the child's dimension observed at Time 1. For example, to test the longitudinal effect of maternal scaffolding behaviour observed at the baseline on the child's behaviour displayed approximately seven months later, the child's level of difficulty at Time 2 was a dependent variable. In Step 1, the child's level of difficulty at Time 1 was entered followed by four independent variables – the dimensions of scaffolding behaviour observed at Time 1.

Out of five regression analyses, two were exclusively predicted by the control variables (child's behaviour observed at Time 1): the level of difficulty and on task behaviour (see Appendix G: Tables G.10- G.11). This suggested that there was no impact of maternal scaffolding at the baseline visit. On the other hand, the dimensions of maternal scaffolding were found to be significant predictors of the child's autonomy, positive affect and non-compliance are discussed further.

The regression analysis tested four dimensions of maternal scaffolding as a predictor of the child's autonomy (see Table 5.25). Model 1 identified that the control variable (child's autonomy at Time 1) was a statistical significant predictor and accounted for 53% of the variability of the child's autonomy (F=72.07, p< .01). The addition of maternal scaffolding strategy and positive affect, in Step 2 and Step 3 respectively, did not contribute to the variability explained. However, the addition of the negative affect variable in Step 4 explained a further 5% of the variance (Adjusted R^2= .58, F=22.14,

p<.001); the mother's negativity displayed during the tutoring interaction led to the child's inability to work on the task independently later in time. Model 4 was considered as the best fitting.

Furthermore, Table 5.26 illustrates that the child's positive affect was predicted by one independent maternal variable. Model 1 suggested that the child's positive affect at Time 1 explained 16% of the variability in child's positivity when observed approximately seven months later (F= 12.77, p< .01). While maternal scaffolding strategy was not a significant predictor (Model 2), maternal positive affect displayed at Time 1, entered in Step 3, explained a further 8% of the overall variance in the child's positivity observed at the follow up visit (Adjusted R^2= .22, F= 6.81, p< .01). However, the addition of maternal negative affect (Model 4) suggested a cross-lagged effect on the child's positive affect later in time and explained a further 4% of its variability (Adjusted R^2= .26, F= 6.57, p< .001). Model 4 was accepted as the most fitting as Model 5 did not contribute to the percentage of the explained variance in the child's positive affect at Time 2.

Finally, in relation to the child's non-compliance (see Table 5.27), in Model 1, the child's non-compliance observed at Time 1 explained 17% of the variability in child non-compliant behaviour observed at Time 2 (F= 13.58, p< .001). Models 2 to 4 did not explain any further variability in the child's non-compliance displayed at Time 2 during the problem-solving interaction with their mother. Model 5, however, indicated that maternal controlling behaviour at Time 1 was a significant predictor of the child's non-compliance at Time 2 and explained a further 2% of the overall variance (Adjusted R^2= .19, F= 3.93, p< .001). This finding suggested that a mother's over-control behaviour, observed at the baseline visit, had a longitudinal impact on the child's non-compliance displayed during the scaffolding interaction at the follow up visit.

Table 5.25

Hierarchical regression analysis of maternal scaffolding behaviour at Time 1 predicting child's autonomy at Time 2 (N=63)

Variables	*Model 1*			*Model 2*			*Model 3*			*Model 4*			*Model 5*		
	B	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Child's Autonomy	.51	.07	.74**	.48	.08	.69**	.48	.08	.69**	.44	.08	.64**	.43	.08	.62**
Maternal Scaffolding Strategy				.06	.08	.09	.06	.08	.09	.00	.07	.00	-.01	.08	-.02
Positive Affect							.00	.04	.00	-.03	.04	-.06	-.03	.04	-.06
Negative Affect										-.31	.12	-.28**	-.31	.12	-.28**
Over-control													-.02	.05	-.05
Adjusted R^2		.53			.53			.53			.58			.57	
F for change in R^2		72.07***			36.35***			23.83***			22.14***			17.50***	

B- unstandardised beta coefficient; SE- standard error; β- standardised beta;

*$p < .05$. **$p < .01$. ***$p < .001$

Table 5.26

Hierarchical regression analysis of maternal scaffolding behaviour at Time 1 predicting child's positive affect at Time 2 (N=63)

Variables	*Model 1*			*Model 2*			*Model 3*			*Model 4*			*Model 5*		
	B	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Child's Positive Affect	.40	.12	.42**	.40	.12	.42**	.28	.12	.29*	.35	.12	.37**	.35	.12	.37**
Maternal Scaffolding Strategy				.04	.16	.03	-.02	.15	-.02	-.16	.16	-.12	-.05	.19	-.04
Positive Affect							.29	.13	.32*	.21	.13	.23	.19	.13	.21
Negative Affect										-.55	.29	-.28*	-.55	.28	-.28*
Over-control													.13	.12	.15
Adjusted R^2		.16			.15			.22			.26			.27	
F for change in R^2		12.77**			6.32**			6.81**			6.57***			5.52***	

B- unstandardised beta coefficient; SE- standard error; β- standardised beta;

$*p < .05$. $**p < .01$. $***p < .001$

Table 5.27

Hierarchical regression analysis of maternal scaffolding behaviour at Time 1 predicting child's non-compliance at Time 2 (N=63)

Variables	*Model 1*			*Model 2*			*Model 3*			*Model 4*			*Model 5*		
	B	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Child's Non-compliance	.42	.16	.43*	.42	.17	.43*	.41	.16	.42*	.42	.16	.43*	.47	.16	.48*
Maternal Scaffolding Strategy				.00	.09	.00	-.02	.08	-.03	-.03	.09	-.04	-.14	.11	-.20
Positive Affect							.09	.06	.19	.09	.06	.18	.10	.06	.20
Negative Affect										-.05	.14	-.04	-.06	.14	-.06
Over-control													-.12	.07	-.25*
Adjusted R^2		.17			.16			.18			.16			.19	
F for change in R^2		13.58***			6.68**			5.41**			4.02**			3.93**	

B- unstandardised beta coefficient; SE- standard error; β- standardised beta;

**p < .05. **p < .01. ***p < .001*

The second set of independent hierarchical multiple regressions explored the cross-lagged effect of six of the child's behavioural dimensions (level of difficulty, on task, autonomy, positive affect, negative affect and non-compliance) that were displayed during the process of tutoring interaction at Time 1 on four of the mother's behavioural dimensions (scaffolding strategy, positive affect, negative affect, over-control) observed at Time 2.

The same principle of loading the independent variables with control for autoregressive effects as described earlier was adopted for the examination of cross-lagged effect of maternal scaffolding on the child's behavioural dimensions. Specifically, the first step was always a control variable of the same behaviour observed at Time 1.

Three of out four hierarchal multiple regressions were predicted only by the control variables (see Appendix G: Tables G.12- G.14), suggesting that the child's behaviour at Time 1 did not have any longitudinal effect on the maternal use of scaffolding strategies, positive or negative affect, at Time 2.

However, in relation to maternal over-control behaviour observed at the follow up visit (see Table 5.28), the controlling behaviour displayed by the mother at Time 1 explained 35% of the overall variance in over-control behaviour later in time at Model 1 (F= 33.75, p<. 001). The child's level of difficulty and on task behaviour at Time 1, entered at Model 2 and Model 3 respectively, did not contribute any further percent of the variability explained. Model 4 introduced the child's autonomous behaviour observed at the baseline visit and explained a further 2% of the variability in maternal controlling behaviour at Time 2 (Adjusted R^2= .37, F= 9.96, p<. 001). Model 4 was considered at the best fitting and suggested that children's ability for independent problem-solving at Time 1 led to a lower level of maternal over-control at Time 2.

Table 5.28

Hierarchical regression analysis of child behaviour at Time 1 predicting maternal over-control at Time 2 (N=63)

Variables	*Model 1*			*Model 2*			*Model 3*			*Model 4*			*Model 5*			*Model 6*			*Model 7*		
	B	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Maternal Over-Control T1	.48	.11	.60**	.49	.11	.61**	.47	.11	.60**	.38	.13	.48**	.38	.13	.48**	.38	.13	.48**	.38	.13	.48*
Child's Level of Difficulty				.00	.00	-.10	.00	.00	-.12	.00	.00	-.18	.00	.00	-.19	.00	.00	-.19	.00	.00	-.19
On Task							-.11	.14	-.08	-.02	.15	-.02	-.01	.16	-.01	-.02	.17	-.01	-.02	.18	-.02
Autonomy										-.28	.12	-.25*	-.29	.12	-.26*	-.29	.12	-.26*	-.29	.12	-.26*
Positive Affect													.04	.09	.05	.04	.10	.04	.04	.10	.04
Negative Affect																-.01	.15	.00	.00	.19	.00
Non-compliance																			-.02	.22	-.01
Adjusted R^2	.35			.35			.34			.37			.36			.35			.33		
F for change in R^2	33.75***			17.36***			11.68***			9.96***			7.89***			6.46***			5.44***		

B- unstandardised beta coefficient; SE- standard error; β- standardised beta;

$*p < .05$. $**p < .01$. $***p < .001$

The results of these groups of hierarchical multiple regressions indicate a number of longitudinal relationships. Specifically, once autoregressive effects were controlled for, it was identified that maternal negative affect observed at Time 1 had cross-lagged effects on the child's autonomy and positive affect. This suggested that maternal negativity was a significant predictor across time, over and above the stability of the child's behaviour. Maternal disapproval, rejection or criticism displayed at the baseline visit led to the child's higher reliance on maternal help and lower positivity observed at the follow up visit.

Moreover, maternal over-control at Time 1, after controlling for autoregressive effect, had a cross-lagged effect on the child's non-compliance behaviour observed approximately seven months later. This result suggested that the more controlling mothers had children who were more compliant later in time. This finding is consistent with other research in the field. For example, Blandon and Volling (2008), identified that less controlling parental instruction during a clean-up task was a significant predictor of passive non-compliance in children of a similar age to the current sample.

In turn, it was identified that maternal over-control behaviour at Time 2 was significantly predicted by the child's autonomy displayed at Time 1, after controlling for autoregressive effect. Children who were able to act independently and to autonomously solve problem-solving tasks at the baseline visit had mothers who were less controlling at the follow up visit.

Based on the findings described in this chapter, the model of mother-child scaffolding behaviour was constructed (See Figure 5.7).

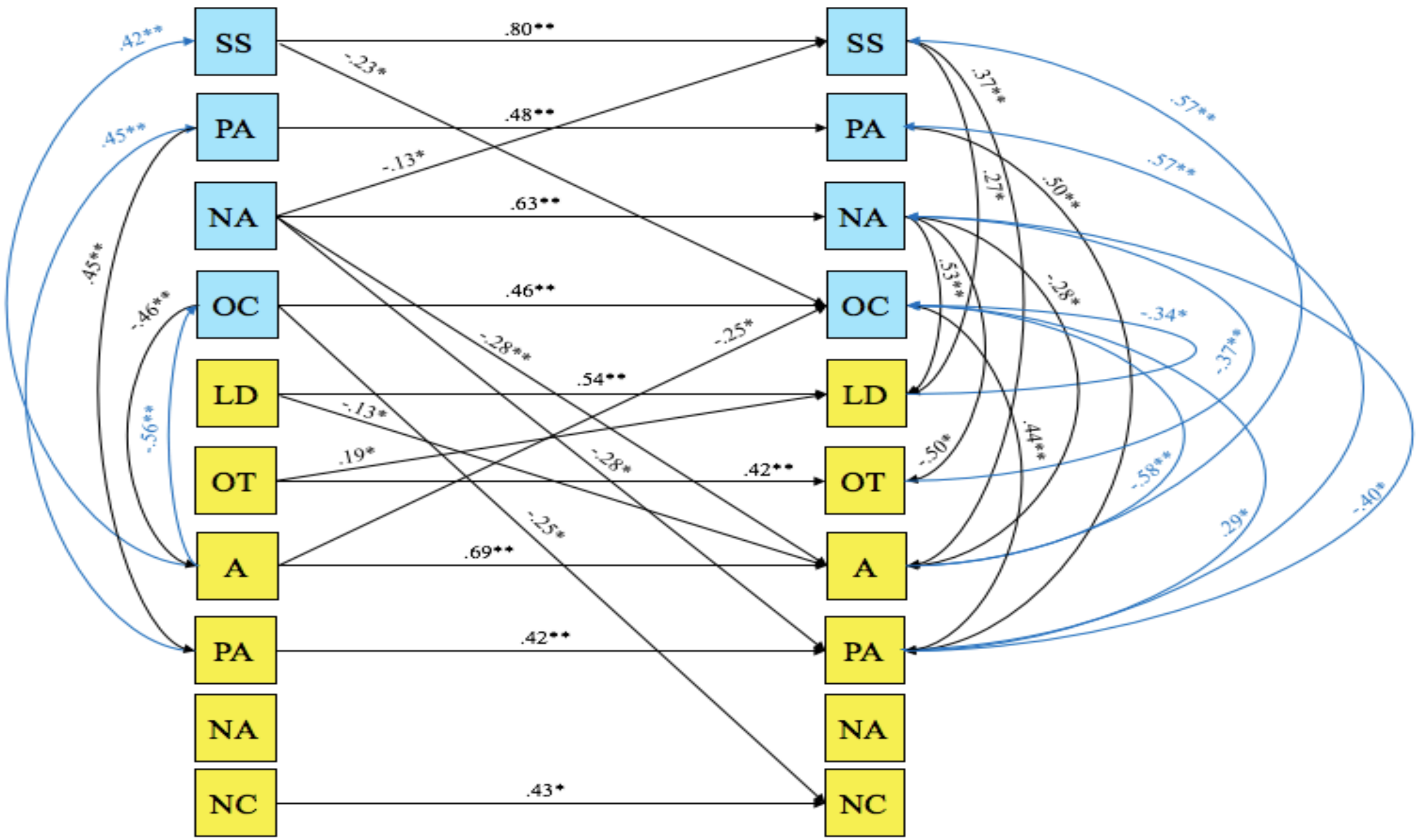

Figure 5.7 Consolidation of results: Cross-lagged autoregressive model examining the bidirectional relationship between the dimensions of behaviour displayed by mother and child during scaffolding interaction (*N*= 63). *Maternal dimensions: SS-Scaffolding Strategy, PA- Positive Affect, NA-Negative Affect, OC- Over-Control, Child's dimensions: LD- Level of Difficulty, OT- On Task behaviour, A- Autonomy, PA-- Positive Affect, NA- Negative Affect, NC-Non-compliance*

5.3. The role of intersubjectivity in scaffolding interaction

Intersubjectivity in the dyadic interaction is often referred to as a key point of mutual understanding and shared views during the interaction. It was suggested that intersubjectivity is crucial in the learning process (Mulvaney et al., 2006). The current study explored what dimensions of scaffolding behaviour of the mother and child drive mutual intersubjectivity and how, in turn, intersubjectivity predicts scaffolding behaviour.

5.3.1 Time 1: Cross-sectional examination. How dimensions of mother and child behaviour impact dyadic intersubjectivity and vice versa?

The first set of regressions was calculated to identify what dimensions of behaviour observed in scaffolding interaction determines the level of mutual intersubjectivity and vice versa across Time 1 (See Tables 5.29-5.30).

The same order, 4-step hierarchical multiple regression (see Subchapter 5.2.1), was conducted to establish whether maternal scaffolding behaviour predicts intersubjectivity. Maternal scaffolding strategy was entered in Step 1, in Step 2 - positive affect, in Step 3 - negative affect and in Step 4 - over-control behaviour.

Table 5.29 illustrated that in Model 1 maternal scaffolding strategy accounts for 27% of the overall variance in dyadic intersubjectivity (F= 25.29, p< .001); the choice of more appropriate scaffolding strategies by the mother predicted mutual intersubjectivity within the dyad. Entering positive affect as the next step explains a further 11% of variance (Adjusted R^2= .38, *F*= 21.47, *p*< .001). Beta coefficients for the two predictors were maternal scaffolding strategies (β=.48, *t*= 4.88, *p*<.01) and positive affect (β=.35, *t*=3.61, *p*< .01). The addition of further predictive variables did not improve the variance explained.

In order to investigate the nature of the predictive relationship between the child's behaviour and intersubjectivity (see Table 5.30), the 6-step model that was discussed earlier was utilised (see Subchapter 5.2.1). In Step 1- the child's level of difficulty was entered, in Step 2- on task behaviour, in Step 3- autonomy, in Step 4- positive affect, in Step 5- negative affect, and finally, in Step 6- non-compliance behaviour. Neither Model 1 nor Model 2 were statistically significant. However, Model 3 accounted for 10% of the variance of the mutual intersubjectivity (*F*= 3.37, *p*< .001); children who could demonstrate autonomy while working on problem-solving tasks with their mother were more likely to be in a dyad with higher intersubjectivity. Entering positive affect in Step 4 provided an explanation for a further 15% of the variance (Adjusted $R^2 = .25$, $F = 6.70$, $p < .001$). Introduction of additional variables did not explain a higher percent of the variability.

The results of two regressions identified that both the mother's and the child's positive affect predicted intersubjectivity along with the higher quality of scaffolding strategies displayed by the mother and the ability to work independently, as demonstrated by the child.

Table 5.29

Hierarchical regression analysis of maternal scaffolding behaviour predicting dyadic intersubjectivity. Time 1 (N=68)

Variables	*Model 1*			*Model 2*			*Model 3*			*Model 4*		
	B	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Scaffolding Strategy	.59	.12	.53**	.53	.11	.48**	.49	.11	.44**	.45	.14	.40**
Positive Affect				.28	.09	.35**	.26	.09	.33**	.27	.10	.34**
Negative Affect							-.15	.24	-.10	-.16	.23	-.10
Over-control										-.05	.13	-.07
Adjusted R^2		.27			.38			.38			.37	
F for change in R^2		25.29***			21.47***			14.52***			10.85***	

B- unstandardised beta coefficient; SE- standard error; β- standardised beta;

**p* < .05. ***p* < .01. ****p* < .001

Table 5.30

Hierarchical regression analysis of child behaviour predicting dyadic intersubjectivity. Time 1 (N= 68)

Variables	*Model 1*			*Model 2*			*Model 3*			*Model 4*			*Model 5*			*Model 6*		
	B	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Level of difficulty	.00	.00	-.17	.00	.00	-.12	.00	.00	-.03	.00	.00	-.16	.00	.00	-.16	.00	.00	-.16
On Task				.28	.15	.22	.15	.14	.12	.21	.13	.17	.27	.15	.21	.26	.15	.21
Autonomy							.32	.12	.29*	.30	.10	.27**	.29	.10	.27**	.29	.10	.27**
Positive Affect										.36	.09	.43**	.39	.09	.46**	.39	.09	.46**
Negative Affect													.15	.27	.10	.17	.30	.11
Non-compliance																-.06	.19	-.04
Adjusted R^2		.02			.05			.10			.25			.25			.24	
F for change in R^2		2.05			2.69*			3.37*			6.70***			5.46***			4.50**	

B- unstandardised beta coefficient; SE- standard error; β- standardised beta;

**p < .05. **p < .01. ***p < .001*

The second group of regressions was calculated to investigate the impact of dyadic intersubjectivity on dimensions of behaviour as displayed by both the mother and child during scaffolding interaction at Time 1. In order to test these potential predictive relationships, a simple linear regression analysis was utilised due to only one independent predictor: dimension of intersubjectivity (see Table 5.31).

The results showed that intersubjectivity predicted three out of four scaffolding dimensions displayed by the mother during the collaborative problem-solving situation. Specifically, intersubjectivity explained 27% of the overall variance in maternal use of appropriate scaffolding strategy ($F = 25.29$, $p < .001$), along with 17% of variance in maternal positivity ($F = 14.24$, $p < .001$) and 12% of the variance in negative affect ($F = 10.53$, $p < .01$). These findings suggested that dyads with higher mutual understanding had higher involved mothers who used more appropriate and contingent scaffolding strategies, were more positive and less rejecting or disapproving.

Furthermore, three dimensions of the child's behaviour were significantly predicted by dyadic intersubjectivity. In particular, dyadic intersubjectivity explained 5% of the overall variance in the child's on task behaviour ($F = 4.41$, $p < .05$), 11% of the variability in dimension of autonomy ($F = 9.44$, $p < .01$) and finally, 8% of the variance in the child's positivity ($F = 6.83$, $p < .05$). The results suggested that in dyads with a higher level of intersubjectivity, children were more likely able to concentrate and act independently in order to complete the task, as well as being more positive and responsive to their mothers.

Table 5.31

Linear regression analyses of dyadic intersubjectivity predicting the dimensions of the mother and child behaviour. Time 1 (N= 68)

Variables	*B*	*SE B*	*β*	*Adjusted R^2*	*F*
		Mother's Scaffolding behaviour			
Scaffolding Strategy	.47	.10	.53**	.27	25.29***
Positive Affect	.53	.12	.42**	.17	14.24***
Negative Affect	-.23	.10	-.37*	.12	10.53**
Over-control	-.33	.18	-.26	.05	4.69*
		Child's Scaffolding behaviour			
Level of difficulty	-19.25	17.89	-.17	.02	2.05
On Task	.20	.08	.25*	.05	4.41*
Autonomy	.33	.09	.35**	.11	9.44**
Positive Affect	.37	.17	.31*	.08	6.83*
Negative Affect	-.09	.09	-.13	.00	1.19
Non-compliance	-.10	.08	-.16	.01	1.62

B- unstandardised beta coefficient; SE- standard error; β- standardised beta;
**p < .05. **p < .01. ***p < .001*

To sum up, cross-sectional examination at Time 1 revealed an interrelationship between dimensions of the mother's behaviour, child's behaviour and intersubjectivity. Specifically, reciprocal predictive relationships were identified between maternal use of scaffolding strategies, positivity and intersubjectivity. A similar pattern, obtained through the regression analyses, was observed between the child's autonomy and positivity in predicting dyadic intersubjectivity and vice versa. Additionally, it was identified that dyadic intersubjectivity was a significant negative predictor of maternal over-control and a positive contributor to the child's on task behaviour. The visual illustration of these findings is presented in Figure 5.8.

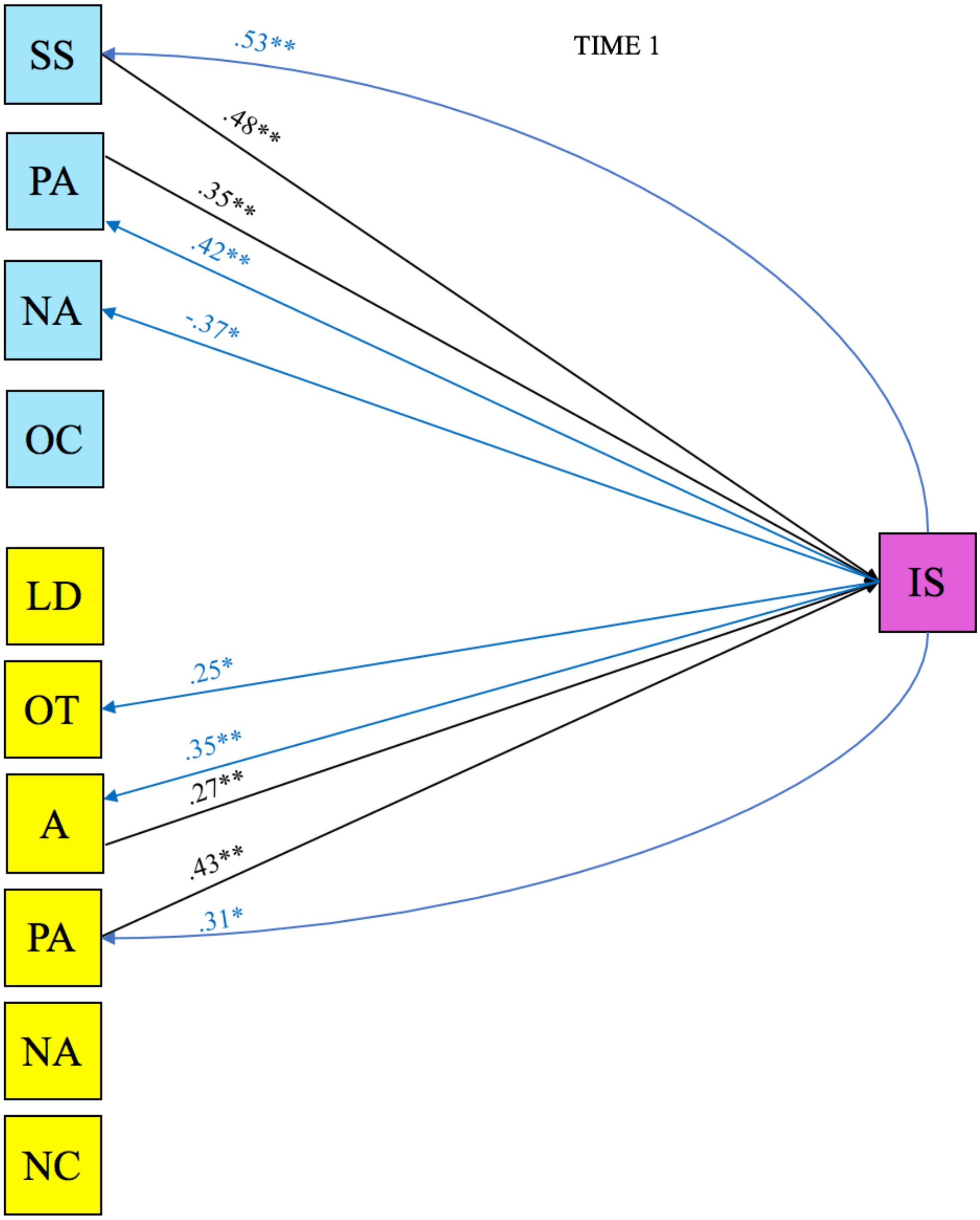

Figure 5.8 Cross-sectional examination. Predictive relationship between dyadic intersubjectivity and the dimensions of the mother and child behaviour at Time 1 (*N*= 68). *IS-Intersubjectivity. Maternal dimensions: SS-Scaffolding Strategy, PA- Positive Affect, NA- Negative Affect, OC- Over-Control, Child's dimensions: LD- Level of Difficulty, OT- On Task behaviour, A- Autonomy, PA-- Positive Affect, NA- Negative Affect, NC- Non-compliance*

5.3.2 Time 2: Cross-sectional examination. How do dimensions of mother and child behaviour impact dyadic intersubjectivity and vice versa?

The next group of analyses aimed to investigate the consistency of the relationships identified at Time 1 and potentially reveal new predictive relationships between variables by conducting the same type analyses using data from Time 2 (See Tables 5.32-5.34).

Firstly, the impact of maternal scaffolding behaviour on the dyadic intersubjectivity measured at Time 2 was tested (see Table 5.32). Model 1 accounted for 36% of the variance (F= 36.11, p< .001). Similar to results gained at Time 1, the choice of better scaffolding strategies by the mother predicted higher intersubjectivity in the dyad. Model 2 explained a further 5% of the variance by entering maternal positive affect in Step 2 (Adjusted R^2= .41, F= 22.66, p< .001). However, with the addition of a statistically significant predictor (negative affect), Model 3 accounted for another 7% of the overall variance of dyadic intersubjectivity, but the positive affect had lost its significance (Adjusted R^2= .48, F= 19.92, p< .001). Model 4 remained the same in relation to the variance explained, thus Model 3 was considered as the best fit. The results of this regression showed that lower negative affect and the choice of more appropriate scaffoldings strategies by the mother predicted the intersubjectivity observed during the second home visit.

The regression that examined whether the child's behaviour determines mutual intersubjectivity at Time 2 (see Table 5.33) proved to be consistent with the results found earlier at Time 1 (Adjusted R^2= .34, F= 8.80, p< .001). Beta coefficients for the two predictors were the level of autonomy (β=. 38, t= 3.17, p<.01) and the child's positive affect (β= .46, t= 4.30, p< .01).

Finally, a set of simple linear regression was calculated to establish the predictive nature between dyadic intersubjectivity and behaviour displayed by both mother and child during the tutoring interaction at Time 2 (see Table 5.34). In relation to dimensions of maternal scaffolding behaviour, the results obtained at Time 2 were stable over time. Additionally, at Time 2, it was identified that intersubjectivity predicted 9% of the variance in maternal over-control behaviour (F= 6.99, p< .001). Mothers who were part of the dyads with higher mutual understanding and similar views on how to accomplish the task were less controlling.

In relation to the child's behavioural dimensions, the results obtained at Time 2 were consistent with findings of the first cross-sectional examination. In particular, at Time 2, dyadic intersubjectivity predicted 16% of the overall variance in the child's autonomy (F= 12.76, p< .01) and 13% of the variability in the child's positivity (F= 10.45, p<.01). Moreover, a new significant predictive relationship was identified: intersubjectivity negatively predicted 6% of the variance in the child's negative affect (F= 5.24, p< .05). Children were less negative if they were part of the dyad with higher intersubjectivity.

Table 5.32

Hierarchical regression analysis of maternal scaffolding behaviour predicting dyadic intersubjectivity. Time 2 (N=63)

Variables	*Model 1*			*Model 2*			*Model 3*			*Model 4*		
	B	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Scaffolding Strategy	.77	.11	.61**	.72	.10	.57**	.58	.11	.46**	.59	.14	.47**
Positive Affect				.19	.06	.25**	.12	.06	.15	.12	.06	.15
Negative Affect							-.61	.20	-.31**	-.60	.21	-.31**
Over-control										.02	.11	.02
Adjusted R^2		.36			.41			.48			.47	
F for change in R^2		36.11***			22.66***			19.92***			14.70***	

B- unstandardised beta coefficient; SE- standard error; β- standardised beta;

**p < .05. **p < .01. ***p < .001*

Table 5.33

Hierarchical regression analysis of child behaviour predicting dyadic intersubjectivity. Time 2 (N= 63)

Variables	*Model 1*			*Model 2*			*Model 3*			*Model 4*			*Model 5*			*Model 6*		
	B	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Level of difficulty	.00	.00	-.10	.00	.00	-.05	.00	.00	.05	.00	.00	.02	.00	.00	.02	.00	.00	.02
On Task				.36	.22	.22	.12	.21	.08	.32	.22	.20	.32	.22	.20	.31	.22	.19
Autonomy							.66	.24	.40*	.62	.19	.38**	.62	.20	.38**	.62	.20	.37**
Positive Affect										.42	.12	.46**	.42	.13	.46**	.42	.13	.46**
Negative Affect													-.01	.18	-.01	.01	.22	.01
Non-compliance																-.05	.23	-.03
Adjusted R^2		-.01			.03			.14			.34			.32			.31	
F for change in R^2		.67			1.82**			4.29**			8.80***			6.92***			5.68***	

B- unstandardised beta coefficient; SE- standard error; β- standardised beta;

**p < .05. **p < .01. ***p < .001*

Table 5.34

Linear regression analyses of dyadic intersubjectivity predicting the dimensions of the mother and child behaviour. Time 2 (N= 63)

Variables	*B*	*SE B*	*β*	*Adjusted R^2*	*F*
			Mother's Scaffolding behaviour		
Scaffolding Strategy	.48	.08	.61**	.36	36.11***
Positive Affect	.43	.13	.34**	.10	7.85**
Negative Affect	-.29	.09	-.56**	.30	27.29***
Over-control	-.31	.10	-.32**	.09	6.99**
			Child's Scaffolding behaviour		
Level of difficulty	-12.18	19.68	-.10	-.01	.67
On Task	.15	.07	.23	.04	3.51
Autonomy	.25	.08	.42**	.16	12.76**
Positive Affect	.42	.10	.38**	.13	10.45**
Negative Affect	-.14	.07	-.28*	.06	5.24*
Non-compliance	-.06	.08	-.10	-.01	.56

B- unstandardised beta coefficient; SE- standard error; β- standardised beta

$^*p < .05$. $^{**}p < .01$. $^{***}p < .001$

To sum up, a cross-sectional examination at Time 2 identified an overall consistency with the results obtained during the cross-sectional examination at Time 1. Specifically, the consistency in the reciprocal predictive patterns between the behavioural dimensions displayed by the mother, the child and dyadic intersubjectivity in the learning interaction at home. However, this time it was determined that there was a negative interrelationship between maternal negative affect and intersubjectivity as opposed to a positive predictive relationship between maternal positive affect and intersubjectivity found at Time 1. Figure 5.9 illustrates the patterns of relationship obtained through a set of regressions during cross-sectional examination at Time 2.

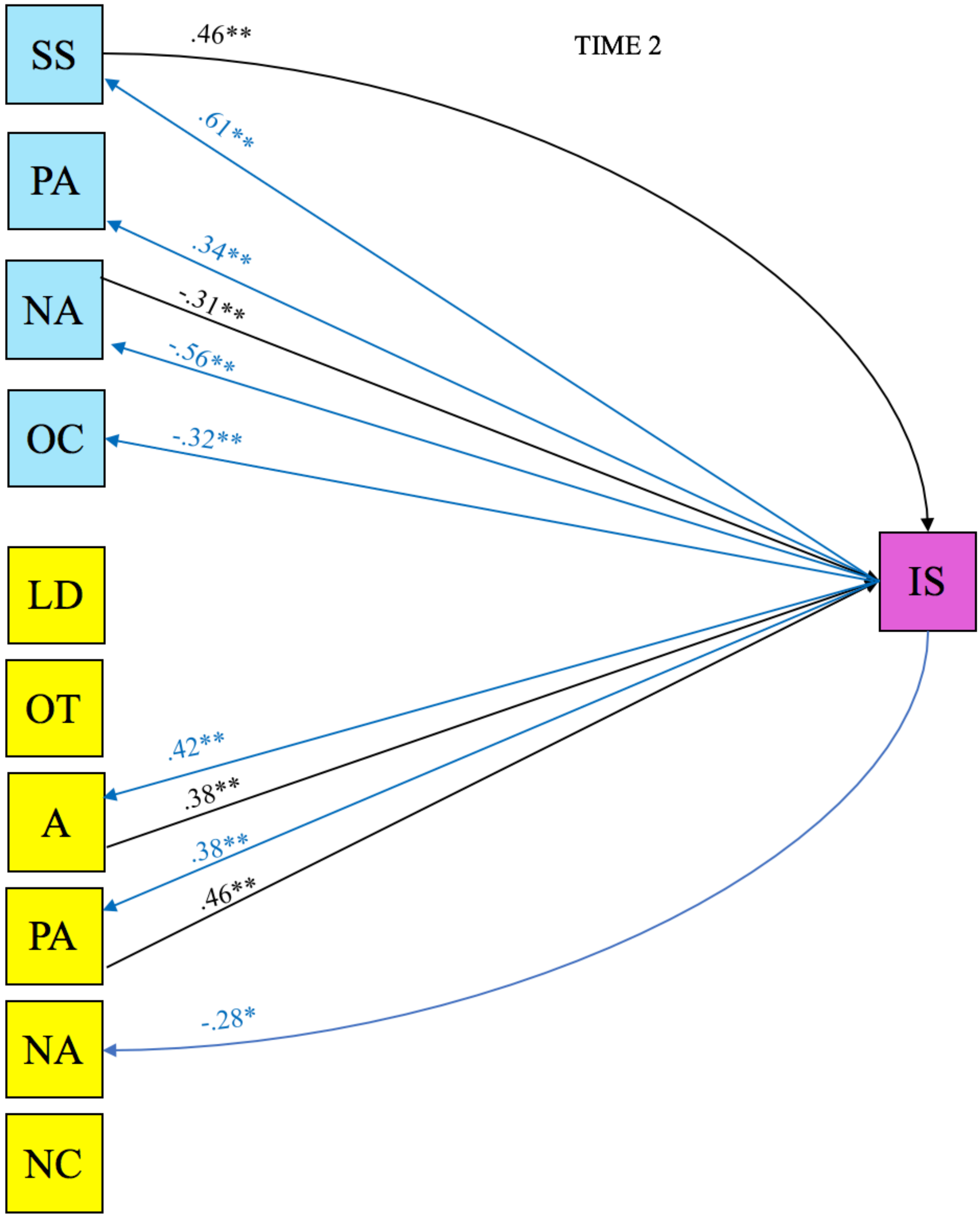

Figure 5.9 Cross-sectional examination. Predictive relationship between dyadic intersubjectivity and the dimensions of the mother and child behaviour at Time 2 (N= 63).

IS-Intersubjectivity. Maternal dimensions: SS-Scaffolding Strategy, PA- Positive Affect, NA- Negative Affect, OC- Over-Control, Child's dimensions: LD- Level of Difficulty, OT- On Task behaviour, A-Autonomy, PA-- Positive Affect, NA- Negative Affect, NC- Non-compliance

5.3.3 Longitudinal investigation: cross-lagged effect of mother and child behaviour on intersubjectivity and vice versa

The longitudinal effect of the mother's and child's dimensions of behaviour, displayed during the problem-solving interaction at Time 1, was tested on the level of dyadic intersubjectivity observed at Time 2, along with the longitudinal effects of dyadic intersubjectivity at Time 1 on the dimensions of the mother's and child's behaviour at Time 2.

In order to test these cross-lagged effects, two sets of hierarchical multiple regressions were calculated. Similar to previous analyses (see Subchapter 5.2.4), the autoregressive effect was controlled in order to reduce the potential bias in the cross-lagged effect. The autoregressive effects, which are reflected in the stability of the variables (dimensions of mother's and child's behaviour) over time, were tested earlier (see Subchapter 5.2.3). All dimensions proved to remain consistent across the two time points, except for the child's negative affect. Therefore, the child's negative affect was not included in further analyses.

Also, the stability of dyadic intersubjectivity between the two time points was calculated by a simple linear regression (see Appendix G: Table G.15). The results identified a strong consistency in the dyadic intersubjectivity between Time 1 and Time 2 (Adjusted R^2= .30, F= 27.22, p< .001).

The first set of hierarchical multiple regression analyses investigated the cross-lagged effects of the mother's and child's behaviour at Time 1 on the dyadic intersubjectivity observed at Time 2 (see Appendix G: Tables G.16-G.17). Both regressions identified no longitudinal effect on dyadic intersubjectivity after controlling for the autoregressive effect. These results suggested that none of the maternal scaffolding dimensions (scaffolding strategy, positive affect, negative affect or over-control) or the child's behaviour (level of difficulty, on task behaviour, autonomy, positive affect or non-compliance) had an impact on the dyadic intersubjectivity across time. That is particularly interesting as conflicting results were found in the cross-sectional analyses at each time point.

Another group of hierarchical regressions was calculated to examine the longitudinal effect of the dyadic intersubjectivity observed at Time 1 on dimensions of maternal scaffolding and the child's behaviour displayed during collaborative problem-solving at Time 2 (see Table 5.35). After controlling for the autoregressive effect, only one dimension of the mother's scaffolding behaviour observed at Time 2 was predicted by the intersubjectivity displayed at Time 1. The cross-lagged effect of dyadic intersubjectivity on maternal controlling behaviour was significant (Adjusted R^2 *change*= .07, F= 23.28, p< .001). This finding was consistent with results obtained by the cross-sectional analyses at Time 2.

To conclude, while the cross-lagged effects of the mother's and child's behaviour on the dyadic intersubjectivity and vice versa were tested, only a single longitudinal effect was identified: mothers who were part of dyads with a higher level of intersubjectivity were less controlling approximately seven months later. The consolidation of the group of regression analyses presented in Subchapter 5.3 is illustrated in the Figure 5.10.

Table 5.35

Autoregressive hierarchical regression analyses of mother and child behaviour at Time 1 predicting dyadic intersubjectivity at Time 2 (N= 63)

Variables	Model 1			Model 2		
	B	SE B	β	B	SE B	β
Mother's Scaffolding Behaviour						
Dyadic Intersubjectivity	.78	.08	.86**	.71	.10	.78**
Scaffolding Strategy				.11	.07	.13
Adjusted R^2		.73			.73	
F for change in R^2		165.91***			86.60***	
Dyadic Intersubjectivity	.52	.12	.48**	.51	.14	.48**
Positive Affect				.03	.18	.02
Adjusted R^2		.22			.21	
F for change in R^2		18.57***			9.15***	
Dyadic Intersubjectivity	.60	.21	.63*	.59	.23	.63*
Negative Affect				-.01	.08	-.01
Adjusted R^2		.39			.38	
F for change in R^2		39.97***			19.66***	
Dyadic Intersubjectivity	.48	.11	.60**	.39	.12	.49**
Over-control				-.32	.11	-.31**
Adjusted R^2		.35			.42	
F for change in R^2		33.75***			23.28***	
Child's Behaviour						
Dyadic Intersubjectivity	.57	.12	.50**	.59	.14	.52**
Level of difficulty				10.30	14.65	.08
Adjusted R^2		.24			.24	
F for change in R^2		20.82***			10.59***	
Dyadic Intersubjectivity	.36	.11	.42**	.34	.11	.40**
On Task				.06	.09	.08
Adjusted R^2		.16			.15	
F for change in R^2		12.90**			6.63**	
Dyadic Intersubjectivity	.51	.07	.74**	.51	.07	.73**
Autonomy				.02	.08	.03
Adjusted R^2		.53			.53	
F for change in R^2		72.07***			35.53***	
Dyadic Intersubjectivity	.40	.12	.42**	.40	.14	.42**
Positive Affect				-.02	.19	-.02
Adjusted R^2		.16			.15	
F for change in R^2		12.77**			6.29**	
Dyadic Intersubjectivity	.42	.17	.43*	.42	.17	.43*
Non-compliance				.02	.09	.02
Adjusted R^2		.17			.16	
F for change in R^2		13.58***			6.70**	

B- unstandardised beta coefficient; SE- standard error; β- standardised beta;
**p<.05; **p<.01, ***p<.001*

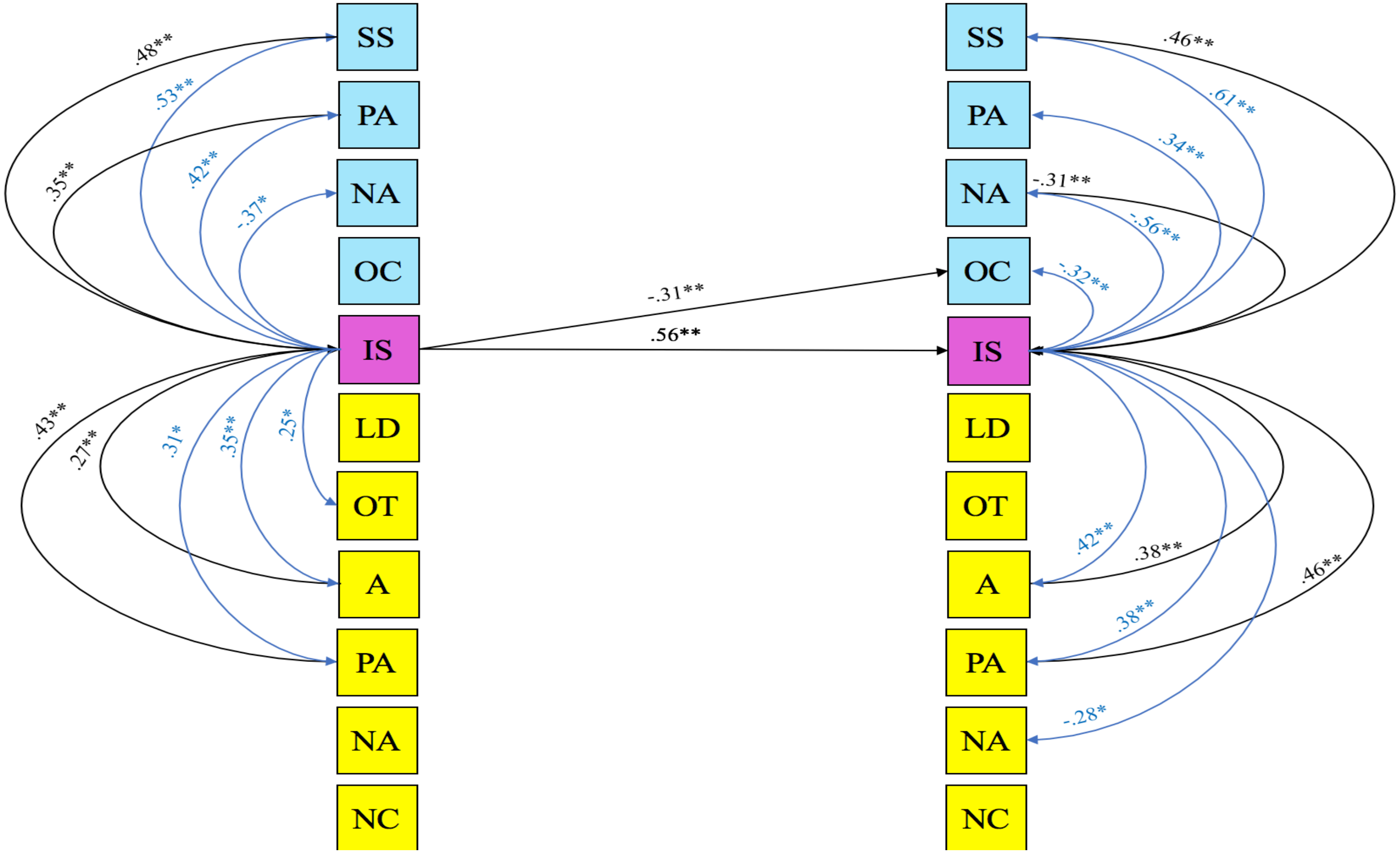

Figure 5.10 Consolidation of results: Cross-lagged autoregressive model examining the relationship between dyadic intersubjectivity and dimensions of behaviour displayed by mother and child during scaffolding interaction (N= 63). *IS- Intersubjectivity. Maternal dimensions: SS-Scaffolding Strategy, PA- Positive Affect, NA- Negative Affect, OC- Over-Control, Child's dimensions: LD- Level of Difficulty, OT- On Task behaviour, A- Autonomy, PA-- Positive Affect, NA- Negative Affect, NC- Non-compliance.*

5.4 Summary of findings

1. The analyses of cross-sectional data at Time 1 identified an interrelationship between the positive affect displayed by the mother and child. Also, the child's autonomy was determined by the mother's controlling behaviour, while over-control and use of scaffolding strategies was influenced by the child's autonomy.
2. The analyses of cross-sectional data at Time 2 suggested that the relationship identified at Time 1 remained approximately the same. This suggested further relationship between the mother and her child. For example, the child's on task behaviour was influenced by maternal negativity and vice versa.
3. All dimensions displayed during a scaffolding interaction remained stable across the two time points apart from the child's negative affect.
4. The analyses of longitudinal data showed that maternal negative affect predicted the child's autonomy and positive affect approximately seven months later. Also, cross-lagged effect was identified between the maternal over-control behaviour observed at Time 1 and the child's non-compliance displayed during collaborative problem-solving at Time 2. Finally, the child's autonomous behaviour observed at the baseline had an impact over time on the maternal controlling behaviour displayed during the follow up visit.
5. The analyses of cross-sectional data (at Time 1 and Time 2) identified interrelationships between the mother's emotional support along with the use of appropriate strategies and mutual intersubjectivity. Similarly, reciprocal predictive relationships were identified between the child's autonomy, the child's positive affect and dyadic intersubjectivity consistently across the two measurement points.
6. The analyses of cross-lagged effects identified a single longitudinal effect of dyadic intersubjectivity on maternal over-control behaviour. Mothers who were part of the dyads with higher mutual understanding were less controlling approximately seven months later. This finding was consistent with the results of cross-sectional analyses at Time 2.

CHAPTER 6. THE CONTRIBUTION OF PERSON AND CONTEXTUAL FACTORS TO MOTHER AND CHILD BEHAVIOUR IN SCAFFOLDING INTERACTION

The Process-Person-Context-Time model of development (PPCT; Bronfenbrenner & Morris, 2006) suggests that multiple factors impact children's learning. In the current chapter, the behaviour displayed during a '*proximal process*', such as the scaffolding interaction, is related to the *person characteristics* of both the mother and child as well as *contextual factors* of their home environment across two time points. Person and contextual characteristics, relevant to the process of scaffolding, were identified based on relevant literature which led to the identification of indirect links as discussed earlier (see Chapter 3).

The following hypotheses are tested:

1. Person characteristics of both mother (SES, parenting affection/stress, social and emotional abilities) and child (general cognitive abilities, social and emotional abilities, behavioural adjustment) and contextual factors (home environment, over-crowdedness, number of siblings) will predict the variability in dimensions of the mother's scaffolding behaviour (scaffolding strategy, positive affect, negative affect and over-control) cross-sectionally and longitudinally.
2. Person characteristics of the mother and child, along with contextual factors, will predict the variability in dimensions of the child's behaviour (level of difficulty, on task behaviour, autonomy, positive affect, non-compliance) displayed during problem-solving situations cross-sectionally and longitudinally.
3. Person characteristics of mother and child, along with contextual factors, will predict the variability in dyadic intersubjectivity displayed during problem-solving situations cross-sectionally and longitudinally.

Figure 6.1 illustrates a model based on which four cross-lagged autoregressive models is conducted, for each dimension of maternal behaviour (scaffolding strategy, positive affect, negative affect and over-control) as a dependent variable to test Hypothesis 1. Similarly, Figures 6.2 and 6.3 are models based on the dimensions of the child's behaviour (level of difficulty, on task behaviour, autonomy, positive affect, non-compliance) and the dyad's intersubjectivity to address Hypothesis 2 and Hypothesis 3, respectively.

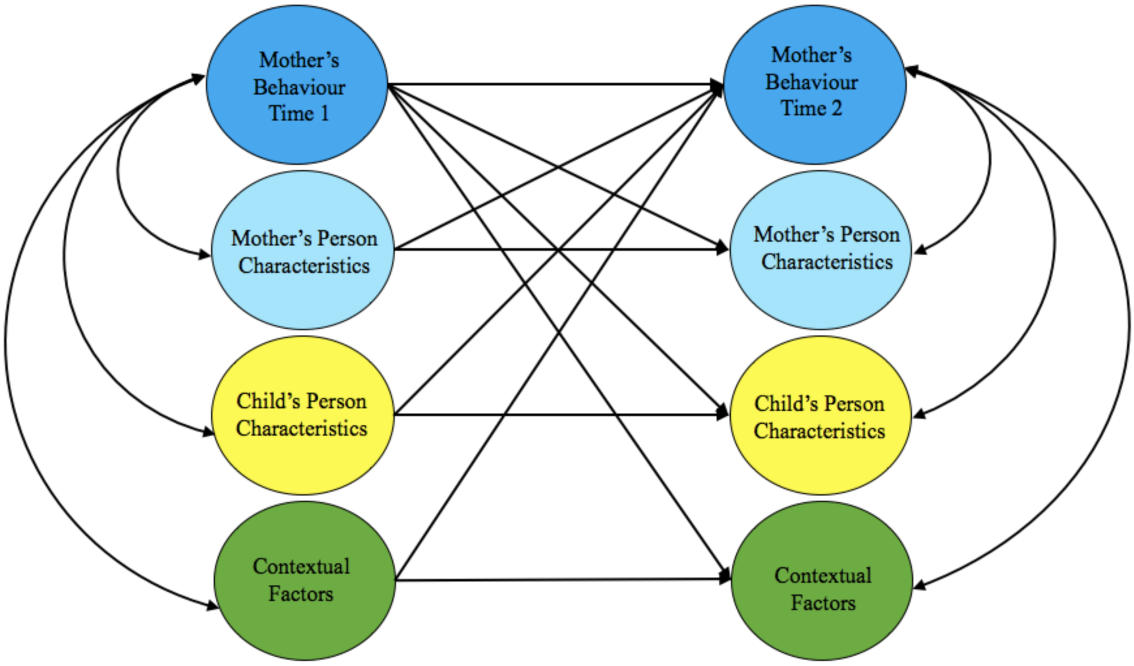

Figure 6.1 Cross-lagged autoregressive model examining the relationship between dimensions of maternal scaffolding behaviour and mother, child and contextual characteristics based on the multiple regression analyses.

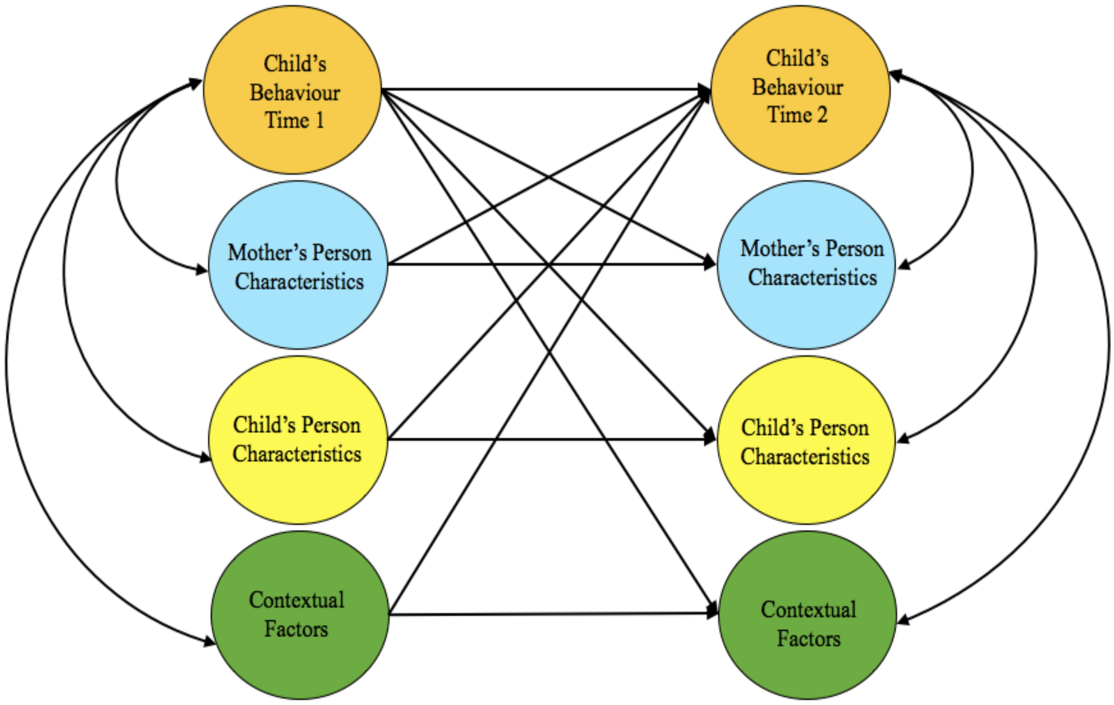

Figure 6.2 Cross-lagged autoregressive model examining the relationship between dimensions of child behaviour exhibited during scaffolding interactions and mother, child and contextual characteristics based on the multiple regression analyses.

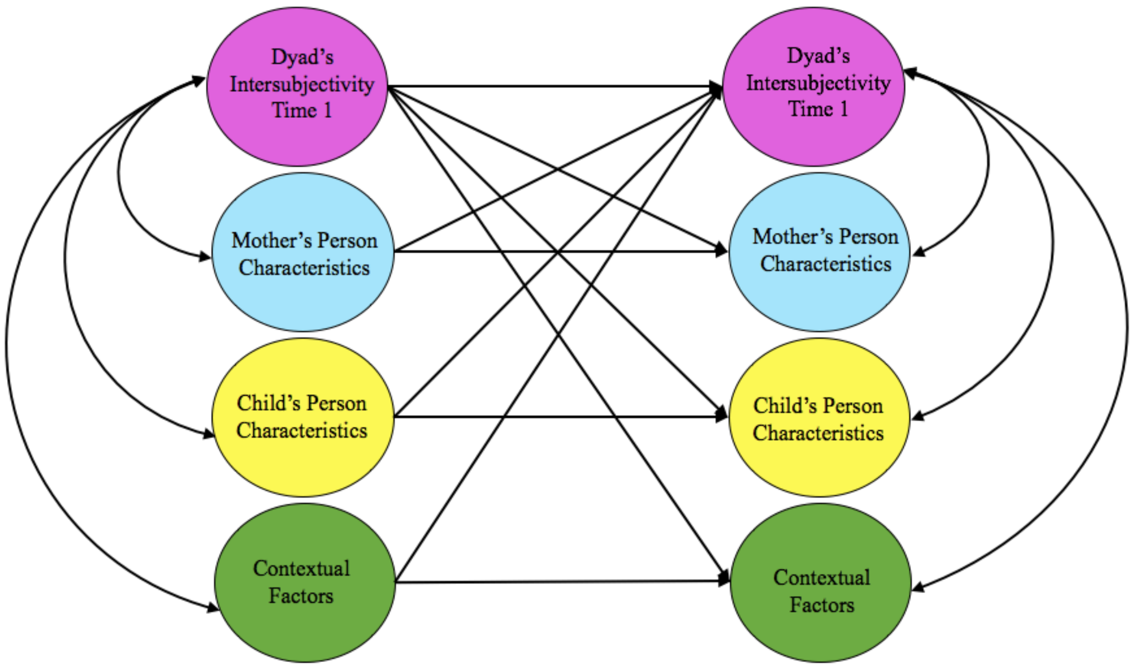

Figure 6.3 Cross-lagged autoregressive model examining the relationship between dimensions of dyadic intersubjectivity exhibited during scaffolding interactions and mother, child and contextual characteristics based on the multiple regression analyses.

6.1 Preliminary analyses

In Chapter 5, it was established that several behavioural dimensions demonstrated during learning interactions at home were moderately correlated and composite scores were calculated. Specifically, maternal ‘quality of instruction’ and ‘contingency’ (*r*= .56) were averaged into a single dimension of ‘scaffolding strategy’ and child’s dimensions - ‘amount of help required’ and ‘autonomy’ (*r*= -.60) - were merged into a new variable - child’s ‘autonomy’. These new composite variables are used in the analyses to increase the consistency in results. Furthermore, it was also established that the child’s negative affect was not stable across two time point and, as a result, excluded from further analyses.

Therefore, analyses presented in the current chapter are based on four dimensions of the mother’s behaviour (scaffolding strategy, positive and negative affect, over-control), five dimensions of the child’s behaviour (level of difficulty, on task behaviour, autonomy, positive affect and non-compliance) and one dimension of dyadic behaviour (intersubjectivity) that were observed during scaffolding interactions.

Maternal person characteristics were represented by the level of education, parenting aspects (expression of affection and parenting stress), emotional abilities (traits of emotional intelligence and emotion regulation), and use of mental state talk. The child’s person characteristics consisted of general cognitive abilities (verbal mental age (VMA) and working memory), behavioural adjustment (hyperactivity/ inattention, emotional symptoms, conduct problems, peer problems and pro-social behaviour), emotional abilities (emotion recognition and emotion regulation) and theory of mind. Finally, contextual factors were comprised of household chaos, crowding index and the number of siblings (younger and older).

The descriptive statistics represented by means, standard deviations and range values for all study variables that were measured across two time points are displayed in Tables 6.1-6.3. The sample size was *N*=68 and *N*=63 at Time 1 and Time 2 respectively.

Table 6.1

Descriptive statistics for maternal scaffolding behaviour and person characteristics. Time 1 (N=68) and Time 2 (N=63)

Variables	*Time 1*			*Time 2*		
	Mean	*SD*	*Observed Range*	*Mean*	*SD*	*Observed Range*
Mother's Scaffolding Behaviour						
Scaffolding Strategy	3.82	.50	2.50- 4.75	3.89	.46	2.67- 4.75
Positive Affect	2.80	.70	1.50- 4.50	2.54	.74	1.0- 4.67
Negative Affect	1.21	35	1.00-2.67	1.16	.30	1.0- 2.67
Over-control	1.97	.71	1.00- 4.50	1.78	.57	1.0- 3.67
Mother's Person Characteristics						
Education	6.19	1.36	2.00- 8.00	6.14	1.39	2.00- 8.00
Parenting						
Expression of affection	3.88	.44	3.11- 5.00	3.80	.41	3.06- 4.94
Parenting stress intensity	2.01	.31	1.20- 2.70	1.93	.28	1.25- 2.90
Parenting stress frequency	2.18	.52	1.00- 3.60	2.13	.49	1.05- 3.80
Emotional abilities						
Emotion Intelligence	5.42	.59	4.07- 6.50	5.48	.62	3.83- 6.77
Reappraisal	5.11	1.04	2.00- 7.00	5.29	.80	3.00- 7.00
Suppression	2.75	.94	1.00- 4.75	2.86	.98	1.00- 5.50
Mental State Talk						
Cognitive States	.24	.10	.02- .49	.27	.12	.07- .71
Emotion States	.13	.07	.01- .33	.14	.07	.03- .31
Desire States	.05	.03	.00- .15	.03	.03	.00- .12
Modulation of assertion States	.07	.05	.00- .23	.07	.04	.00- .19
Other Mental States	.02	.02	.00- .11	.03	.02	.00- .12

Table 6.2

Descriptive statistics of child behaviour and person characteristics. Time 1 (N=68) and Time 2 (N=63)

Variables	*Time 1*			*Time 2*		
	Mean	*SD*	*Observed Range*	*Mean*	*SD*	*Observed Range*
Child's Scaffolding Behaviour						
Level of difficulty (time)	211.63	62.19	112.50-402.00	206.70	68.47	99.75- 416.50
On Task	4.53	.44	3.50- 5.00	4.74	.36	3.75- 5.00
Autonomy	3.48	52	2.38- 4.50	3.48	.36	2.67- 4.38
Positive Affect	2.11	.67	1.00- 3.75	2.03	.64	1.00- 4.00
Non-compliance	1.40	.35	1.00- 2.67	1.39	.36	1.00- 2.67
Child's Person Characteristics						
General cognitive abilities						
Working memory	3.66	.97	2.00- 5.50	4.40	.85	2.00- 6.00
VMA	75.87	10.73	46.00- 102.00	84.52	10.55	59.00- 109.00
Behavioural adjustment						
Hyperactivity/ inattention	.77	.46	.00- 1.60	.69	.42	.00- 1.60
Emotional symptoms	.43	.33	.00- 1.20	.43	.39	.00- 1.40
Conduct problems	.33	.26	.00- 1.00	.26	.22	.00- 1.00
Peer problems	.31	.27	.00- 1.00	.29	.35	.00- 1.40
Pro-social behaviour	1.63	.34	.60- 2.0	1.66	.32	.40- 2.00
Emotional abilities						
Emotion recognition	.60	.16	.13- .94	.71	.16	.19- .94
Lability/Negativity	1.77	.28	1.13- 2.47	1.70	.28	1.20- 2.53
Emotion Regulation	3.33	.36	2.50- 4.00	3.38	.31	2.75- 4.00
Social understanding						
Theory of Mind	3.65	1.63	.00- 5.00	4.46	1.04	.00- 5.00
Cognitive States	.03	.04	.00- .13	.06	.09	.00- .51
Emotion States	.09	.07	.00- .38	.10	.07	.00- .32
Desire States	.03	.04	.00- .30	.04	.03	.00- .12
Modulation of assertion States	.02	.03	.00- .10	.03	.04	.00- .15
Other Mental States	.01	.02	.00- .10	.01	.02	.00- .06

Table 6.3

Descriptive statistics of dyadic behaviour and contextual factors. Time 1 (N=68) and Time 2 (N=63)

Variables	*Time 1*			*Time 2*		
	Mean	*SD*	*Range*	*Mean*	*SD*	*Range*
Dyad's scaffolding behaviour						
Intersubjectivity	3.69	.56	2.00- 4.75	3.73	.59	2.25-5.00
Contextual factors						
Household chaos	2.11	.51	1.00- 3.50	2.07	.51	1.0- 3.33
Crowding index	.89	.25	.33- 1.33	.89	.26	.33- 1.33
Younger siblings	.28	.48	.00- 2.00	.27	.48	.00- 2.00
Older siblings	.74	.59	.00- 2.00	.78	.58	.00- 2.00
Total number of siblings	1.01	.64	.00- 3.00	1.05	.66	.00- 3.00

All dependent and independent variables, at both time points, were tested for a normal distribution using the Kolmogorov-Smirnov and Shapiro-Wilk tests, also by assessment of histograms, along with skewness and kurtosis (Appendix H: Tables H.1.1-H.1.2).

The assumption of normality was not met for three out of four dimensions of the mother's behaviour (except scaffolding strategy dimension), and similarly, two out of four of the child's dimensions were not-normally distributed (except for dimensions of autonomy and the level of difficulty). Therefore, further analyses required the use of non-parametric methods such as bootstrapping.

The next step of the preliminary analysis was to test any possible gender differences in the child's related variables: parenting aspects (expression of affection and parenting stress), child's person characteristics (general cognitive and emotional abilities, social understanding) and finally, the contextual factor - household chaos.
These variables were tested for normal distribution by Kolmogorov-Smirnov and Shapiro-Wilk tests; however, a majority of the child's person characteristics (working memory, behavioural problems (SDQ), mental state talk, theory of mind) did not meet an assumption of normality. Since some of the variables were not-normally-distributed, the Mann-Whitney U test was utilised to compare two independent sample groups.

The results of Mann-Whitney U test between two gender groups (male N= 24, female N= 44 at Time 1; male N= 22, female N= 41 at Time 2) across two points suggested no significant differences in the parenting aspects nor household chaos. Also, there were no significant gender differences (p>.05) in the children's theory of mind, emotion recognition or peer problems at either time points. The results revealed no significant differences (p> .05) between boys and girl in working memory, VMA and pro-social behaviour at Time 1, while there were significant differences identified for these variables at Time 2 (working memory (p<.05), VMA (p<.05), pro-social behaviour (p<.001). In contrast, emotional symptoms (p<.01) and use of emotion mental state talk (p<.05) were significantly different at Time 1, while at Time 2, gender differences were not detected. Finally, at both time points, conduct problems (p<.05; p<.05) and hyperactivity/inattention (p<.01; p<.01) were significantly different in respect to the children-participants' gender.

6.2 Correlation analyses

The final step in preliminary analysis was the correlation analyses cross-sectional (within each time point) and longitudinal (across two Time points). To calculate the correlations, the Pearson correlation analysis was utilised as this statistical method is valid regardless of the variable's distribution. The Pearson correlation analyses (N= 68; N= 63) demonstrated the relationship identified between the behavioural dimensions displayed during the scaffolding interaction and the number of mother, child and contextual variables observed during each home visit (see Tables 6.4-6.5). Further correlation analyses tested the significance of the relationship between independent variables measured at Time 1 and behavioural dimensions displayed by the mother and child during problem-solving situations at Time 2 (see Table 6.6). The results of correlation analyses should be treated with caution as there was some level of likelihood that the significance of the correlations reported might occur due to chance in the form of a random sampling error and/or Type I error (Warner, 2007).

First, the links between the mother's scaffolding behaviour and the examined variables are presented, then associations between the child's and dyad's dimensions with the same variables.

6.2.1 Characteristics associated with maternal scaffolding behaviour

Scaffolding Strategy. The results consistently suggested that mothers who achieved higher scores for the use of scaffolding strategies (Time 1: r= .35, p<.01; Time

2: $r= .39$, $p<.01$) had children with a higher VMA. This relationship was previously identified in a study by Carr & Pike (2012), in which the child's VMA was linked with maternal contingent behaviour. Also, at both Time points, mothers who used scaffolding strategies more successfully had children with higher abilities for emotion regulation (Time 1: $r= .40$, $p<.01$; Time 2: $r= .31$, $p<.05$). Further, at Time 1, a negative association with child's peer-related problems was revealed (Time 1: $r= -.34$, $p<.01$). The results obtained through the study conducted by Clark and colleagues (2008) supported these links with the suggestion that parental responsive behaviour was a significant predictor of behavioural and emotional regulation. Interestingly, while the child's theory of mind did not have a significant relationship with maternal scaffolding behaviour at Time 1, it was moderately associated with three scaffolding dimensions (scaffolding strategy, negative affect and over-control behaviour) at Time 2. Specifically, mothers who used more appropriate tutoring techniques ($r= .43$; $p<.01$) had children with a higher ToM. When Galende and colleagues (2012) investigated linguistic scaffolding, they identified a similar positive relationship between the quality of scaffolding and the child's ToM. The longitudinal correlation analyses between the child's variables measured at Time 1 and the mother's scaffolding strategies at Time 2 (see Table 6.6) provided evidence of consistency with identified links at Time 1 and Time 2.

In relation to the mother's characteristics, consistent with the other results (Carr & Pike, 2012; Lowe et al., 2013; Neitzel & Stright, 2004), maternal education was positively correlated with scaffolding strategy at both Time points (Time 1: $r= .34$, $p<.01$; Time 2: $r= .32$, $p<.01$), suggesting that mothers with higher levels of education used more successful scaffolding strategies. Similarly, maternal emotional intelligence (Time 1: $r= .45$, $p<.01$; Time 2: $r= .33$, $p<.01$) and the use of cognitive mental states (Time 1: $r= .42$, $p<.01$; Time 2: $r= .35$, $p<.01$) are moderately related to the dimension of scaffolding strategy at both time points. Additionally, at Time 1 the correlation analysis showed that mothers who use more emotion mental states, were more likely to score higher at scaffolding strategies ($r= .26$, $p<.05$).

Corresponding with the child's characteristics, the longitudinal correlation analyses (see Table 6.6) suggested that maternal characteristics measured at Time 1 were consistently associated with maternal scaffolding strategy at Time 2 with links revealed through cross-sectional analyses at each time point. The only new relationship identified was a weak positive correlation between maternal use of modulation of assertion at Time 1 and scaffolding strategy at Time 2 ($r= .26$, $p<.05$).

Finally, the correlation analyses revealed that in the households with lower crowdedness index mothers displayed more successful scaffolding strategy during mutual problem-solving at both time points (Time 1; r= -.24, p<.05; Time 2: r= -.37, p<.01). The identified relationship was stable within and across time (see Tables 6.4-6.6). Previously it was highlighted that over-crowding led to more inefficient parenting practices and, in turn, to a delay in a child's development (Evans, Wells, & Moch, 2003).

Emotional support: Positive affect. A higher positive affect displayed by mothers was positively linked with the children's behavioural adjustment. Specifically, their children scored higher on the scales of hyperactivity/inattention (r= .26; p<.05) and pro-social behaviour (r= .32, p<.01) at Time 1. However, out of these relationships, only the positive correlation between maternal positivity and the child's pro-social behaviour maintained significance at Time 2 (r= .28, p<.05) when maternal positive affect was observed approximately seven months later (r= .31, p<.05). The demonstration of positive affect has been previously associated with children's pro-social behaviour (Denham & Grout, 1992; Garner, Jones, & Miner, 1994). For example, a study conducted among families with younger children by Pettygrove and colleagues (2013) also identified a relationship between parental use of positive socialisation techniques (praise, reasoning, encouragement) and children's pro-social behaviour. Additionally, it was established at Time 2 that mothers who displayed more warmth and positivity during the dyadic task accomplishment had children who were more proficient in the ability to regulate emotion (r= .26, p<.05).

In relation to the mother's person characteristics, the dimension of maternal positive affect was not associated to any of the maternal variables at either Time point. However, the Pearson correlation analyses identified a relationship between both aspects of maternal emotion regulation (reappraisal and suppression) measured at Time 1 and maternal positive affect observed at Time 2. Many studies previously supported this relationship suggesting that maternal regulatory ability is essential for successful tutoring (Bigelow et al., 2010; Raikes & Thompson, 2006).

Finally, it was identified that maternal positive affect was positively related to the number of older children in the household (r= .35, p<.01) at Time 2 and longitudinally (r= .35, p<.01) (see Tables 6.5-6.6). Interestingly, the longitudinal correlation analyses also revealed a negative link between the number of younger children at Time 1 and maternal positivity displayed approximately seven months later.

Emotional support: Negative affect. Consistently within each time point and across the time, mothers who displayed more negative affect had children with a lower VMA. Previous research has shown that parents were more directive and intrusive when interacting with their children who had delayed development, rather than parents of children with typical development (Costigan, Floyd, Harter, & McClintock, 1997; Fenning, Baker, J. Baker, B., & Crnic, 2007; Floyd, Harter, & Costigan, 2004). Moreover, at the second visit it was identified that a lower negative affect from the mother was also associated with the child's higher pro-social behaviour (r= -.35, p<.01). The positive link between parental negative affect and the child's behavioural problems, specifically peer-problem, appeared to be significant when tested longitudinally (r= .32, p<.01). Aligned to these findings, parental rejection and negativity, displayed explicitly as harsh parenting, has been linked with children's issues in behavioural adjustment (Dodge, Pettit, & Bates, 1994; Smith, Calkins, Keane, Anastopoulos, & Shelton, 2004). Additionally, at Time 2 it was suggested that mothers who were more negative or disapproving had children with a lower ability to understand the minds of others (r= -.32, p<.05).

In relation to maternal characteristics, it was identified that mothers who were more negative during problem-solving situations with their child were less likely to score lower on the reappraisal scale (r= -.25, p<.05) and to use fewer cognitive mental states (r= -.32, p<.01) at Time 1. This negative relationship between maternal negative affect and use of cognitive mental states also remained significant at Time 2 (r= -.30, p<.05). However, neither of these relationships were revealed longitudinally.

Finally, in the current study, maternal negative affect was not associated with any of the contextual factors at each time point or across the time.

Transfer responsibility: over-control. A significant negative link was established between maternal over-control behaviour and the child's VMA (r= -.28, p<.05) and theory of mind (r= -.35, p<.01) at Time 2. However, only the relationship between maternal controlling behaviour observed at Time 2 and child's VMA measured at Time 1 remained significant when tested across the time.

Maternal over-control behaviour was associated with none of the mother's variables at Time 1. At Time 2 (r= -.25, p<.05) and longitudinally (r= -.40, p<.01), it was identified that mothers who were controlling used fewer utterances about cognitive mental states in the conversation with their child.

Also, at the time of the initial visit, a link between maternal over-control behaviour and the number of older children was identified ($r = .31$, $p < .05$), however, this result was not consistent at Time 2 or across two time points.

6.2.2 Characteristics associated with child behaviour in scaffolding interaction

Level of difficulty. The results of the Pearson correlation analyses (*N*= 68; *N*= 63) consistently suggested that children who completed tasks faster than others had a higher level of VMA (see Tables 6.4-6.6). At Time 1, the level of difficulty was found to be relevant to the child's peer-related problem (r= .29, p<.05). At the next visit, this relationship was not significant, while this relationship was evident once tested longitudinally (r= .25, p<.05). Interestingly, the children's level of difficulty observed during scaffolding interactions positively correlated to their use of mental state talk at Time 2. In particular, children, who used more cognitive (r= .30, p<.05), modulation of assertion (r= .26, p<.05) or other mental states (r= .29, p<.05) in their conversation with their mother, spend more time completing the tasks. Potentially, it could be explained that children who were able to mentalise their speech were able to have a more sophisticated discussion with their mother about the problem-solving strategies, which consumed a more considerable amount of time than if the child had followed direct instruction from their parent. However, there was no supporting correlation of these relationships across two time points. Finally, it was suggested that the child's higher level of emotion regulation measured at the baseline was linked to a higher level of difficulty (r= .32, p<.05).

Consistently across three correlation analyses (see Tables 6.4-6.6), neither maternal person characteristics nor contextual factors were significantly related to child's level of difficulty.

On Task behaviour. Children with a higher VMA displayed more on task behaviour (Time 1: r= .30, p<.05; Time 2: r= .30, p<.05) during mutual problem-solving with their mother across both visits. A similar relationship was identified between the children's VMA at Time 1 and their on task behaviour displayed at Time 2 (r= .41, p<.01). Furthermore, at the follow-up visit, children who scored higher on conduct problems (r= -.34, p<.01) were less able to display on task behaviour during mutual problem-solving situations. When tested across the time, the negative link between the child's conduct problem and on task behaviour remained significant (r= -.27, p<.05).

Regarding the mother's person characteristics, at both visits, the results suggested that the use of cognitive mental states by the mother positively linked with the child's on task behaviour (Time 1: *r*= .26, *p*<.05; Time 2: *r*= .25, *p*<.05). This link was not supported longitudinally. At Time 2, the child's on task behaviour was also negatively correlated with the frequency of parenting stress (*r*= -.28, *p*<.05).

Autonomy. The correlation analyses identified that children with a higher level of working memory (Time 1: *r*= .26, *p*<.05; Time 2: *r*= .26, *p*<.05), VMA (Time 1: *r*= .38, *p*<.01; Time 2: *r*= .49, *p*<.01) and theory of mind (Time 1: *r*= .32, *p*<.01; Time 2: *r*= .42, *p*<.01) were more autonomous and independent during problem-solving situations, which was observed at both time points. Longitudinally the positive links remained significant between the children's VMA (*r*= .52, *p*<.01), theory of mind (*r*= .32, *p*<.05) and the dimension of autonomy.

Within each time point, the relationship between maternal characteristics and the child's autonomy was not identified, yet across time there was a link which suggested that mothers who used more cognitive mental state talk had children who were more able to act independently during joint problem-solving.

During the initial visit, it was identified that higher household chaos (*r*= -.25, *p*<.05) was linked with a lower ability in the child to be autonomous. However, this result was not stable at Time 2. However, consistently at Time 2 and across two time points, the obtained results suggested that the existence of older siblings was associated with a lower autonomy in the child's behaviour (*r*= -.26, *p*<.05).

Positive affect. Children with higher emotion regulation abilities at Time 1 displayed more positive affect at Time 2. Furthermore, at Time 2, a moderate negative association with the child's positive affect and use of other states by the mother was established, suggesting that mothers who used a variety of mental states in their day-to-day life had children who demonstrated less positive affect during learning interactions at home (*r*= -.25, *p*<.05). However, this link did not remain significant once tested across time, while another relationship was identified. Mothers who reported a higher level of suppression as part of their emotion regulation abilities had children who displayed a lower level of positive affect during collaborative problem-solving (*r*= -.27, *p*<.05). Finally, the results consistently suggested (see Tables 6.4-6.5), that the number of older siblings was positively associated with the child's positive affect.

Non-compliance. The results of the analyses, in relation to the child's person characteristics and dimension of non-compliance, were not stable. While at the initial visit there was no significant relationship, at the follow up visit, it was revealed that children with a more developed theory of mind were more non-compliant during scaffolding interactions (r= .25, p<.05). However, the only significant relationship that was identified across time suggested that a higher level of child's emotion regulation at Time 1 was linked with lower non-compliance behaviour (r= -.26, p<.05).

Consistently, across the three correlation analyses (see Tables 6.4-6.6), there were no significant associations between the child's non-compliant behaviour and any of the maternal characteristics. On the other hand, some significant links between non-compliance and contextual factors were revealed. In particular, at Time 1, it was suggested that more compliant children lived in a household with a higher level of over-crowdedness (r= -.24, p<.05). At Time 2, this relationship did not remain; instead. there was a negative association between non-compliant behaviour and the number of younger children (r= -.25, p<.05).

To summarise, the literature which investigated the impact of individual differences on the dimensions of the child's behaviour is more limited as opposed to the mother's scaffolding behaviour. However, there is a range of evidence that is consistent with the results obtained by correlation analyses which highlighted the role of the child's IQ, behavioural difficulties, regulatory abilities with the child's learning-related skills such as independence, attention to the task and compliance (McClelland, Acock & Morrison, 2006; McClelland, Morrison & Holmes, 2000; Speece & Cooper, 1990; Rimm-Kaufman, Curby, Grimm, Nathanson, & Brock, 2009). Along with the child's characteristics, to a lesser extent, some of the mother's characteristics (for example, education) and contextual variables (such as family size) were previously identified as relevant to the child's learning capabilities (Gutman, Sameroff, & Cole, 2003).

6.2.3 Characteristics associated with dyadic intersubjectivity in scaffolding interaction

At Time 1, the child's cognitive abilities (working memory and VMA) were positively linked with dyadic intersubjectivity observed during the scaffolding interaction. At the follow-up visit, the only link with the child's person characteristics suggested that the children who had a higher level of theory of mind were part of the dyad with a higher mutual understanding of each other (*r*= .25, *p*<.05). The correlation analyses across the two time points were reflective of the results obtained at each home visit. Specifically, the dyad had a higher level of intersubjectivity at Time 2 when the children had a higher level of VMA (*r*= .32, *p*<.05) and theory of mind (*r*= .26, *p*<.05) at Time 1. Furthermore, the results consistently suggested (see Tables 6.4-6.6) a significant positive link between maternal use of cognitive mental states in their speech with children and mutual intersubjectivity displayed during problem-solving interactions.

Table 6.4

Bivariate correlations between behavioural dimensions of scaffolding, person and contextual characteristics. Time 1 (N=68)

Variables	*Maternal scaffolding*					*Child's behaviour*				*Dyadic behaviour*
	Scaffolding Strategy	*Positive Affect*	*Negative Affect*	*Over-control*	*Level of Difficulty (time)*	*On Task*	*Autonomy*	*Positive Affect*	*Non-compliance*	*Inter-subjectivity*
Child's variables										
Working memory	.03	-.20	.04	-.05	-.19	.20	.26*	.01	-.11	.34**
VMA	.35**	.15	-.41**	-.17	-.28*	.30*	.38**	-.09	-.17	.34**
Hyperactivity/ inattention	.04	.26*	-.13	-.02	.07	-.06	-.05	.08	-.19	.20
Emotional symptoms	-.04	.03	-.16	-.00	.04	-.00	.11	-.06	.01	-.07
Conduct problems	-.06	.09	-.13	.05	-.13	-.22	-.10	.09	-.18	.21
Peer problems	-.34**	.05	.18	.16	.29*	.02	-.01	.03	.02	-.20
Pro-social behavior	.14	.32**	-.07	.08	-.02	.06	.01	.15	.04	.15
Emotion recognition	.16	-.06	-.06	.01	-.01	.11	.13	.11	-.18	.13
Lability/Negativity	.03	.20	-.10	.10	.04	-.21	-.05	.10	-.09	.14
Emotion Regulation	.40**	.11	-.19	-.05	.05	.11	.03	.12	.15	.19
Theory of mind	.14	-.02	-.19	-.20	-.12	.05	.32**	-.02	-.03	.14
Cognitive Mental States	-.02	.05	-.07	-.07	.19	.18	.06	-.01	.00	.10
Emotion Mental States	.03	.10	-.17	-.13	.21	.13	.08	-.03	.03	-.16
Desire Mental States	.13	.06	-.01	-.14	.16	.08	.15	.11	-.01	.13
Modulation of assertion Mental States	-.14	.07	.08	.07	.02	.07	.02	.09	-.02	.09
Other Mental States	.05	-.06	-.10	-.20	.02	-.07	.08	-.06	.15	-.07
Maternal variables										
Education	.34**	.01	-.06	-.05	-.07	.03	.19	-.20	.05	.15
Expression of affection	.09	.12	.00	-.16	.04	.09	.11	.02	.08	-.09
Parenting stress frequency	.12	.15	-.07	-.05	-.02	-.08	.06	.21	.03	.21
Parenting stress intensity	-.21	.09	.01	.12	.08	-.10	-.06	.14	-.01	-.02

Variable	Scaffolding Strategy	Positive Affect	Negative Affect	Over-control	Level of Difficulty (time)	On Task	Autonomy	Positive Affect	Non-compliance	Inter-subjectivity
Emotion Intelligence	.45**	.15	-.23	-.06	-.05	.17	-.03	-.08	.09	.14
Reappraisal[2]	.04	.09	-.25*	.06	.17	.00	.00	.13	.11	-.01
Suppression	-.09	-.21	.01	-.09	-.03	.06	.14	-.11	-.15	.04
Cognitive Mental States	.42**	.21	-.32**	-.12	.01	.26*	.10	-.02	-.04	.34**
Emotion Mental States	.26*	.19	-.21	.02	.20	-.18	.00	.12	.26	.00
Desire Mental States	-.15	-.04	-.03	.06	-.23	-.08	.07	.01	-.14	-.07
Modulation of assertion Mental States	.16	-.12	-.06	.13	-.01	-.00	-.03	.04	-.03	.09
Other Mental States	-.03	.01	-.19	.00	-.23	.10	.07	-.23	.04	-.07
Contextual variables										
Household chaos	-.14	.13	.04	.20	.06	-.14	-.25*	.15	-.24	.05
Crowding index	-.24*	-.25	.18	-.17	-.10	-.11	-.04	-.01	-.24*	-.09
Younger siblings	-.21	-.12	.13	-.02	.13	-.24	-.22	.05	-.05	-.13
Older siblings	.10	.22	-.07	.31*	.04	-.06	-.21	.15	-.13	.12

**p<.05, ** p<.01 (two-tailed)*

Table 6.5

Bivariate correlations between behavioural dimensions of scaffolding, person and contextual characteristics. Time 2 (N=63)

Variables	*Maternal scaffolding*					*Child's behaviour*				*Dyadic behaviour*
	Scaffolding Strategy	*Positive Affect*	*Negative Affect*	*Over-control*	*Level of Difficulty (time)*	*On Task*	*Autonomy*	*Positive Affect*	*Non-compliance*	*Inter-subjectivity*
					Child's variables					
Working memory	.09	-.14	-.07	-.04	-.21	.07	.26*	-.17	.10	.13
VMA	.39**	.06	-.33**	-.28*	-.33**	.30*	.49**	-.13	-.01	.24
Hyperactivity/ inattention	.10	.08	-.23	-.19	-.06	-.17	.05	-.12	-.11	.18
Emotional symptoms	.14	.11	-.16	-.06	-.06	-.01	.14	.05	-.04	.15
Conduct problems	-.12	.18	-.03	-.02	.04	-.34**	-.10	.07	.10	-.03
Peer problems	-.24	.18	.18	.00	.14	-.21	-.05	.00	.19	-.20
Pro-social behavior	.10	.28*	-.35**	.00	.04	.13	.07	.16	.18	.14
Emotion recognition	.20	-.10	.02	-.13	.09	.13	-.05	.12	-.08	.18
Lability/Negativity	-.03	.11	-.08	-.09	-.10	-.32*	-.01	.03	.14	-.06
Emotion Regulation	.31*	.26*	-.21	-.03	.02	-.11	-.14	.25	.21	.30*
Theory of mind	.43**	-.03	-.32*	-.35**	-.19	.08	.42**	-.05	.25*	.22
Cognitive Mental States	-.07	-.08	.08	.03	.30*	.18	-.07	-.18	-.09	.01
Emotion Mental States	0	.09	-.03	-.11	-.06	.07	.10	-.14	-.19	-.07
Desire Mental States	0	.07	.12	-.10	.10	-.15	-.09	.01	.14	-.14
Modulation of assertion Mental States	.03	-.03	.17	-.18	.26*	-.03	-.03	-.04	.07	.10
Other Mental States	-.04	.01	.12	-.20	.29*	.14	.03	-.07	-.16	.02
					Maternal variables					
Education	.32**	-.17	.01	-.14	.00	.06	.22	-.07	-.04	.19
Expression of affection	.10	-.10	.19	.06	.23	-.17	-.03	.14	.08	-.04
Parenting stress frequency	.07	.10	-.05	-.03	-.03	-.28*	-.16	.21	.02	.00
Parenting stress intensity	-.14	.11	-.15	-.04	-.16	.14	-.05	.02	-.13	.10

Variable	*Scaffolding Strategy*	*Positive Affect*	*Negative Affect*	*Over-control*	*Level of Difficulty (time)*	*On Task*	*Autonomy*	*Positive Affect*	*Non-compliance*	*Inter-subjectivity*
Emotion Intelligence	.33**	.14	-.16	.03	.18	.07	.03	.19	-.05	.18
Reappraisal[2]	.01	.22	-.07	.11	.14	.03	-.08	.20	.02	.08
Suppression	-.10	-.13	.07	.20	-.07	-.11	.02	.09	.02	-.06
Cognitive Mental States	.35**	.16	-.29*	-.25*	-.17	.25*	.21	-.17	-.08	.30*
Emotion Mental States	.04	.03	.03	-.11	.05	.07	-.08	-.16	-.15	-.08
Desire Mental States	-.09	.12	.02	.11	-.02	-.13	-.14	.08	.20	-.12
Modulation of assertion Mental States	.20	-.03	-.11	-.21	.07	.10	.15	-.11	.08	.15
Other Mental States	-.18	-.06	.02	-.17	-.22	.14	.14	-.25*	-.04	-.14
Contextual variables										
Household chaos	-.20	.04	-.11	.18	-.16	-.14	-.22	.02	.03	.04
Crowding index	-.37**	-24	.08	-.02	.04	-.02	-.15	-.14	-.16	-.23
Younger siblings	-.23	-.24	.07	.14	-.13	.14	-.07	-.09	-.25*	-.19
Older siblings	.01	.35**	-.18	.08	.13	.08	-.26*	.26*	-.18	.09

**p<.05, ** p<.01 (two-tailed)*

Table 6.6

Bivariate correlations between person and contextual characteristics at Time 1 and behavioural dimensions of scaffolding at Time 2 (N=63)

Variables	*Maternal Scaffolding*					*Child's behaviour*				*Dyadic behaviour*
	Scaffolding Strategy	*Positive Affect*	*Negative Affect*	*Over-control*	*Level of Difficulty (time)*	*On Task*	*Autonomy*	*Positive Affect*	*Non-compliance*	*Inter-subjectivity*
Child's variables										
Working memory	.21	-.21	-.03	-.19	-.01	.13	.12	-.23	-.05	.20
VMA	.36**	.10	-.38**	-.19	-.34**	.41**	.52**	-.09	-.10	.32*
Hyperactivity/ inattention	.15	.13	-.20	-.25	-.03	-.07	.00	-.14	-.09	.17
Emotional symptoms	.07	.14	-.05	-.06	-.01	.18	.22	.03	-.09	.12
Conduct problems	-.11	.16	-.05	.09	-.04	-.27*	-.14	.18	.05	-.07
Peer problems	-.28*	.08	.32*	.08	.25*	.00	-.15	.04	.02	-.14
Pro-social behavior	.09	.31*	-.14	-.02	.09	.01	.06	.13	.19	.13
Emotion recognition	.24	-.12	-.08	.04	-.03	.21	.13	.03	-.26*	.26*
Lability/Negativity	.03	.19	-.09	-.08	.07	-.17	-.08	.09	-.17	-.03
Emotion Regulation	.39**	.22	-.13	-.09	.32*	-.18	-.11	.27*	.13	.20
Theory of mind	.21	-.04	-.08	-.24	-.02	-.05	.32*	-.03	.19	.17
Cognitive Mental States	.11	.06	-.13	-.08	.09	-.04	.04	.12	.00	.13
Emotion Mental States	.12	.14	-.12	-.04	.17	.03	.05	.19	.05	.06
Desire Mental States	.08	.20	.05	-.12	.21	.03	.06	.17	-.06	.03
Modulation of assertion Mental States	-.03	.07	.28*	-.10	.21	-.04	-.04	-.06	-.05	-.05
Other Mental States	-.02	.15	-.10	.03	.10	.03	.03	.09	.03	-.09
Maternal variables										
Education	.32**	-.17	.01	-.14	.00	.06	.22	-.07	-.04	.19
Expression of affection	.08	.08	.11	-.07	.13	-.22	.00	.13	.22	.00

Variable	*Scaffolding Strategy*	*Positive Affect*	*Negative Affect*	*Over-control*	*Level of Difficulty (time)*	*On Task*	*Autonomy*	*Positive Affect*	*Non-compliance*	*Inter-subjectivity*
Parenting stress frequency	.11	.16	-.19	-.10	-.03	.04	-.07	.13	-.09	.21
Parenting stress intensity	-.17	-.02	-.15	.00	-.09	.17	-.03	.04	-.17	.07
Emotion Intelligence	.36**	.20	-.16	-.08	.11	.16	.11	.03	.09	.16
Reappraisal	.19	.30*	-.05	-.03	.20	-.04	.08	.17	.08	.18
Suppression	-.11	-.26*	.14	.01	-.02	.11	.06	-.27*	-.16	-.13
Cognitive Mental States	.51**	.10	-.17	-.40**	-.10	.10	.30*	-.16	-.01	.42**
Emotion Mental States	.38**	.22	-.22	-.25	.09	-.04	.12	.15	.15	.20
Desire Mental States	-.19	-.06	.05	.19	.02	-.03	-.05	.18	.08	-.11
Modulation of assertion Mental States	.26*	.05	-.18	-.11	-.07	.11	.20	-.01	-.14	.25
Other Mental States	-.09	-.01	-.04	.02	-.03	-.04	.05	-.09	.17	-.11
Contextual variables										
Household chaos	-.05	.12	-.11	.19	-.08	.09	-.19	.09	-.16	.13
Crowding index	-.35**	-.21	.07	.00	.04	-.01	-.16	-.11	-.16	-.20
Younger siblings	-.18	-.28*	.04	.06	-.14	.10	-.04	-.12	-.23	-.12
Older siblings	.01	.35**	-.18	.08	.13	.08	-.26*	.26*	-.18	.09

**p*<.05, ** *p*<.01 (two-tailed)*

6.3 Person characteristics and contextual factors as predictors of maternal scaffolding behaviour

Subsequent to the preliminary analysis, a more in-depth examination was undertaken to test Hypothesis 1. The issue of appropriate statistical tool selection was discussed earlier (see Subchapter 4.9.4). Due to the not-normally-distributed dependent variables and moderate sample size, the calculation of the complex nesting model was not possible.

To calculate the autoregressive cross-lagged model for each dimension of behaviour the Hierarchical Multiple Regression analysis was utilised. To meet the required assumptions for the calculation of the Hierarchical Multiple Regression, one of which is a normal distribution of the variables, a bootstrapping method was used. All multiple regressions were bootstrapped to 1,000 samples with a 95% bias-corrected acceleration (Mooney & Duval, 1993). To identify the significant independent variables and to accommodate the power of regression analyses, Pearson correlation analyses were performed beforehand (See Tables 6.4-6.6).

In order to test the predictive nature of independent variables, it was essential to identify the order of their entrance which would be used in further hierarchical multiple regression analyses. The child's involvement in the process of scaffolding itself is often overlooked; however, the child is crucial for the scaffolding process as the mother responds to the child's actions (Granott, 2005; Rogoff, 1990). The entry order of the steps was guided by the PPCT model (Bronfenbrenner & Morris, 2006), which suggested that there is an influence on the child's development through processes such as mother-child interactions, parental characteristic and contextual factors. Therefore, the child's characteristics (general cognitive abilities, behavioural adjustment, social and emotional abilities) was entered at Step 1, followed by the mother's person characteristics (education, parenting affection/stress, social and emotional abilities) at Step 2 and finally, contextual factors (home environment, over-crowdedness, number of siblings) were entered at Step 3.

The results presented in Chapter 5 (see Figure 5.5) demonstrate the consistency in maternal scaffolding behaviour across two Time points. Explicitly, the use of scaffolding strategies by mothers at Time 1 explained 73% of the variability of the same dimension at Time 2. Furthermore, 22% of the overall variability in maternal positive affect observed at Time 2 was explained by the mother's dimension of positive affect measured at Time 1. Similarly, maternal negative affect measured at Time 1 explained 39% of the variability of negative affect displayed by the mother at Time 2. Finally, over-control behaviour demonstrated at Time 1 predicted 37% of the same dimension measured approximately seven months later.

Scaffolding strategy

The first set of hierarchical multiple regressions tested the nature of the predictive relationship between maternal scaffolding strategy and a set of independent variables (child's variables: VMA, peer problems, emotion regulation, ToM; mother's variables: education, emotion intelligence, cognitive, emotion and modulation of assertion mental state talk; contextual variable: crowding index) through the development of a cross-lagged model.

The first regression (see Table 6.7) identified that the child's person characteristics – VMA, peer problems, emotion regulation, ToM, entered at Step 1, explained 29% of the variance in the maternal use of scaffolding strategies (F= 7.86, p<.001). Except for child's ToM, all variables were significant predictors. Entering maternal variables (maternal education, traits of emotional abilities, use of cognitive, emotion, modulation of assertion mental states) in Step 2 explained a further 16% of the variance (F= 7.06, p<.001, Adjusted R^2 = .45); however, out of the four maternal variables, only the maternal education had a significant contribution to the use of the dimension of maternal scaffolding strategy, while the child's peer-related problems remained significant. The addition of the crowding index variable in Step 3 did not explain any further percentage of the variability in the maternal use of scaffolding strategies. Therefore, Model 2 was accepted as the best fitting model.

The results of this hierarchical regression suggested that children with fewer peer-related problems are more likely to have mothers who use more successful scaffolding strategies during joint problem-solving situations. Moreover, the mothers' level of education, over and above the child's characteristics, predicted the use of more appropriate scaffolding strategies.

At Time 2, Step 1 significantly predicted the mother's use of scaffolding strategy at the follow-up visit and explained 33% of the variance (F= 8.60, p<. 001). The inclusion of maternal person characteristics in Model 2 explained a further 6% of the variability in scaffolding strategies (F= 5.36, p<.001) while Model 2 revealed another significant predictor – the use of cognitive mental states (β= .22, t= 1.98, p<.05). Only one of the child's variables remained significant - theory of mind. Model 3 was statistically significant, and the inclusion of the crowding index explained an additional 3% of the variability (p<. 05) in scaffolding strategies (F=5.32; p<.001). Thus, Model 3 explained 42% of the variance of scaffolding strategy that mothers used at Time 2 and included three significant predictors - child's theory of mind (β=.29, t=2.41, p<.05), mother's cognitive mental state talk (β= .20, t= 1.81, p<.05) and household crowding (β=-.19, t=-1.75, p<.05).

Interestingly, the results obtained through hierarchical regressions varied at each time point. For example, the child's VMA appeared to be significant through the analyses which was consistent with results obtained at Time 1 but lost its significance in the final Model 3.

Table 6.7

Hierarchical regressions predicting maternal scaffolding strategy. Time 1 (N= 68) and Time 2 (N= 63)

Variables	*Model 1*			Model 2			Model 3		
	B	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*
				Time 1					
Child's VMA	.01	.01	.30**	.01	.00	.15	.01	.00	.15
Peer Problems	-.43	.19	-.23*	-.39	.19	-.21*	-.39	.20	-.21*
Emotion regulation	.48	.16	.34**	.34	.16	.25	.34	.16	.25
Theory of mind	.03	.03	.11	.01	.03	.04	.01	.03	.04
Maternal education				.13	.04	.35**	.13	.04	.35**
Emotion intelligence				.21	.13	.24	.21	.14	.25
Cognitive Mental States				.63	.53	.13	.63	.56	.13
Emotion Mental States				.52	.65	.08	.52	.66	.08
Modulation of assertion				-.45	1.02	-.05	-.45	1.03	-.05
Crowding index							.01	.13	.01
Adjusted R^2		.29			.45			.44	
F for change in R^2		7.86***			7.06***			6.25***	
				Time 2					
Child's VMA	.01	.00	.24*	.01	.00	.13	.00	.01	.11
Peer Problems	-.07	.04	-.23	-.05	.04	-.17	-.06	.04	-.19
Emotion regulation	.31	.19	.23	.24	.19	.18	.15	.20	.12
Theory of mind	.14	.04	.36**	.12	.05	.29*	.11	.06	.29*
Maternal education				.07	.04	.19	.07	.04	.17
Emotion intelligence				.13	.11	.19	.11	.10	.16
Cognitive Mental States				.81	.39	.22*	.73	.39	.20*
Emotion Mental States				.05	.73	.01	-.03	.73	.00
Modulation of assertion				.61	.99	.08	.32	1.00	.06
Crowding index							-.20	.11	-.19*
Adjusted R^2		.33			.39			.42	
F for change in R^2		8.60***			5.36***			5.32***	

B- unstandardised beta coefficient; SE- standard error; β- standardised beta;
**p<.05; **p<.01, ***p<.001*

The next step (see Table 6.8), was to test the longitudinal effect between independent variables measured at Time 1 and scaffolding strategy observed at Time 2. The order of the input of independent variables in hierarchical multiple regression was repeated from the cross-sectional analyses with a single difference, specifically, the addition of autoregressive effects in Step 1. This step was required to control for autoregressive effects to reduce the potential bias when cross-lagged effects were tested (Cole & Maxwell, 2003; Gollob & Reichardt, 1987; Selig & Little, 2012).

Thus, the regression analyses involved four steps. Model 1 identified that a control variable (scaffolding strategy at Time 1) explained 73% of the overall variability in maternal scaffolding behaviour observed at the second home visit (F= 165.91, p<.001). Model 2 and Model 3 explained approximately the same percent of the variance in the maternal choice of scaffolding strategies. The addition of neither the child's nor the mother's variables revealed a significant predictor. The entrance of a contextual variable in Step 4 suggested that crowding index measured at Time 1, over and above other tested variables, had a negative longitudinal effect and contributed to the maternal scaffolding strategy displayed at Time 2 (Adjusted R^2 = .77, F= 19.50, p<.001).

The final step of the cross-lagged model was to test the predictive relationship between the dependent variables at Time 1 and independent variables measured approximately seven months later, with an account of autoregressive effects. Therefore, a set hierarchical multiple regression was calculated (see Table 6.9). Out of the ten regression analyses, nine were exclusively predicted by the control variables (child's, mother's and contextual characteristics observed at Time 1). Such results suggested maternal scaffolding observed at the baseline visit had no impact on the tested variables. On the other hand, the dimension of scaffolding strategy was found to be a significant predictor of the child's theory of mind.

In particular, Model 1 suggested that the child's theory of mind measured at the baseline visit explained 12% of the variability in the child's ability to understand the mind of other people when measured at the follow-up visit (F= 9.40, p< .01). However, in Step 2 the addition of maternal scaffolding strategy observed at Time 1 contributed another 15% to the overall variance of the child's theory of mind at Time 2 (Adjusted R^2= .27, F= 12.58, p< .001). Mothers who provided sufficient and appropriate support during learning interactions at home were most like to have children with a high level of theory of mind approximately seven months later.

Table 6.8

Autoregressive hierarchical regression analysis of child, mother and contextual variables at Time 1 predicting maternal scaffolding strategy at Time 2 (N= 63)

Variables	*Model 1*			*Model 2*			*Model 3*			*Model 4*		
	B	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Scaffolding Strategy	.78	.08	.86**	.71	.09	.78**	.68	.09	.74**	.68	.08	.75**
Child's VMA				.00	.00	.07	.00	.00	.07	.00	.00	.06
Peer Problems				-.03	.12	-.02	-.06	.11	-.03	-.08	.11	-.04
Emotion regulation				.10	.09	.08	.10	.11	.08	.07	.11	.05
Theory of mind				.03	.02	.09	.01	.02	.02	.01	.02	.03
Maternal education							.00	.03	.00	-.00	.03	-.01
Emotion intelligence							-.11	.08	-.14	-.14	.08	-.17
Cognitive MS							.63	.35	.14	.51	.35	.12
Emotion MS							.75	.49	.12	.78	.49	.12
Modulation of assertion MS							.54	.59	.06	.51	.57	.06
Crowding index										-.15	.08	-.15*
Adjusted R^2	.73			.73			.75			.77		
F for change in R^2	165.91***			33.76***			19.65***			19.50***		

B- unstandardised beta coefficient; SE- standard error; β- standardised beta;
**p<.05; **p<.01, ***p<.001*

Table 6.9

Autoregressive hierarchical regression analyses of maternal scaffolding strategy at Time 1 predicting child, mother and contextual variables at Time 2 (N=63)

Variables	Model 1			Model 2		
	B	*SE B*	*β*	*B*	*SE B*	*β*
Child's VMA	.85	.05	.87**	.83	.05	.85**
Scaffolding Strategy				1.30	1.20	.06
Adjusted R^2		.75			.75	
F for change in R^2		182.55***			91.44***	
Peer Problems	4.15	.76	.64**	3.86	.76	.60**
Scaffolding Strategy				-.49	.31	-.15
Adjusted R^2		.40			.41	
F for change in R^2		42.78***			22.73***	
Emotion regulation	.28	.14	.31*	.27	.12	.30*
Scaffolding Strategy				.02	.08	.03
Adjusted R^2		.08			.07	
F for change in R^2		6.49*			3.22*	
Theory of mind	.23	.07	.37**	.20	.07	.31*
Scaffolding Strategy				.83	.33	.41*
Adjusted R^2		.12			.27	
F for change in R^2		9.40**			12.58***	
Maternal education	1.00	.00	1.00***	1.00	.00	1.00***
Scaffolding Strategy				.00	.00	0.00
Adjusted R^2		1.00			1.00	
F for change in R^2		1000.00			1000.00	
Emotion intelligence	.86	.09	.81**	.86	.09	.81**
Scaffolding Strategy				.00	.12	.00
Adjusted R^2		.65			.64	
F for change in R^2		115.21***			56.66***	
Cognitive MS	.67	.15	.58**	.65	.15	.56**
Scaffolding Strategy				.01	.02	.04
Adjusted R^2		.33			.32	
F for change in R^2		30.83***			15.27***	
Emotion MS	.42	.10	.46**	.47	.10	.50**
Scaffolding Strategy				-.02	.02	-.16
Adjusted R^2		.19			.20	
F for change in R^2		15.89***			8.94***	
Modulation of assertion MS	.31	.12	.37*	.29	.13	.37*
Scaffolding Strategy				.01	.01	.10
Adjusted R^2		.12			.12	
F for change in R^2		9.68**			5.18**	
Crowding index	1.00	.00	1.00***	1.00	.00	1.00***
Scaffolding Strategy				.00	.00	0.00
Adjusted R^2		1.00			1.00	
F for change in R^2		1000.00			1000.00	

B- unstandardised beta coefficient; SE- standard error; β- standardised beta;
**p<.05; **p<.01, ***p<.001*

Overall, the cross-lagged model (see Figure 6.4) highlighted that, consistent with the literature, at Time 1, maternal education, child's cognitive abilities and behavioural adjustment predicted maternal scaffolding strategy. At Time 2 there were different predictors- child's theory of mind and crowding index which were reflected in the longitudinal analyses. The home environment, specifically, the crowding index, predicted the appropriate use of scaffolding strategies exhibited during collaborative problem-solving later over and above any of the child's and mother's characteristics. In turn, more sophisticated use of scaffolding strategies by the mother led to the child's higher theory of mind approximately seven months later.

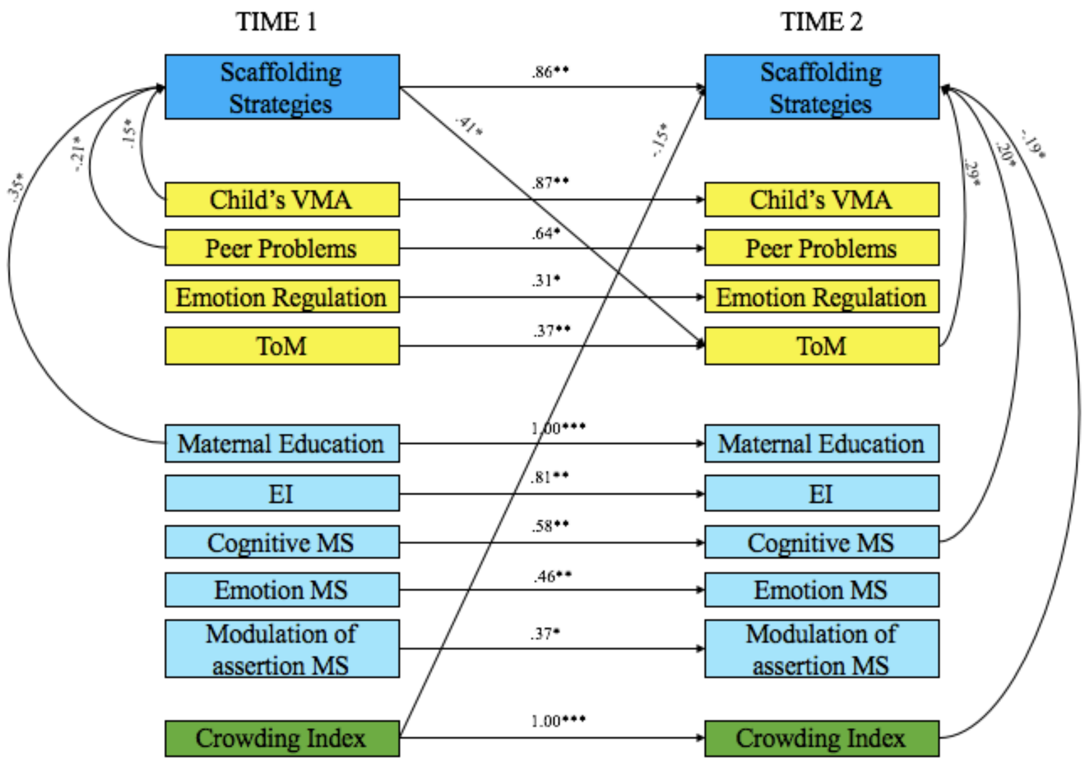

Figure 6.4. Cross-lagged model predicting maternal scaffolding strategy over time (*N*= 63).

Positive affect

The second set of hierarchical multiple regressions (see Tables 6.10-6.11) was calculated in order to examine the predictive nature of the relationship between maternal positive affect and the number of independent child's variables (hyperactivity/inattention, pro-social behaviour and emotion regulation), mother's variables (aspects of emotion regulation: reappraisal and suppression) identified through the Pearson correlation analyses (see Tables 6.4-6.6). Subsequent to the regression analyses, the cross-lagged model was developed (see Figure 6.5).

The multiple hierarchical regression was calculated to test how much of the maternal positive affect could be explained by the child's, mother's or contextual variables (see Table 6.10). Two aspects of the child's behavioural adjustment - hyperactivity/inattention and pro-social behaviour - were both significant predictors and explained 12% of the variability of maternal positive affect (Adjusted R^2= .12, F= 4.10, p<.01). While Model 2 and 3 were significant, the addition of maternal or contextual variables did not significantly contribute to the variability in maternal positive emotional support at Time 1. Therefore, Model 1 was identified as the best fitting and suggested that children who were scored higher on scales of hyperactivity and pro-social behaviour had mothers who displayed higher levels of positive affect during scaffolding interactions.

The next hierarchical multiple regression (see Table 6.10) was calculated to test the relationship that occurred during the follow-up visit and to examine the stability of the results obtained at Time 1. Model 1 and Model 2 were not significant and did not identify any predictive relationship. The addition of the contextual factors in Step 3, provided a significant model and explained 21% of the variability in maternal positive affect. Specifically, the child's pro-social behaviour and the number of older siblings were significant predictors (F= 3.32, p<.01). This suggested that mothers most likely displayed the positive affect during problem-solving situations when their child-participant scored higher on the scale of pro-social behaviour, and also when they had older children in the family.

Table 6.11 illustrated the hierarchical regression that tested the longitudinal relationship between independent variables at Time 1 and positive affect at Time 2, with an account of autoregressive effects of maternal positive affect at Time 1. Model 1 identified that the control variable (positive affect at Time 1) predicted 22% of the overall variance in maternal positive affect at Time 2 (F= 18.57, p<.001). While neither Model

2, nor Model 3 provided any significant predictors, contextual factors (the number of older and younger children) measured at the initial visit explained a further 8% of the variability in maternal positive affect observed at the follow-up visit. Specifically, in families with a higher number of older children at Time 1, mothers were more likely to provide more encouragement, praise and approval at Time 2.

Table 6.10

Hierarchical regressions predicting maternal positive affect. Time 1 (N= 68) and Time 2 (N= 63)

Variables	*Model 1*			*Model 2*			*Model 3*		
	B	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*
					Time 1				
Hyperactivity/ inattention	.37	.16	.25*	.42	.17	.28*	.39	.17	.26*
Pro-social behaviour	.60	.19	.29**	.54	.21	.26*	.57	.21	.27**
Emotion regulation	.11	.19	.05	-.04	.19	-.02	-.06	.22	-.03
Maternal Reappraisal				.04	.08	.05	.04	.08	.06
Suppression				-.14	.10	-.19	-.12	.10	-.16
Older siblings							.24	.20	.17
Younger siblings							-.08	.14	-.07
Adjusted R^2		.12			.13			.14	
F for change in R^2		4.10**			3.01*			2.61*	
					Time 2				
Hyperactivity/ inattention	.29	.21	.17	.30	.20	.17	.29	.19	.17
Pro-social behaviour	.56	.34	.24	.56	.34	.24	.76	.30	.33*
Emotion regulation	.39	.37	.16	.28	.36	.12	-.05	.30	-.02
Maternal Reappraisal				.14	.11	.15	.17	.10	.18
Suppression				-09	.08	-.12	-.03	.09	-.04
Older siblings							.50	.27	.32*
Younger siblings							-.23	.14	-.18
Adjusted R^2		.08			.09			.21	
F for change in R^2		2.73			2.18			3.32**	

B- unstandardised beta coefficient; SE- standard error; β- standardised beta;
**p<.05; **p<.01, ***p<.001*

Table 6.11

Autoregressive hierarchical regression analysis of child, mother and contextual variables at Time 1 predicting maternal positive affect at Time 2 (N= 63)

Variables	*Model 1*			*Model 2*			*Model 3*			*Model 4*		
	B	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Positive affect	*.52*	*.13*	*.48***	.44	.14	.41**	.41	.14	.38**	.34	.13	.32*
Hyperactivity/ inattention				.01	.18	.00	.08	.17	.05	.08	.18	.05
Pro-social behaviour				.39	.26	.17	.28	.25	.12	.42	.26	.18
Emotion regulation				.27	.21	.13	.15	.23	.07	.08	.24	.04
Maternal Reappraisal							.17	.09	.21	.15	.08	.20
Suppression							-.07	.08	-.09	-.04	.08	-.05
Older siblings										.36	.17	.23*
Younger siblings										-.19	.12	-.15
Adjusted R^2		.22			.23			.26			.34	
F for change in R^2		18.57***			5.64**			4.62**			4.92***	

B- unstandardised beta coefficient; SE- standard error; β- standardised beta;
**p<.05; **p<.01, ***p<.001*

Finally, no cross-lagged effects of maternal positive affect displayed at Time 1 on the child's (hyperactivity/inattention, pro-social behaviour and emotion regulation), mother's (emotional regulation: reappraisal and suppression) or contextual variables (number of older and younger children) measured at Time 2 were identified after controlling for the autoregressive effect (see Appendix H: Table H.2).

In summary, the aspects of the child's behaviour, such as pro-social behaviour, were consistently significant predictors of maternal positive affect at each time point (see Figure 6.5). Furthermore, the cross-sectional analysis at Time 2, consistent with the cross-lagged analysis, identified that the mothers who had more extensive parenting experience (had older children in the household) were more likely to display positivity, encouragement and approval to their children during problem-solving interactions.

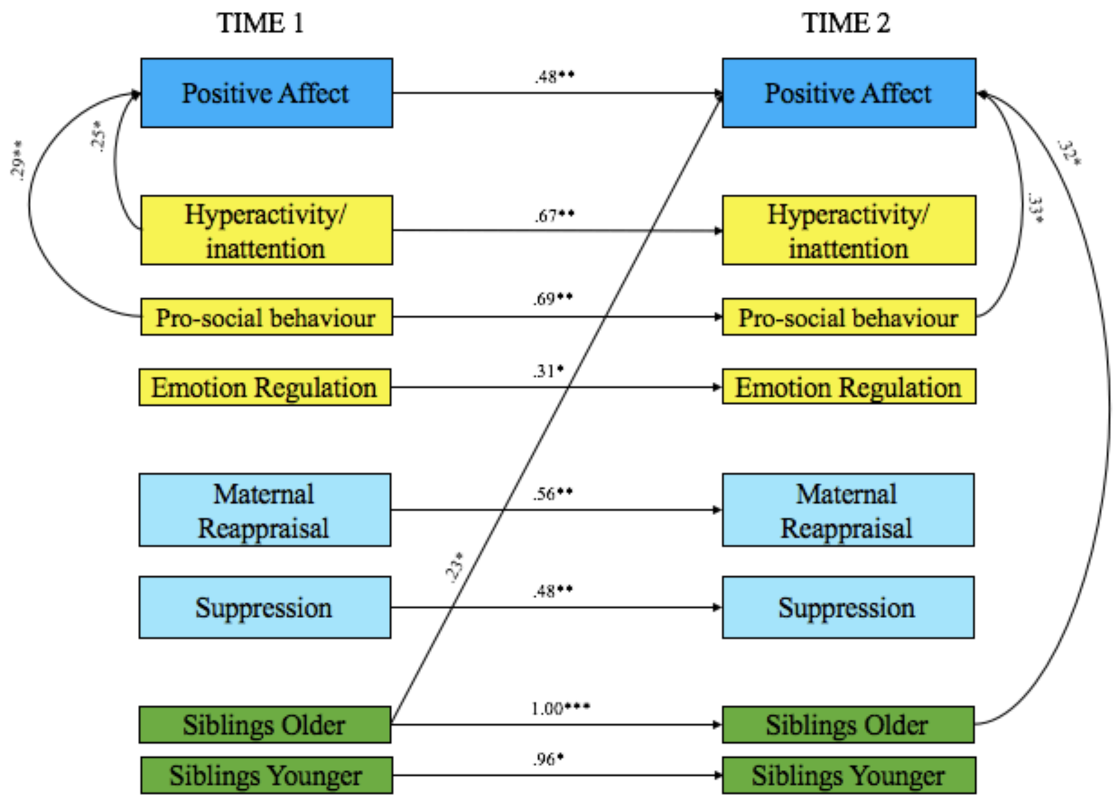

Figure 6.5 Cross-lagged model predicting maternal positive affect over time (N= 63).

Negative affect

The third set of hierarchical multiple regressions (see Tables 6.12-6.13) tested to what extent the child's individual characteristics (VMA, aspects of behaviour, theory of mind and use of modulation of assertion mental states) and mother's individual characteristics (reappraisal and use cognitive mental states) influenced the maternal negative affect displayed during collaborative problem-solving.

Cross-sectional analyses at Time 1 (see Table 6.12) revealed that the child's VMA in Step 1 explained 13% of the overall variance in maternal negative affect (F= 2.92, p<.05). As Model 2 did not identify any significant predictors, Model 1 was considered as the most fitting. However, the results obtained at Time 2 were not consistent with Time 1. While the regression analyses provided two significant Models, neither of them identified significant predictors after bootstrapping.

The following step aimed to test the longitudinal relationship between independent variables measured at Time 1 and the dependent variable (maternal negative affect) observed at Time 2, while the autoregressive affect was controlled for (see Appendix H: Table H.3). However, the results suggested there was no cross-lagged effect of the child's or mother's characteristics on the dependent variable. The maternal negative affect displayed at Time 1 had the most substantial impact on the same dimension of behaviour displayed approximately seven months later.

In relation to the final step of the cross-lagged model, seven hierarchical multiple regressions were calculated to test the longitudinal effect of maternal negative affect at Time 1 on several of the child's and mother's variables at Time 2 (see Table 6.13). Only one of them (child's theory of mind) was not exclusively predicted by the autoregressive effect.

In particular, while Model 1 revealed that the control variable (theory of mind measured at Time 1) explained 12% of the variance in the child's ability to understand, at the follow-up visit, the beliefs and perspectives of other people (F= 9.40, p<.01). Model 2, with the addition of maternal negative affect, explained a further 15% of the overall variance in the child's theory of mind (Adjusted R^2 = .27, F= 12.64, p<.001). This result suggested that a high level of maternal negative affect during collaborative problem-solving is linked to the child's lower understanding of other people's minds.

Table 6.12

Hierarchical regressions predicting maternal negative affect. Time 1 (N= 68) and Time 2 (N=63)

Variables	*Model 1*			Model 2		
	B	*SE B*	*β*	*B*	*SE B*	*β*
	Time 1					
Child's VMA	-.01	.01	-.37*	-.01	.01	-.30
Peer Problems	.22	.20	.17	.22	.20	.17
Pro-social behaviour	-.02	.15	-.02	.02	.15	.02
Theory of Mind	-.02	.02	-.08	-.03	.02	-.12
Modulation of assertion Mental States	-.23	1.21	-.02	.15	1.36	.01
Maternal Reappraisal				-.09	.06	-.25
Cognitive Mental States				-.33	.40	-.10
Adjusted R^2		.13			.19	
F for change in R^2		2.92*			3.17**	
	Time 2					
Child's VMA	-.01	.00	-.19	.00	.00	-.13
Peer Problems	.19	.12	.22	.19	.12	.22
Pro-social behaviour	-.30	.17	-.32	-.28	.17	-.30
Theory of Mind	-.07	.05	-.24	-.07	.06	-.25
Modulation of assertion Mental States	1.37	.78	.17	1.22	.83	.15
Maternal Reappraisal				.00	.05	.01
Cognitive Mental States				-.42	.26	-.16
Adjusted R^2		.25			.25	
F for change in R^2		5.13**			3.91**	

B- unstandardised beta coefficient; SE- standard error; β- standardised beta;
**p<.05; **p<.01, ***p<.001*

Table 6.13

Autoregressive hierarchical regression analyses of maternal negative affect at Time 1 predicting child and mother characteristics at Time 2 (N= 63)

Variables	*Model 1*			Model 2		
	B	*SE B*	*β*	*B*	*SE B*	*β*
VMA	*.85*	*.05*	*.87***	*.83*	*.06*	*.85***
Negative affect				*-2.01*	*2.33*	*-.06*
Adjusted R^2		*.75*			*.75*	
F for change in R^2		*182.55****			*91.38****	
Peer Problems	.69	.16	.51**	.68	.17	.50**
Negative affect				.02	.14	.02
Adjusted R^2		.25			.23	
F for change in R^2		21.27***			10.47***	
Pro-social behaviour	.70	.13	.70**	.69	.12	.69**
Negative affect				-.16	.16	-.16
Adjusted R^2		.49			.51	
F for change in R^2		59.98***			32.80***	
Theory of mind	.23	.08	.37**	.18	.08	.29*
Negative affect				-1.33	.74	-.41*
Adjusted R^2		.12			.27	
F for change in R^2		9.40**			12.64***	
Modulation of assertion Mental States	.42	.13	.33**	.42	.13	.33**
Negative affect				.00	.01	-.01
Adjusted R^2		.09			.08	
F for change in R^2		7.34**			3.61*	
Maternal Reappraisal	.46	.11	.56**	.48	.10	.57**
Negative affect				.23	.42	.09
Adjusted R^2		.30			.30	
F for change in R^2		27.45***			14.01***	
Cognitive Mental States	.67	.15	.58**	.63	.15	.54**
Negative affect				-.05	.04	-.12
Adjusted R^2		.33			.33	
F for change in R^2		30.83***			16.13***	

B- unstandardised beta coefficient; SE- standard error; β- standardised beta;
**p<.05; **p<.01, ***p<.001*

To summarise, in relation to maternal negative affect, the results were inconclusive. At Time 1, it was identified that the child's cognitive abilities (VMA) predicted maternal negativity, but this was not supported at Time 2. The autoregressive effect was the most reliable predictor when tested across time. However, the longitudinal analysis revealed that mothers who are more negative during the scaffolding interaction at Time 1 had children who were more likely to have less ability to understand the theory of mind approximately seven months later (see Figure 6.6).

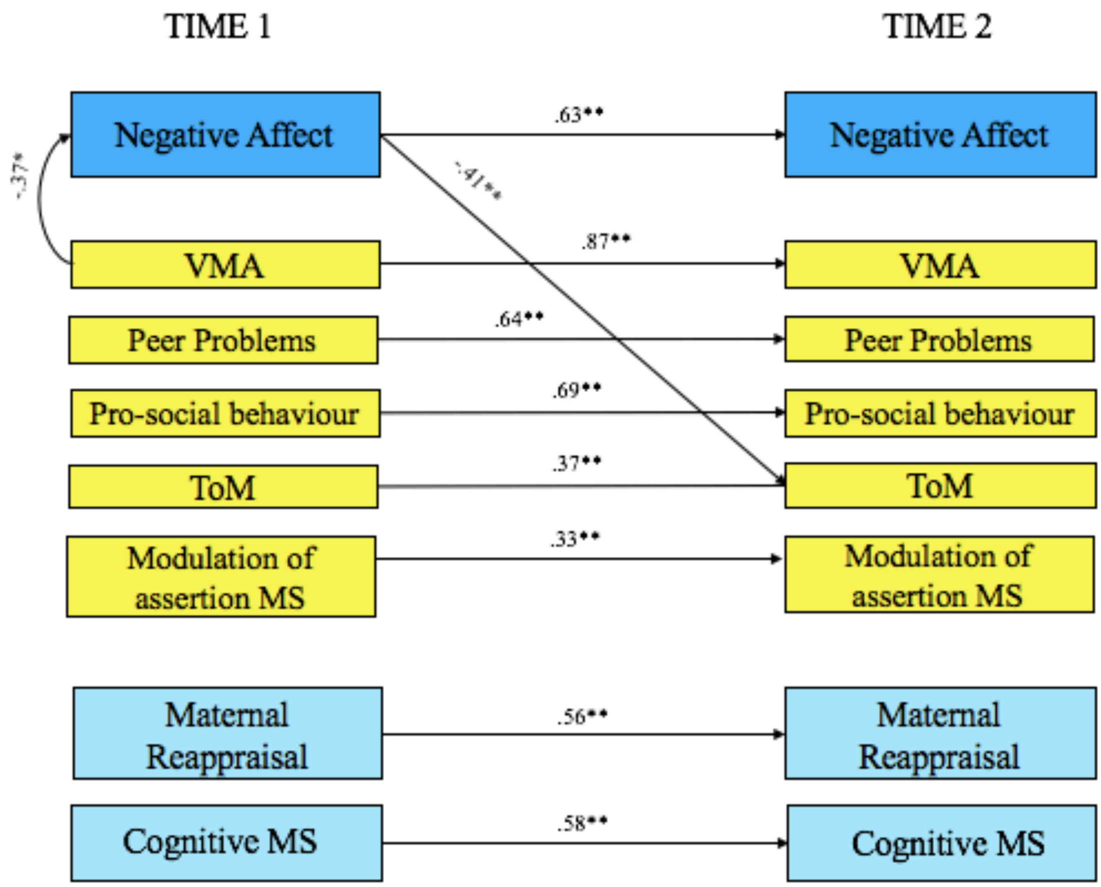

Figure 6.6 Cross-lagged model predicting maternal negative affect over time (N= 63).

Over-control behaviour

The final set of hierarchical multiple regressions were calculated to identify the individual differences in maternal over-control (see Tables 6.14-6.16). The predictive nature of the child's VMA and theory of mind, mother's use of cognitive mental states in the day-to-day speech and contextual variable - number of older siblings - was tested.

The first cross-sectional regression analysis did not reveal any significant models at Time 1 (see Table 6.14). However, at Time 2, the child's variables (VMA, hyperactivity/inattention theory of mind) entered in Step 1 had a significant and unique contribution of 17% of the variance of maternal over-control behaviour (F= 5.13, p<.01). However, the inclusion of the independent predictors - maternal use of cognitive mental states (Step 2) and number of older siblings (Step 3) – did not contribute to the understanding of the nature of maternal over-control. Model 1 was the best fitting model with the child's theory of mind (β=-.32, t=-2.53, p< .05) acting as a significant predictor. This suggested that mothers who displayed controlling behaviour most likely had children with a lower level of theory of mind.

Regarding the longitudinal effects of independent variables in relation to maternal over-control behaviour (see Table 6.15), Model 3 was accepted as the most fitting and explained 42% of the variance in maternal controlling behaviour (F=12.13, p<.001). After controlling for autoregressive effects, it was identified that mothers who used more cognitive mental states in their speech at Time 1 were most likely to transfer responsibility to their child by using less over-controlling behaviour at Time 2.

The final set of regressions within the autoregressive cross-lagged analyses (see Table 6.16) identified that maternal over-control behaviour, displayed at the initial visit, predicted the child's VMA and theory of mind. These implied that maternal control and lack of support in the child's autonomy at Time 1 led to the child's lower VMA and theory of mind scores.

Table 6.14

Hierarchical regressions predicting maternal over-control. Time 1 (N= 68) and Time 2 (N=63)

Variables	*Model 1*			*Model 2*			*Model 3*		
	B	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*
					Time 1				
Child's VMA	-.01	.01	-.12	-.01	.01	-.11	-.01	.01	-.10
Theory of Mind	-.07	.07	-.15	-.06	.07	-.14	-.06	.07	-.14
Maternal Cognitive Mental States				-.38	.92	-.06	-.55	.95	-.08
Older siblings							.44	.17	.31*
Adjusted R^2		.02			.01			.09	
F for change in R^2		1.68			1.16			2.64*	
					Time 2				
Child's VMA	-.01	.01	-.15	-.01	.01	-.12	-.01	.01	-.11
Theory of Mind	-.16	.07	-.32*	-.16	.07	-.32*	-.15	.07	-.31*
Maternal Cognitive Mental States				-.40	.52	-.09	-.42	.55	-.10
Older siblings							.08	.17	.07
Adjusted R^2		.13			.13			.12	
F for change in R^2		5.57**			4.03*			3.11*	

B- unstandardised beta coefficient; SE- standard error; β- standardised beta;
**p<.05; **p<.01, ***p<.001*

Table 6.15

Autoregressive hierarchical regression analysis of child, mother and contextual variables at Time 1 predicting maternal over-control at Time 2 (N= 63)

Variables	*Model 1*			*Model 2*			*Model 3*			*Model 4*		
	B	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Over-control	*.48*	*.11*	*.60***	.45	.11	.57**	.44	.10	.55**	.46	.11	.57**
Child's VMA				.00	.01	-.05	.00	.01	.04	.00	.01	.04
Theory of Mind				-.03	.05	-.09	-.01	.04	-.04	-.01	.04	-.03
Maternal Cognitive Mental States							-1.74	.60	-.32**	-1.70	.60	-.31**
Older siblings										-.08	.13	-.07
Adjusted R^2		.35			.34			.42			.41	
F for change in R^2		33.75***			11.51***			12.13***			9.72***	

B- unstandardised beta coefficient; SE- standard error; β- standardised beta;
**p<.05; **p<.01, ***p<.001*

Table 6.16

Autoregressive hierarchical regression analyses of maternal over-control behaviour at Time 1 predicting the child, mother and contextual variables at Time 2 (N= 63)

Variables	*Model 1*			Model 2		
	B	*SE B*	*β*	*B*	*SE B*	*β*
VMA	*.85*	*.05*	*.87***	*.82*	*.05*	*.84***
Over-control				*-1.89*	*1.00*	*-.12**
Adjusted R^2		*.75*			*.76*	
F for change in R^2		*182.55****			*97.41****	
Theory of mind	.23	.07	.37**	.17	.07	.27*
Over-control				-.59	.15	-.40**
Adjusted R^2		.12			.26	
F for change in R^2		9.40**			12.13***	
Maternal Cognitive Mental States	.67	.15	.58**	.66	.16	.58**
Over-control				.00	.02	.02
Adjusted R^2		.33			.31	
F for change in R^2		30.83***			15.19***	
Older siblings	1.00	.00	1.00***	1.00	.00	1.00***
Over-control				.00	.00	.00
Adjusted R^2		1.00			1.00	
F for change in R^2		1000.00			1000.00	

B- unstandardised beta coefficient; SE- standard error; β- standardised beta;
**p<.05; **p<.01, ***p<.001*

In conclusion, the findings revealed at each stage of cross-lagged autoregressive analyses were inconsistent (see Figure 6.7). Specifically, in Time 1, contextual factor (number of older children) was a significant predictor, while at Time 2, the child's theory of mind was a unique contributor to the variance in maternal over-control behaviour displayed during the scaffolding interaction. This lack of stability and increased role as a determinant of the child's theory of mind at the follow-up visit could potentially be explained by the child's progress in developing an understanding of different people's perceptions. In other words, children's theory of mind at the initial visit was not developed enough to contribute to the mother's controlling behaviour approximately seven months later. The longitudinal effects were identified when mothers, who have lower mentalising capabilities such as using less cognitive mental states in their day-to-day conversations with their children, led to the mother's lack of transfer responsibility.

In turn, controlling behaviour was a significant contributor to the child's cognitive abilities and understanding of other's people mental states, beliefs or perceptions.

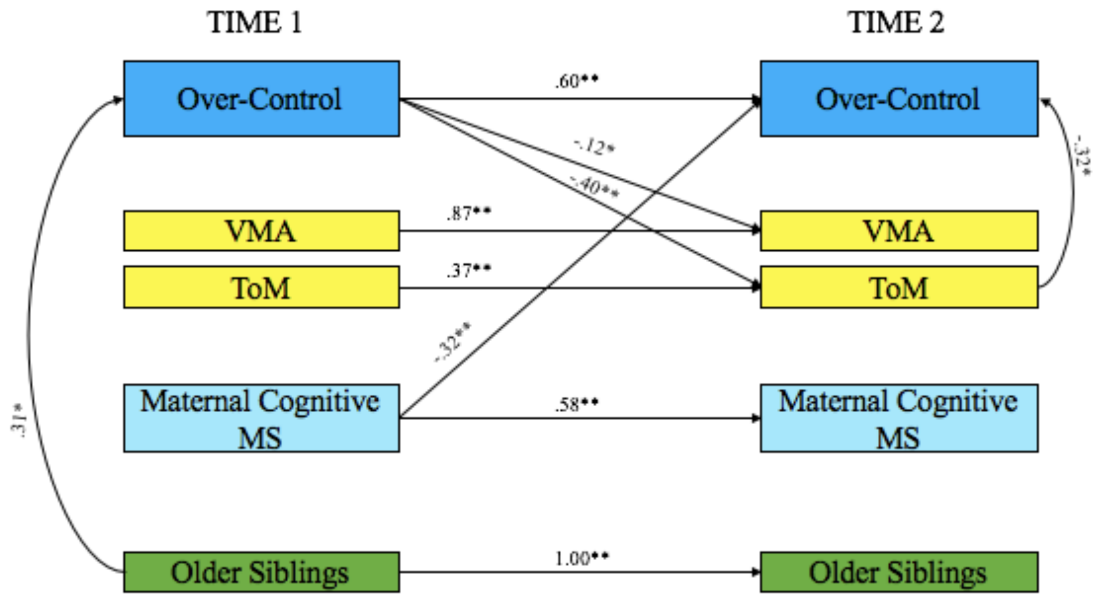

Figure 6.7 Cross-lagged model predicting maternal over-control over time (N= 63).

6.4 Person characteristics and contextual factors as predictors of child behaviour in scaffolding interaction

The findings presented in Chapter 5 suggested a bidirectional nature of scaffolding interaction through the identification of the inter-relationship between the dimensions of the mother's and child's behaviour observed during learning at home. Thus, aside from establishing how the child's, mother's and contextual factors impact maternal scaffolding, it was crucial to identify if the same factors predict the child's behaviour during joint problem-solving situations.

Earlier it was identified (see Subchapter 5.2.3) that the dimensions of the child's behaviour during scaffolding interactions across two time points was consistent (see Figure 5.6). Specifically, the level of difficulty measured during the problem-solving situation at the baseline visit explained 24% of the variability of the same dimension displayed approximately seven months later. The child's ability to concentrate on the task during the tutoring interaction with their mother at the first visit explained 16% of the overall variance in the child's on task behaviour displayed at the follow-up visit. The child's autonomy observed at Time 1 explained 53% of the autonomous behaviour demonstrated during scaffolding interactions at Time 2. Furthermore, 16% of the variability in the child's positive affect at Time 2 was explained by the child's positivity demonstrated during scaffolding interactions approximately seven months earlier. Finally, it was identified that the child's non-compliance behaviour was also consistent across two observations and 17% of the overall variance in non-compliant behaviour exhibited by the child at the follow-up visit was explained by this behaviour observed at the baseline.

However, the child's negative affect was not consistent across time and thus, was excluded from further analyses due to the violation of the key statistical assumption of the autoregressive cross-lagged analysis. Specifically, in order to test the structural relations of repeatedly assessed variables, the stability of such variables were essential across each measurement point (Selig & Little, 2012). Such stability is critical to the minimisation of the bias in identification of the cross-lagged effects.

Therefore, to test Hypotheses 2, five autoregressive cross-lagged models, one for each child's dimensions (level of difficulty, on task behaviour, autonomy, positive affect and non-compliance), were calculated.

Each model included two cross-sectional analyses: the predictive nature of independent variables on the child's dimension of behaviour at Time 1 and at Time 2. The order in which the independent variables was entered was determined by the PPCT model (Bronfenbrenner & Morris, 2006), specifically, the child's person characteristics (general cognitive abilities, behavioural adjustment, social and emotional abilities) was entered at Step 1, mother's characteristics (education, parenting affection/stress, social and emotional abilities) at Step 2 and finally, contextual factors (home environment, over-crowdedness, number of siblings) at Step 3.

Following this, two cross-lagged analyses were conducted. The first examined the longitudinal effects of independent variables measured at Time 1 on the child's behaviour observed at Time 2. The order in which the independent variables were entered was the same as in the cross-sectional analyses, but with an account of the autoregressive effect (Selig & Little, 2012) in Step 1. Thus, Step 1 was the control variable, in this case, the same dimension of the child's behaviour at Time 1, Step 2 - the child's person characteristics, Step 3 - the mother's person characteristics and Step 4 - contextual factors. Finally, the cross-lagged effect was also calculated for the dimension of the child's behaviour exhibited at the baseline visit on the child's, mother's and contextual variables measured at the follow-up visit, with control for these variables when measured at Time 1.

The hierarchical Multiple Regression was used to examine the predictive nature of person and contextual characteristics in relation to the child's dimensions of learning behaviour in scaffolding interactions at each time point and across the time. Similar to the analyses described earlier, due to non-normally distributed dependent variables (dimensions of child's behaviour), to meet the required acceptance of this statistical analyses, all regressions were bootstrapped (based on 1,000 bootstrap samples with the *CI*=95%; Field, 2013)

As discussed earlier (see Subchapter 4.9.4), the independent predictors for each dimension of the child's behaviour were identified through a series of Pearson correlation analyses (see Tables 6.4-6.6).

Level of difficulty

The first group of Multiple Regressions examined the nature of the relationship between the child's level of difficulty exhibited during the scaffolding interactions and independent child's variables (VMA, peer problems, emotion regulation, use of cognitive, modulation of assertion and other mental state talk).

The results (see Table 6.17) obtained during the baseline visit, suggested that the child's VMA (β=-.27, t=-2.28, p< .05), peer-related problems (β=.40, t=2.98, p< .01) and use of mental states from the category modulation of assertion (β=-.23, t=-1.76, p< .05), were significant predictors of the level of difficulty displayed by the child during problem-solving situations at Time 1 (Adjusted R^2= 15%, F= 2.89, p<.05).

The cross-sectional analyses of the data gathered during the follow-up visit demonstrated some consistency with the findings at Time 1. Specifically, the child's VMA remained as a significant predictor of the child's level of difficulty (β=-.32, t=-2.78, p< .05); children with higher VMA were more likely to complete the problem-solving task faster. Furthermore, at Time 2, it also was identified that the child's use of cognitive mental state talk led to a longer time required by the child to complete the activity with their mother (β=.23, t=1.89, p< .05). Overall, the child's variables had a significant and unique contribution of 21% of the variance of the child's level of difficulty at Time 2 (F=3.75, p<.01).

Table 6.17

Multiple regressions predicting the child's level of difficulty. Time 1 (N= 68) and Time 2 (N=63)

Variables	*B*	*SE B*	*β*
	Time 1		
Child's VMA	-1.52	.86	-.27*
Peer Problems	90.36	32.96	.40**
Emotion Regulation	28.59	22.76	.17
Cognitive Mental States	274.87	216.71	.16
Modulation of assertion Mental States	-474.21	232.44	-.23*
Other Mental States	-173.51	436.05	-.06
Adjusted R^2		.15	
F for change in R^2		2.89*	
	Time 2		
Child's VMA	-2.07	.77	-.32*
Peer Problems	17.99	24.77	.09
Emotion Regulation	7.51	21.08	.03
Cognitive Mental States	179.73	89.92	.23*
Modulation of assertion Mental States	368.79	238.82	.21
Other Mental States	842.16	557.63	.19
Adjusted R^2		.21	
F for change in R^2		3.75**	

B- unstandardised beta coefficient; SE- standard error; β- standardised beta;
**p<.05; **p<.01, ***p<.001*

During the longitudinal analyses (see Table 6.18), it was identified that the child's person characteristics, over and above autoregressive effects, explained 12% of the variance in the child's level of difficulty (Adjusted R^2 change= 12%, F=5.93, p<.001). It was revealed that the child's higher VMA and lower emotion regulation measured at Time 1 predicted that the child was more likely to spend less time completing the task at Time 2.

Table 6.18

Autoregressive hierarchical regression analysis of child variables at Time 1 predicting child's level of difficulty at Time 2 (N= 63)

Variables	*Model 1*			Model 2		
	B	*SE B*	*β*	*B*	*SE B*	*β*
Level of Difficulty. Time 1	*.57*	*.13*	*.50***	.43	.12	.38**
Child's VMA				-1.25	.70	-.20*
Peer Problems				41.06	28.42	.16
Emotion Regulation				59.56	19.50	.30**
Cognitive Mental States				-90.19	243.44	-.05
Modulation of assertion Mental States				286.36	294.38	.12
Other Mental States				463.64	323.61	.14
Adjusted R^2		.24			.36	
F for change in R^2		20.82***			5.93***	

B- unstandardised beta coefficient; SE- standard error; β- standardised beta;
**p<.05; **p<.01, ***p<.001*

Finally, there was no cross-lagged effect of the child's level of difficulty exhibited during scaffolding interaction at Time 1 on the child's person characteristics measured at Time 2, once these characteristics at Time 1 were controlled for (see Appendix H: Table H.4).

To sum up, the child's VMA was a consistent predictor of the child's level of difficulty at each time point and across time (see Figure 6.8). Both cross-sectional analyses, at Time 1 and Time 2, highlighted the role of the child's mental state talk in predicting the amount of time spent on the task. However, at each time point, the category of mental state talk varied (Time 1- modulation of assertion; Time 2- cognitive mental state talk). Also, it was suggested that the child's emotion regulation measured at the baseline visit had a unique contribution to the child's level of difficulty exhibited during the follow-up visit.

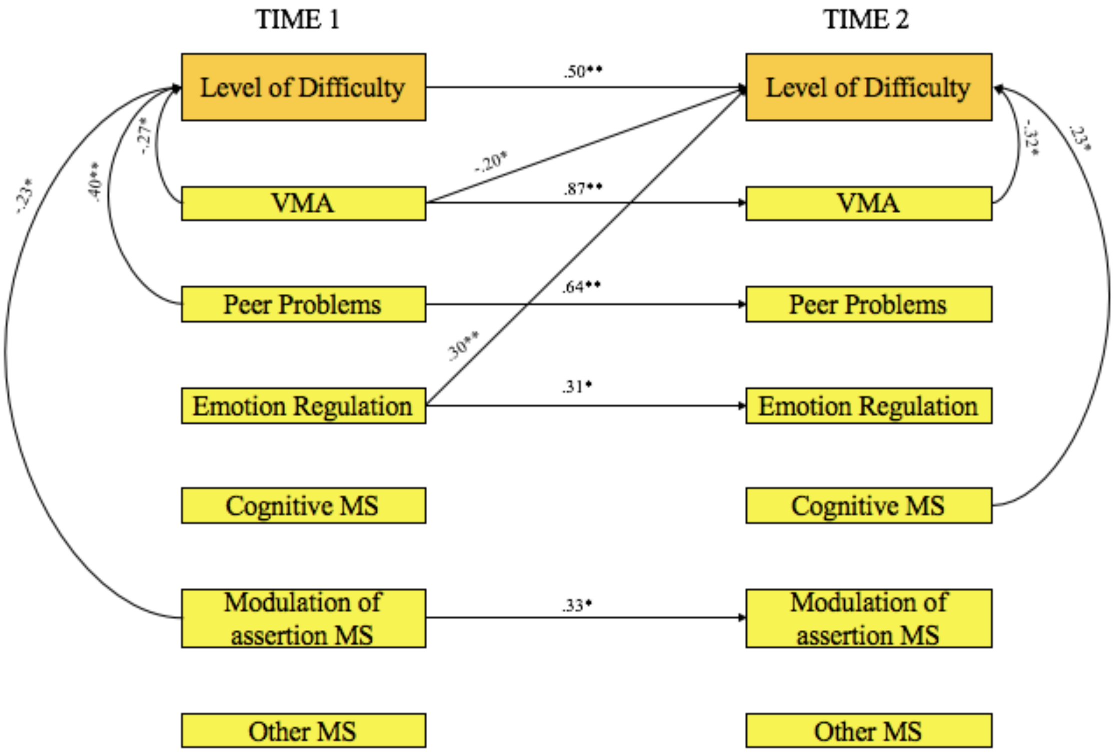

Figure 6.8 Cross-lagged model predicting child's level of difficulty over time (N=63).

On Task behaviour

The next group of Hierarchical Multiple Regressions intended to test the predictive nature of child's (VMA, conduct problems, lability/negativity) and mother's person characteristics (frequency of parenting stress and use of cognitive mental states) in relation to the dimension of the child's on task behaviour.

The analyses of the first regression suggested that one of the variables (see Table 6.19), specifically the child's VMA, was a significant predictor of the child's on task behaviour displayed by the child during problem-solving situations at Time 1. This predictor was reflected in Model 1 which explained 10% of overall variance of dependent variable (F=3.52, p<.05). In Step 2, the mother's variables (parenting stress and use of cognitive mental states) were entered, but did not explain any further variability. Thus, Model 1 was accepted as the most fitting.

In relation to the cross-sectional analyses at Time 2, the child's variables (VMA, conduct problems and lability/negativity) entered at Step 1 predicted 19% of the variability in the child's persistence and focus during the joint task accomplishment at Time 2 (F=5.76, p<.01). Similar to the cross-sectional analyses at Time 1, Model 1 was considered as the most fitting model as the addition of maternal variables (parenting stress and use of cognitive mental states) did not identified any new significant predictors

(Model 2: Adjusted R^2 *change* =.02, F=4.24, p<.01). Consistent with findings obtained at the baseline, children with higher VMA were most likely to demonstrate on task behaviour at Time 2.

The first set of hierarchical multiple regression analyses investigated the cross-lagged effects of the mother's and child's variables measured at Time 1 on the child's on task behaviour observed at Time 2 (see Table 6.20). The findings were consistent with results obtained at each visit (see Table 6.19) and suggested that the child's VMA had a significant impact on the child's ability to concentrate on the task across time, after controlling for autoregressive effect (Adjusted R^2 *change* =.10, F= 6.44, p< .001).

Table 6.21 contains the group of hierarchical regressions, which were calculated to examine the longitudinal effect of the child's on task behaviour exhibited at Time 1 on number of independent variables measure at Time 2. After controlling for the autoregressive effect, only the frequency of maternal parenting stress at Time 2 was predicted by the child's on task behaviour observed seven months earlier (Adjusted R^2 =.44, F= 26.97, p< .001).

Table 6.19

Hierarchical regressions predicting the child's on task behaviour. Time 1 (N= 68) and Time 2 (N= 63)

Variables	*Model 1*			*Model 2*		
	B	*SE B*	*β*	*B*	*SE B*	*β*
			Time 1			
Child's VMA	.01	.01	.28*	.01	.01	.23
Conduct Problems	-.30	.23	-.18	-.26	.22	-.15
Lability/ Negativity	-.17	.20	-.10	-.16	.21	-.10
Maternal Parenting stress: frequency				-.03	.18	-.02
Cognitive Mental States				.54	.46	.13
Adjusted R^2		.10			.09	
F for change in R^2		3.52*			2.27	
			Time 2			
Child's VMA	.01	.00	.29*	.01	.00	.21
Conduct Problems	-.37	.21	-.23	-.33	.21	-.21
Lability/ Negativity	-.27	.18	-.21	-.20	.19	-.16
Maternal Parenting stress: frequency				-.20	.19	-.16
Cognitive Mental States				.49	.35	.16
Adjusted R^2		.19			.21	
F for change in R^2		5.76**			4.24**	

B- unstandardised beta coefficient; SE- standard error; β- standardised beta;
**p<.05; **p<.01, ***p<.001*

Table 6.20

Autoregressive hierarchical regression analysis of child and mother variables at Time 1 predicting child's on task behaviour at Time 2 (N= 63)

Variables	*Model 1*			*Model 2*			*Model 3*		
	B	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*
On Task behaviour Time 1	*.36*	*.10*	*.42***	.25	.10	.29*	.26	.11	.31*
Child's VMA				.01	.00	.33**	.01	.00	.38**
Conduct Problems				-.29	.16	-.21	-.32	.17	-.24
Lability/ Negativity				.07	.15	.05	.01	.17	.00
Maternal Parenting stress: frequency							.12	.14	.11
Cognitive Mental States							-.52	.45	-.15
Adjusted R^2		.16			.26			.26	
F for change in R^2		12.90**			6.44***			4.70**	

B- unstandardised beta coefficient; SE- standard error; β- standardised beta;
**p<.05; **p<.01, ***p<.001*

Table 6.21

Autoregressive hierarchical regression analyses of child's on task behaviour at Time 1 predicting child and mother variables at Time 2 (N=63)

Variables	*Model 1*			*Model 2*		
	B	*SE B*	*β*	*B*	*SE B*	*β*
Child's VMA	*.85*	*.05*	*.87***	*.84*	*.05*	*.86***
On Task				*.81*	*1.63*	*.03*
Adjusted R^2		*.75*			*.75*	
F for change in R^2		*182.55****			*90.24****	
Conduct Problems	.36	.08	.44**	.33	.08	.39**
On Task				-.11	.08	-.20
Adjusted R^2		.18			.20	
F for change in R^2		14.32***			8.94***	
Lability/ Negativity	.66	.11	.63**	.65	.12	.62**
On Task				-.02	.07	-.04
Adjusted R^2		.39			.38	
F for change in R^2		39.94***			19.75***	
Maternal Parenting stress: frequency	.58	.10	.63**	.56	.09	.62**
On Task				-.15	.07	-.23*
Adjusted R^2		.39			.44	
F for change in R^2		44.42***			26.97***	
Cognitive Mental States	.67	.14	.58**	.63	.14	.54**
On Task				.05	.03	.17
Adjusted R^2		.33			.34	
F for change in R^2		30.83***			17.06***	

B- unstandardised beta coefficient; SE- standard error; β- standardised beta;
**p<.05; **p<.01, ***p<.001*

In summary, the results for the child's on task behaviour exhibited during collaborative problem-solving were consistent throughout cross-lagged analyses (see Table 6.9). The child's cognitive ability (VMA) provided a significant and unique contribution to the child's ability to be focused and persistent during task accomplishment. Interestingly, the child's inability to stay on task led to a higher frequency of parenting stress among mothers approximately seven months later.

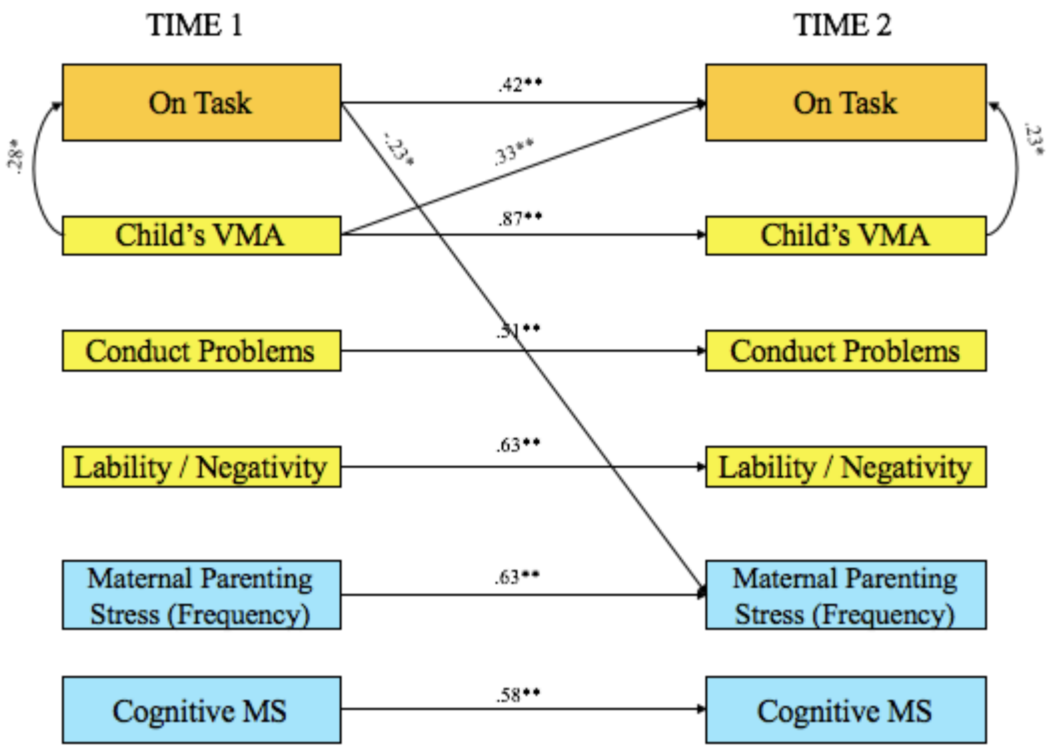

Figure 6.9 Cross-lagged model predicting child's on task behaviour over time (N= 63).

Autonomy

In order to examine the individual differences in the child's autonomous behaviour, a group of hierarchical multiple regressions were calculated (see Tables 6.22-6.24).

The cross-sectional analyses at Time 1 was represented by a three-step hierarchical regression (see Table 6.22). In Step 1, the child's variables (working memory, VMA, theory of mind) were entered and explained 17% of the overall variance in the child's autonomous behaviour during learning at home interactions (F=5.60, p<.01). Neither Model 2 nor Model 3, with the addition of maternal and contextual variables respectively, revealed any new significant predictors. Thus, Model 1 was accepted as the most fitting. Children's heightened verbal ability and theory of mind predicted more autonomous behaviour at the baseline visit.

These findings were consistent at Time 2, the Model 1 was considered as the best fit (Adjuster R^2= .28, F= 8.72, p<.001). Beta coefficients for two predictors were the child's VMA (β=.37, t= 3.08, p<.01) and theory of mind (β=.28, t=2.33, p< .01).

Table 6.22

Hierarchical regressions predicting the child's autonomy. Time 1 (N= 68) and Time 2 (N=63)

Variables	*Model 1*			*Model 2*			*Model 3*		
	B	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Time 1									
Child's working memory	.09	.07	.16	.08	.07	.15	.07	.07	.13
VMA	.01	.01	.28**	.01	.01	.29*	.01	.01	.29*
Theory of mind	.06	.03	.20*	.07	.03	.21*	.06	.04	.17
Maternal Cognitive Mental States				-.26	.57	-.05	-.15	.58	-.03
Household chaos							-.15	.13	-.14
Older siblings							-.16	.14	-.15
Adjusted R^2		.17			.16			.19	
F for change in R^2		5.60**			4.19**			3.59**	
Time 2									
Child's working memory	.02	.05	.05	.03	.05	.06	.03	.05	.08
VMA	.01	.00	.37**	.01	.00	.35*	.01	.00	.32*
Theory of mind	.10	.03	.28**	.09	.03	.28**	.08	.04	.22*
Maternal Cognitive Mental States				.15	.29	.05	.29	.31	.10
Household chaos							-.10	.07	-.13
Older siblings							-.15	.09	-.20
Adjusted R^2		.28			.27			.30	
F for change in R^2		8.72***			6.49***			5.40***	

B- unstandardised beta coefficient; SE- standard error; β- standardised beta;
**p<.05; **p<.01, ***p<.001*

In relation to the longitudinal effects of independent variables, measured at Time 1, on the child's ability to act independently at Time 2, all regression models were significant (see Table 6.23). Model 4 explained 61% of the child's autonomy at the follow-up visit in tutoring interactions with the mother and included two significant predictors, after controlling for autoregressive effects (F= 14.84, p<.001). Children with a higher VMA at Time 1 were more likely to work on the task on their own without seeking help or approval from the mother at Time 2. Moreover, the number of older siblings in the household was a negative predictor (β=-19, t=-2.25, p< .05) which suggested that children who had older siblings displayed less autonomous behaviour approximately seven months later.

Finally, out of six regression analyses, four (child's VMA, maternal use of cognitive mental states, household chaos and number of older sibling) were exclusively predicted by the control variables (see Table 6.24). These predictions implied that there was no impact of the child's autonomy displayed at Time 1. However, the child's working memory and theory of mind measured at the second visit were explained by the child's autonomous behaviour observed at the baseline visit.

While the autoregressive effect explained 19% of the overall variance of the child's working memory at Step 1, the addition of the dimension of child's autonomy displayed during the scaffolding interaction at Step 2 contributed a further 5% of the variability (Adjuster R^2= .24, F= 10.90, p<.001).

Corresponding with this Model 1 suggested that the child's theory of mind at Time 1 explained 12% of the variability in the theory of mind when measured approximately seven months later (F= 9.40, p< .01). The addition of the child's autonomy at Step 2 suggested a cross-lagged effect on the child's theory of mind later in time and explained a further 9% of its variability (Adjusted R^2= .21, F= 9.13, p< .001).

Table 6.23

Autoregressive hierarchical regression of analysis child, mother and contextual variables at Time 1 predicting the child's autonomy at Time 2 (N= 63)

Variables	*Model 1*			*Model 2*			*Model 3*			*Model 4*		
	B	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Autonomy Time 1	*.51*	*.07*	*.74****	.44	.07	.63**	.44	.07	.64**	.42	.07	.61**
Child's working memory				-.05	.03	-.13	-.05	.03	-.13	-.05	.03	-.14
VMA				.01	.00	.28*	.01	.00	.24*	.01	.00	.25*
Theory of mind				.01	.02	.05	.01	.02	.03	.01	.02	.04
Maternal Cognitive Mental States							.43	.32	.13	.45	.30	.13
Household chaos										.03	.06	.05
Older siblings										-.14	.05	-.19*
Adjusted R^2		.53			.58			.59			.61	
F for change in R^2		72.07***			22.52***			18.74***			14.84***	

B- unstandardised beta coefficient; SE- standard error; β- standardised beta;
**p<.05; **p<.01, ***p<.001*

Table 6.24

Autoregressive hierarchical regression analyses of child's autonomy at Time 1 predicting child, mother and contextual variables at Time 2 (N=63)

Variables	*Model 1*			*Model 2*		
	B	*SE B*	*β*	*B*	*SE B*	*β*
Child's working memory	*.40*	*.45*	*.45***	*.34*	*.39*	*.39***
Autonomy				*.44*	*.27*	*.27**
Adjusted R^2		*.19*			*.24*	
F for change in R^2		*15.27****			*10.90****	
VMA	.85	.05	.87**	.84	.06	.86**
Autonomy				.34	1.60	.02
Adjusted R^2		.75			.74	
F for change in R^2		182.55***			89.87***	
Theory of mind	.23	.08	.37**	.17	.07	.26*
Autonomy				.68	.24	.33*
Adjusted R^2		.12			.21	
F for change in R^2		9.40**			9.13***	
Maternal Cognitive Mental States	.67	.15	.58**	.68	.15	.58**
Autonomy				-.01	.03	-.03
Adjusted R^2		.33			.31	
F for change in R^2		30.83***			15.21***	
Household chaos	.67	.10	.68**	.64	.11	.66**
Autonomy				-.09	.09	-.09
Adjusted R^2		.45			.45	
F for change in R^2		51.99***			26.31***	
Older siblings	1.00	.00	1.00***	1.00	.00	1.00***
Autonomy				.00	.00	.00
Adjusted R^2		1.00			1.00	
F for change in R^2		1000.00			1000.00	

B- unstandardised beta coefficient; SE- standard error; β- standardised beta;
*$p<.05$; **$p<.01$, ***$p<.001$*

To conclude, the results of cross-sectional analyses within each home visit were consistent (see Figure 6.10). Child's autonomy displayed during the scaffolding interactions was explained by the child's VMA and theory of mind. Aligned to these findings, the cross-lagged effect was identified of the child's VMA, measured at Time 1, to the child's autonomous behaviour at Time 2. Moreover, the child's autonomy exhibited at the baseline visit also predicted the child's capabilities (working memory and theory of mind) at the follow-up visit, after controlling for this behaviour observed seven months earlier.

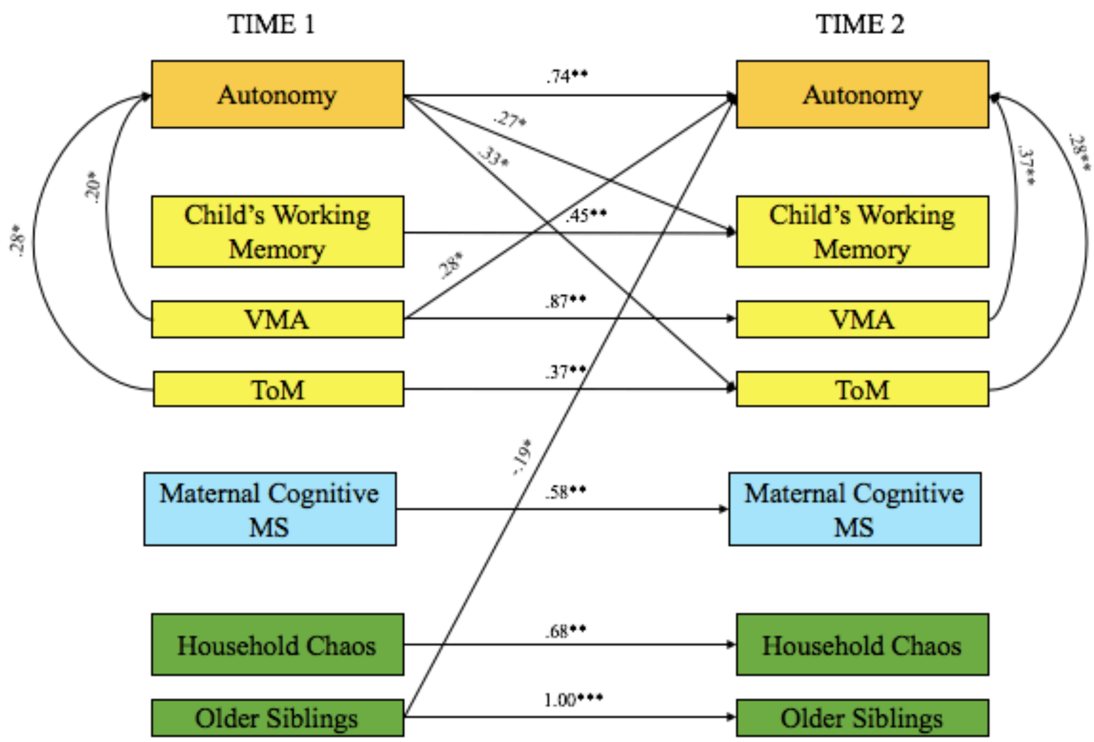

Figure 6.10 Cross-lagged model predicting child's autonomy over time (N= 63).

Positive affect

The next set of hierarchical multiple regressions tested to what extent the child's individual characteristics (emotion regulation), mother's individual characteristics (suppression and use other mental state talk) or contextual factors (number of older siblings) determined the child's positive affect displayed during learning interactions at home.

The child's positive affect displayed during joint problem-solving situations at Time 1 did not have any established predictive relationship with the child's, mother's or contextual variables (see Table 6.25). The performed regression analyses did not identified any significant models. At Time 2, Model 2 was accepted as the most fitting and revealed 8% of the overall variance in the child's positivity. This is explained by the children's abilities to regulate their emotions and use of mental states from the category 'other' by mother's (Adjuster R^2= .08, F= 2.88, p<.05).

Table 6.25

Hierarchical regressions predicting the child's positive affect. Time 1 (N= 68) and Time 2 (N= 63)

Variables	*Model 1*			Model 2			Model 3		
	B	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*
				Time 1					
Child's Emotion Regulation	*.23*	*.21*	.12	.09	.23	.05	.10	.23	.06
Maternal Suppression				-.09	.10	-.13	-.08	.10	-.11
Other Mental States				-7.45	3.35	-.24*	-7.16	3.47	-.23*
Older siblings							.18	.17	.13
Adjusted R^2		.00			.03			.03	
F for change in R^2		.99			1.75			1.59	
				Time 2					
Child's Emotion Regulation	*.51*	*.23*	.25*	.51	.23	.25*	.40	.27	.20
Maternal Suppression				.05	.08	.08	.09	.09	.14
Other Mental States				-6.56	3.30	-.24*	-5.89	3.32	-.22
Older siblings							.31	.23	.24
Adjusted R^2		.05			.08			.12	
F for change in R^2		3.89			2.88*			3.10*	

B- unstandardised beta coefficient; SE- standard error; β- standardised beta;
$p<.05$; $**p<.01$, $***p<.001$

The longitudinal analyses identified that the child's positive affect at Time 2 was explained by the control variable - child's positive affect - observed at Time 1. None of independent variables (child's, mother's or contextual factors) were significant over and above the autoregressive effect (see Appendix H: Table H.5).

Finally, none of the regressions identified a longitudinal effect of the child's positive affect exhibited at the baseline on the child's (emotion regulation), mother's (suppression, use of other mental state talk) or contextual independent variables (number of older siblings) at the follow-up visit, after controlling for these variables at Time 1 (see Appendix H: Table H.6).

To conclude, the cross-lagged analyses did not identify any consistent predictors in the child's positive affect (see Figure 6.11). The results suggested by cross-sectional analyses at Time 2 had not remained when tested longitudinally.

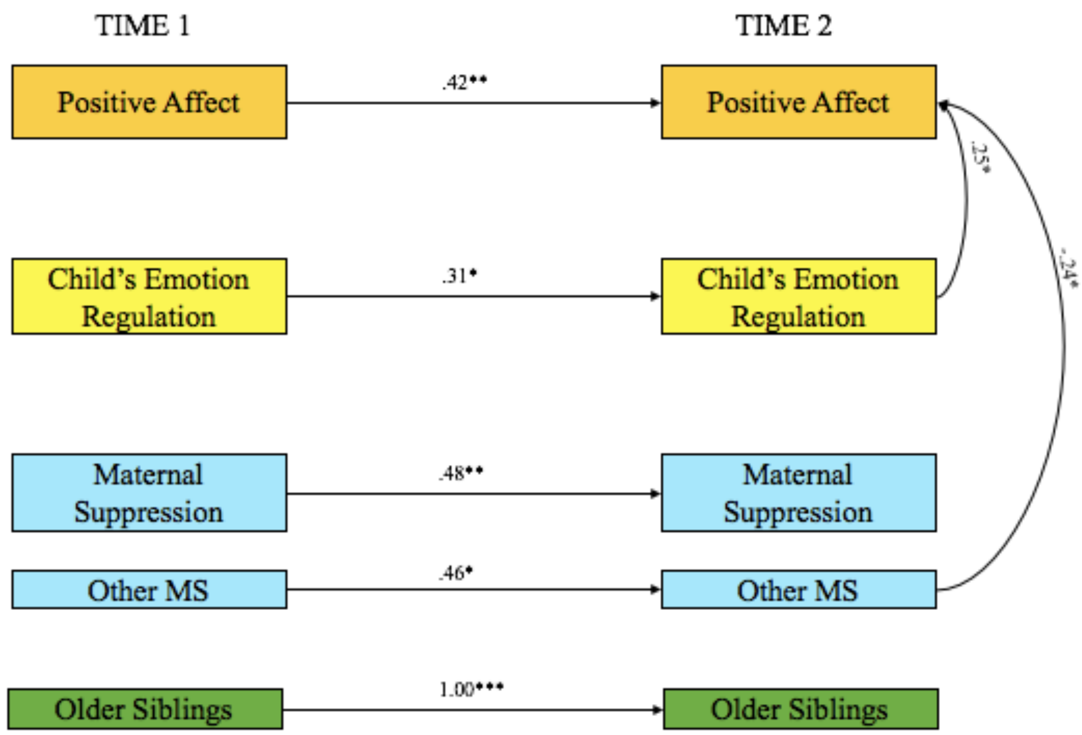

Figure 6.11 Cross-lagged model predicting child's positive affect over time (N= 63).

Non-compliance

A set of Hierarchical Multiple Regressions were calculated to examine the cross-lagged effect of the child's ability to recognise different people's emotions and states of mind, along with the mother's use of emotion mental state talk and crowding index, on the child's non-compliance behaviour displayed during the scaffolding interaction with their mother.

In relation to the child's non-compliance behaviour at Time 1, a three-step hierarchical regression was calculated; however, none of the models revealed any significant predictors. Similar results were identified by cross-sectional analyses at the follow-up visit (see Appendix H: Table H.7).

Table 6.26 demonstrated a longitudinal negative effect of the child's abilities to recognise the four basic emotions in different people at Time 1 on the children's non-compliance during the learning interaction at home. This was reflected in Model 1 which highlighted that autoregressive effect explained 17% of the overall variance of dependent variables at Time 2. In Step 2, the child's variables (emotion recognition and theory of mind) measured at the baseline were entered, which explained a further 4% of the variability in the child's non-compliant behaviour at the follow-up visit (F=6.47, p<.01).

Model 2 was identified as the best fitting as further models neither improved the prediction of the dependent variable nor identified any new significant predictors. Children who were unsuccessful at the identification of emotions at Time 1 were more non-compliant at Time 2.

Lastly, the child's non-compliant behaviour observed at Time 1 did not have any cross-lagged effects on child's, mother's or contextual variables according to four hierarchical multiple regressions (see Appendix H: Table H.8). All variables, except the child's emotion recognition, were explained by autoregressive effects. Furthermore, the child's emotion recognition was not consistent across time as the calculated regression was not significant.

Table 6.26

Autoregressive hierarchical regression analysis of child, mother and contextual variables at Time 1 predicting the child's non-compliance at Time 2 (N= 63)

Variables	*Model 1*			*Model 2*			*Model 3*			*Model 4*		
	B	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Non-compliance. Time 1	*.42*	*.18*	*.42**	.39	.18	.40*	.38	.18	.39*	.36	.17	.37*
Child's Emotion Recognition				-.39	.20	-.17*	-.40	.21	-.18	-.30	.22	-.14*
Theory of mind				.04	.03	.19	.04	.03	.19	.04	.03	.16
Maternal Emotion MS							.16	.59	.03	.21	.56	.04
Crowding index										.01	.08	.01
Adjusted R^2		.17			.21			.20			.19	
F for change in R^2		13.17**			6.47**			4.79**			4.60**	

B- unstandardised beta coefficient; SE- standard error; β- standardised beta;
**p<.05; **p<.01, ***p<.001*

While cross-sectional analyses did not provide any significant predictors to the child's non-compliant behaviour, longitudinally, it was identified that the child's ability to recognise emotions determines non-compliant behaviour later in time. Although this finding was significant, it is important to notice that the child's emotion recognition was not stable across the two time points (see Figure 6.12).

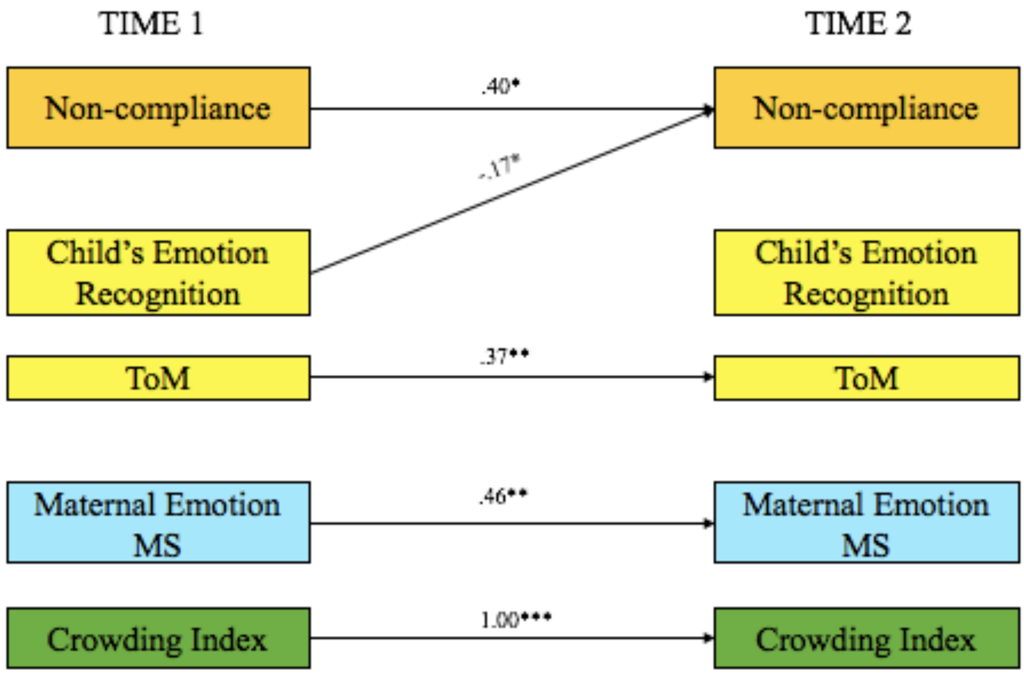

Figure 6.12 Cross-lagged model predicting child's non-compliance over time (N= 63).

6.4 Person characteristics and contextual factors as predictors of dyad's intersubjectivity in scaffolding interaction

Dyadic intersubjectivity is an essential aspect of the joint problem-solving interaction. Earlier it was identified that both dimensions of the mother's and child's behaviour contribute to the mutual understanding during learning interactions at home (see Chapter 5). In the current chapter, it is tested if the child's, mother's and contextual variables contribute to the dimension of intersubjectivity and, if so, to what extent. Through the development of the cross-lagged model, four hierarchical multiple regressions were calculated in order to determine the nature of the relationship between the level of intersubjectivity and independent variables (child's - working memory, VMA, emotion regulation; mother's - cognitive mental state talk).

The first regression (see Table 6.27) tested the cross-sectional predictive relationship of the child's characteristics (working memory, VMA, emotion regulation) and mother's characteristics (use of cognitive mental states) on the dyadic intersubjectivity at the initial home visit. In Step 1, the child's general cognitive abilities (working memory and VMA) predicted the intersubjectivity of the dyad by explaining 18% of its overall variance (F= 9.40, p<.01). The addition of maternal use of cognitive mental states in day-to-day conversation with their child explained a further 3% of the variability in the shared understanding of the mother and child observed during the scaffolding interaction at Time 1 (Adjusted R^2 = .21, F= 5.38, p<.01). Beta coefficients for the two predictors were the child's working memory (β=.28, t= 2.42, p<.01) and maternal cognitive mental state talk (β=.22, t=1.77, p< .05). The dyad, in which the child had a higher level of working memory along with the mother who used a significant amount of cognitive states in the conversation, were more likely to share an understanding of the task and the ways to complete it.

In relation to the cross-sectional analysis at Time 2, the child's person characteristics (working memory, VMA and emotion regulation) explained 10% of the variability in dyadic intersubjectivity at Time 2 (F= 3.35, p<.05). However, only the child's emotion regulation was a significant predictor with a beta coefficient (β=.30, t=2.44, p< .05). Specifically, at the follow-up visit, children who were more able to regulate their emotions were most likely to be a participant of the dyad with higher intersubjectivity. This finding, however, was not consistent with results obtained earlier at Time 1.

Table 6.27

Hierarchical regressions predicting dyadic intersubjectivity. Time 1 (N= 68) and Time 2 (N= 63)

Variables	*Model 1*			Model 2		
	B	*SE B*	*β*	*B*	*SE B*	*β*
		Time 1				
Child's working memory	.14	.05	.26**	.16	.05	.28**
VMA	.01	.01	.27*	.01	.01	.19
Emotion Regulation	.31	.18	.21	.24	.18	.16
Maternal Cognitive Mental States				1.14	.51	.22*
Adjusted R^2		.18			.21	
F for change in R^2		5.92**			5.38**	
		Time 2				
Child's working memory	.04	.09	.06	.07	.09	.10
VMA	.01	.01	.22	.01	.01	.13
Emotion Regulation	.56	.21	.30*	.53	.21	.28*
Maternal Cognitive Mental States				1.06	.61	.22
Adjusted R^2		.10			.13	
F for change in R^2		3.35*			3.29*	

B- unstandardised beta coefficient; SE- standard error; β- standardised beta;
**p<.05; **p<.01, ***p<.001*

The following step was to examine the cross-lagged effect with an account of autoregressive effects in the regression. If the individual or contextual variables measured at Time 1 would significantly predict dyadic intersubjectivity observed at Time 2, once they are controlled for autoregressive effect, they would be indicative of a strong causal relationship across time, which would be over and above the level of intersubjectivity itself.

Thus, the hierarchical regression (see Table 6.28) consisted of three Steps: Step 1 - a control variable: intersubjectivity at Time 1, Step 2 - child's variables (working memory, VMA, emotion regulation), Step 3 - mother's variable (cognitive mental state talk). Model 1 revealed that the control variable accounted for 30% of the overall variability in the dyadic intersubjectivity displayed during the scaffolding interaction at Time 2 (F=27.22, p< .001). The addition of the child's variables at Step 2 did not contribute to the variability explained. However, the inclusion of maternal use of cognitive mental states in their speech at Time 1 at Step 3 explained a further 2% of the variance in intersubjectivity at Time 2 (Adjusted R^2= .32, F=6.89, p< .001). The use of cognitive mental states by mothers in the conversation with their children at the baseline visit led to a higher level of mutual understanding of shared goals and strategies used by the dyad to complete the task.

Table 6.28

Autoregressive hierarchical regression analysis of child, mother and contextual variables at Time 1 predicting dyadic intersubjectivity at Time 2 (N= 63)

Variables	*Model 1*			*Model 2*			*Model 3*		
	B	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Dyadic Intersubjectivity	.60	.11	.56**	.52	.13	.48**	.46	.13	.43**
Child's working memory				-.01	.08	-.01	.01	.07	.02
VMA				.01	.01	.16	.01	.01	.09
Emotion Regulation				.17	.15	.10	.10	.17	.06
Maternal Cognitive MS							1.28	.58	.23*
Adjusted R^2		.30			.29			.32	
F for change in R^2		27.22***			7.32***			6.89***	

B- unstandardised beta coefficient; SE- standard error; β- standardised beta;
**p<.05; **p<.01, ***p<.001*

Finally, four hierarchical multiple regressions were calculated and tested the causal relationship through the identification of longitudinal effects between the dyadic intersubjectivity observed at the baseline visit and the characteristics of the child and mother measured at the follow-up visit (see Appendix H: Table H.9). Once the autoregressive effects were controlled for, none of the dependent variables were explained by a shared understanding in the mother-child dyad as they were exclusively predicted by the control variables.

Figure 6.13 illustrates that while the child's person characteristics were significant contributors to the dyadic intersubjectivity during each of the home visits, they were inconsistent. However, the maternal impact identified at Time 1 was reflected in the cross-lagged effect, suggesting that dyads had a higher level of mutual understanding at Time 2 when mothers used more of the cognitive mental states in their conversation with children at Time 1.

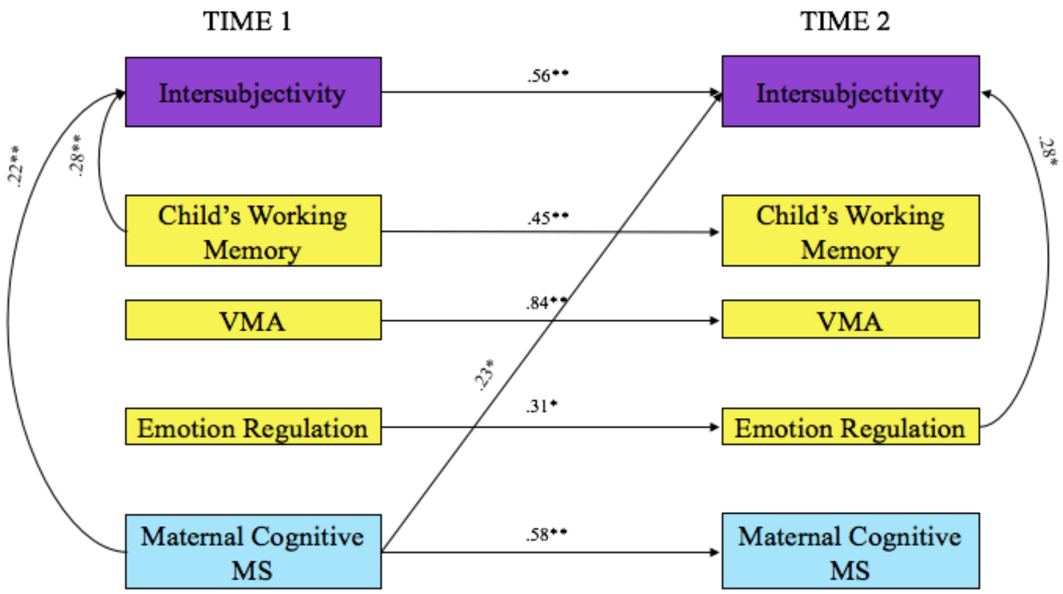

Figure 6.13 Cross-lagged model predicting dyadic intersubjectivity over time (N= 63).

6.5 Summary of findings

1. The cross-lagged analyses revealed that the child's and mother's person characteristics and contextual factors are significant in predicting the maternal use of appropriate scaffolding strategies. Mothers who had a higher level of education and used more cognitive mental state terms in their speech were more likely to provide appropriate scaffolding support. Children's higher verbal mental age and less behavioural issues also predicted the use of contingent tutoring techniques. However, longitudinal analyses identified that, over and above other variables, over-crowdedness led to an inferior choice of tutoring practices.
2. Similarly, another contextual variable (number of older children) was the only significant predictor over time of maternal positive affect. Additionally, cross-sectional analyses consistently identified a positive relationship between the child's pro-social behaviour and maternal positivity in joint problem-solving.
3. There was no consistent determinant of maternal negative affect among the measured variables.
4. Longitudinal analyses revealed that the heightened use of cognitive mental state talk by the mother led to her less controlling behaviour and a higher readiness to share the responsibility for task accomplishment.
5. Three out of four maternal scaffolding dimensions (scaffolding strategy, negative affect and over-control), along with the child's autonomy, had a unique contribution to the child's theory of mind approximately seven months later. Children had a higher level of theory of mind if their mothers used more appropriate, less negative and less controlling scaffolding techniques during the collaborative problem-solving. Furthermore, the children who were able to act independently and autonomously during task accomplishment at the baseline had a higher theory of mind at the follow-up visit.
6. The children's general cognitive abilities and emotional abilities contribute to the dimensions of behaviour exhibited in the scaffolding interactions. Children who had ahigher level of verbal mental age were more likely to work independently, concentrate on the problem and spend less time to accomplish it approximately seven month later. The child's ability to regulate emotions predicted duration of time the child spent on the task later in time. Further, longitudinal analysis

identified the child's ability to recognise emotions led to more compliant behaviour.

7. While it was identified that maternal person characteristics did not predict any of child's behavioural dimensions displayed in the learning interaction at home, the results suggested that mothers of children who were able to focus on the task reported less parenting stress approximately seven months later.
8. Cross-sectional analyses identified that both the child's and mother's person characteristics predicted the level of the dyad's intersubjectivity. Children with higher cognitive abilities (working memory) and emotional abilities (emotion regulation) were most likely part of a dyad that shared more understanding and strategies during the problem-solving interaction. The longitudinal analyses, consistently with cross-sectional analysis, revealed that the mother's extensive use of cognitive mental states in their speech led to dyadic intersubjectivity approximately seven months later.

CHAPTER 7. CROSS-CULTURAL ADAPTATION OF STUDY MEASURES

Bronfenbrenner defined culture as a context for the child's development, particularly as a contextual macrosystem in which the individual is influenced by 'resources, hazards, lifestyles, opportunity structures, life course options and patterns of social interchange' (1993, p. 25). This chapter highlights Stage III of the current research and include a detailed process of measures adaptation required for the Stages IV/V, the preliminary investigation of scaffolding practices in Russian. Further it is clarified how the measures, also used with the English sample in Stage I/ Stage II, were adapted for the Russian sample used in Stage IV/V through the procedures of back-translation, assessment of the validity and reliability.

Cross-cultural research in psychology helps to test existing theories for different populations and introduce new ideas suitable for a large number of cultural groups (Berry et al., 2002). Consequently, it is common practice to translate or adapt measures, which are typically developed for English speaking countries (Butcher & Garcia, 1978). However, this process carries with it potential methodological limitations which need to be addressed in order to ensure that adaptation of a questionnaire or test does not result in misleading or biased results related to the cultural setting or language differences (Geisinger, 1994; Hambleton, 2001), therefore, each of these issues are addressed in turn.

A potential issue in cross-cultural research is item bias which can occur when translation of a measure is inaccurate or inappropriate for the cultural context. For example, two people with similar psychological traits from two different cultures might provide different responses to the same measure. In order to avoid item bias in the current study, an independent back translation was performed. Geisinger (1994, p. 306) described an independent back-translation as a process in which "an original translation would render items from the original version of the instrument to a second language, and a second translator—one not familiar with the instrument—would translate the instrument back into the original language".

Although not exclusive to cross-cultural research, another common concern of measure adaptation is method bias, which can arise due to a number of factors such as social desirability or physical condition of where the testing took place. This type of bias has the potential to affect most or even every aspect of the measurement. The test-retest administration can help to avoid any method bias as the same group of participants would respond to the measure twice, at the initial testing and then follow up testing arranged, later in time. Therefore, the method bias could be avoided through the assessment of the reliability of the participants' results across two measurement points and help to identify possible flaws.

Finally, the issue of validity and reliability is important as the adapted measures should test the same concept that they test in the original language and the results of this measurement should be also consistent. The validity measure provides an indication to what degree of accuracy the measurement tool is actually measuring the concept that it is intended to assess (Gravetter & Forzano, 2012). Two types of validity in measure development are usually assessed: content- and criterion- related.

Content-related validity includes two different aspects of examination, such as face validity and construct validity. Face validity is a subjective assessment and identifies if the adapted measure tests what it claims to (Nevo, 1985). This method helps to exclude and avoid obviously irrelevant items, the assessment of face validity based on the common sense of the reviewer. However, face validity is not considered a robust method as it relies on a subjective opinion of a single person.

Construct validity refers to how much each measure is representative of the theoretical concepts relevant to it (Cronbach & Meehl, 1955). The objective of construct validity is to illustrate the impact of a construct in order to clarify the relationships between the existing research results and enable development of hypotheses for future associations.

All the measures in the current study that were translated are assumed to be relevant to their theoretical concepts, as this was tested as part of the development of the original versions. The comprehensive back-translation procedure ensured that the meaning did not change which indirectly suggests that the face validity and construct validity of the measures were preserved.

Criterion-related validity is also often characterised by two aspects, specifically concurrent validity and predicative validity. Concurrent validity examines the extent to which new measures concur with existing tests while predicative validity refers to measures' ability to predict the nature of the development of the measured phenomenon.

Another crucial issue of measure adaptation is the reliability. Reliability is a measure of consistency in results obtained from the same participant in different circumstances or using alternative measures (Anastasi & Urbina, 1997, p. 84). Usually the statistical manipulation (split-half method) and the research method (test-retest method) helps to establish a level of reliability (Fliess, 1986). Usually, in order to test the reliability of the measure, the Cronbach's alpha (α) is calculated. Cronbach's α is the average value of all the possible variations of items once split into two half-tests (DeVellis, 2003). Researchers' opinions are varied in what is the acceptable range of α's level, generally ranging between .70 and .95 (DeVellis, 2003; Geourge & Mallery, 2003). Geourge & Mallery (2003) suggested the rule of thumb for Cronbach's α '≥.90 – Excellent, ≥.80 – Good, ≥.70 – Acceptable, ≥.60 – Questionable, ≥.50 – Poor, and ≤.50 – Unacceptable' (p. 231). The establishment of internal and external consistency for the measures was feasible within the framework of Stage III through the utilisation of Cronbach's α and test-retest method respectively.

For the purposes of the current research, in order to make a first attempt at a comparative study in Russia, all measures which did not already exist in Russia at the stage of research planning (see Table 7.1) had to be adapted in order to minimise any possible bias. While measure adaptation is a prolonged and time-consuming process, it was essential to conduct, in order to ensure a rigorous method and to minimise unintentional bias which may have result from translation. The remainder of this chapter discusses the process of the adaptation of study measures for the Russian study.

Table 7.1

The measures requiring adaptation in to Russian

Child's person characteristics	• The Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997) • Emotion regulation checklist (ERC; Shields & Ciccheti, 1998)
Mother's person characteristics	• Trait Emotional Intelligence Questionnaire (TEIQuE-SF; Petrides & Furnham, 2006) • Emotion Regulation Questionnaire (ERQ; Gross & John, 2003) • Expression of Affection (EAF; Hetherington & Clingempeel, 1992) • Parenting Daily Hassles (PDH; Crnic and Greenberg, 1990)
Contextual factors	• Confusion, hubbub, and order scale (CHAOS- SF; Matheny, Wachs, Ludwig, & Phillips, 1995).
Interactional measures	• Picture Task and coding scheme • Scaffolding Task and coding scheme

7.1 Back-translation

In line with the International Test Commission guidelines for test adaptation (Hambleton, 2001) all measures were back translated. Firstly, they were translated by one person into Russian and then translated back by another person into English. Both translators were bilingual with Russian as their native language and English as a second language, but both had lived in the UK for approximately five years and were employed by universities. Following analysis of the texts, all items with problematic/unmatched back translations, such as phrasing not identically matching word-for-word, were thoroughly discussed and appropriately amended. Most disagreements were minimal, involving a choice between two synonyms or more appropriate, understandable or commonly-used phrasing. The translations were reviewed by a panel of three Russian colleagues from St. Petersburg State University. With the panel's suggestions, some minor changes were applied, such as slight variation in grammatical phrasing, but they did not change the meaning or readability of the items for Russian speakers.

7.2 Adaptation procedure

The measures for the adaptation were split into three groups. The first group included non-specific measures, in particular, measures of emotional abilities among adults (traits of emotional intelligence and emotion regulation abilities). The second group, included measures related to parenting experience (expression of affection and parenting stress) and parental reports to child-related measures (behavioural adjustment and emotion regulations). Finally, the last group of measures included interactional measures for the mother-child dyads with inclusion of two task-based measures for the children on their understanding of theory of mind.

For the adaption of the first group of measures, students from several campuses at St. Petersburg State University were invited to take part. For the second group of measures, mothers were recruited through a snowball sampling method and were invited to take part in an online survey. Lastly, the interactional measures were piloted on a small sample Russian mother-child dyads who had children of four-five years old age and were thus comparable to the main sample. Across all groups, each participant was introduced to the study and explained the purpose of it. They all had a chance to ask any questions concerning them and participation started only after a written consent form was completed.

Finally, the examination of the adaptation of measures involved four steps: preliminary analyses, establishment of internal reliability, comparison to the existing English sample and identification of external reliability within Russian sample.

7.3 Adaptation of emotional understanding measures

Emotional abilities are a source of individual difference between people and determine the extent to which an individual is able to identify, understand and manage their own and other people's emotions (Brackett et al., 2006; Denham et al., 2003; Eisenberg, Fabes, Guthrie, & Reiser, 2000). For the Russian adaptation of measures of emotional abilities, such as traits of emotional intelligence and emotion regulation, any representative of a general population in Russia could be recruited as a participant. Students as a sample group were chosen due to their representation of different regions of Russian Federation and general accessibility as a group.

Participants. All participants (*N*=100) were students from the faculties of Psychology, History and Philosophy at Saint-Petersburg State University. They were recruited by utilisation of convenience sampling method. The sample comprised of 27 males (27%) and 73 females (73%), aged between 18-20 years (*M*ean age= 19.2, *SD*= .71).

Procedures. Each student participated twice within a month across two time points. In this project, the 100 participants involved were asked to complete two self-reports about their own emotional abilities: the traits of emotional intelligence (TEIQue-SF) and emotion regulation (ERQ) measures. The students completed the questionnaires on a paper-and-pencil form with responses anonymised because participants identified themselves using codes.

Measures. Identically to the English study, in the adaption of Trait Emotional Intelligence Questionnaire (TEIQuE-SF; Petrides & Furnham, 2006) for Russian population, only the global trait EI score was used in the analyses. In addition, in order to obtain a measure of cognitive reappraisal and expressive suppression in Russian, both of these subscales from the Emotion Regulation Questionnaire (ERQ; Gross & John, 2003) were tested. Both measures are presented in Chapter 4 (see Subchapter 4.6.1). The Cronbach's α for the Russian versions of measures at each Time point and their comparison to the internal consistency levels with the results obtained among English sample group at Time 1 can be found in the Table 7.3

The examination of adaptation. The initial analyses, represented by the examination of descriptive statistics of emotional abilities measures, included the range, mean and standard deviation across two measuring points. The results are demonstrated in Table 7.2

Table 7.2

Descriptive statistics for ERQ and TEIQue-SF at Time 1 and Time 2 (N=100)

Variables	*Time 1*			*Time 2*		
	Mean	*SD*	*Range*	*Mean*	*SD*	*Range*
TEIQue-SF						
Global Trait EI	4.20	.33	2.23	4.24	.32	1.77
ERQ						
Cognitive Reappraisal	4.65	1.27	5.8	4.89	1.33	6
Expressive Suppression	3.39	1.28	5.25	3.53	1.32	5.5
Total Score	4.09	1.01	4.89	4.28	1.02	4.67

Table 7.3 demonstrates a good level of internal consistency for the global trait of EI measured by TEIQue-SF among the Russian sample, Cronbach's α were .84 and .86, at Time 1 and at Time 2 respectively. That corresponds with the results of the reliability test gained among the main English sample at Time 1 (α= .86). Similarly, internal consistency for ERQ's subscales varied between acceptable and good in the Russian sample across both time points, which is reflective of the Cronbach's α calculated for English sample. However, while the total score of ERQ in the Russian sample indicated a good level of internal consistency across Time 1 (α= .79) and Time 2 (α= .82), it was even higher than the level of Cronbach's α in English Sample (α= .61).

Table 7.3

Internal consistency for ERQ and TEIQue-SF during Russian adaptation at Time 1 and Time 2 (N=100) and comparison with English sample (Time 1; N=68)

Variables	*Cronbach's α Russia. Time 1*	*Cronbach's α Russia. Time 2*	*Cronbach's α England. Time 1*
TEIQue-SF			
Global Trait EI	.84	.86	.86
ERQ			
Cognitive Reappraisal	.84	.91	.85
Expressive Suppression	.75	.79	.70
Total Score	.79	.82	.61

In order to assess the level of external consistency between the two-time points of measurement one month apart, the test-retest reliability method was performed on the same sample group. Pearson correlation was used to investigate the relationship between the scores gathered at each time of testing (see Table 7.4). Both ERQ's subscales, Cognitive Reappraisal subscale (r=.79, p<.001) and Expressive Suppression subscale (r=.78, p<.001), at Time 1 are significantly correlated with the scores for these scales at Time 2 and subsequently, the total score measured at Time 1 is also associated with ERQ's total score at Time 2 (r=.81, p<.001). These results suggest that the ERQ has an acceptable level of external consistency.

However, Pearson's correlation between Global Trait EI scores received at Time 1 and Time 2 (r=.61, p<.001) are somewhat lower than correlations between ERQ scales' scores. As the TEIQue-SF measure comprised of a larger number of items (n=30) than ERQ (n=9) and so, due to this reason, greater inconsistency was possible as results could potentially be confounded by physical/emotional conditions of the participants. Alternatively, TEIQue-SF involved a wide range of topics so in processing the information between time points, the participants may have interpreted the significance in different ways, prompting them to provide an alternative answer or one based on deeper insights which would have resulted in a lower correlation coefficient.

Table 7.4

Test-retest reliability for ERQ and TEIQue-SF (N=100)

Variables	*Test- Retest*	*Pearson's Correlation*
	ERQ	
Cognitive Reappraisal	TIME 1 TIME 2	.79**
Expressive Suppression	TIME 1 TIME 2	.78**
Total Score	TIME 1 TIME 2	.81**
	TEIQue-SF	
Global Trait EI	TIME 1 TIME 2	.61**

**p<.05, ** p<.01 (two-tailed)*

7.4 Adaptation of child and parenting-related measures

The second group of measures consisted of maternal reports about the child's emotional regulation and behavioural adjustment, along with the questionnaires related to the aspects of parenting and home environment. As these measures relate to parenting practices and identification of the child's person characteristics, it was essential to recruit participants who had some level of parenting experience in order to test the Russian adaptation.

Participants. As the main aims of the current thesis are to investigate mother-child interaction during problem-solving situations, it was decided that for the adaptation of the parent-related measures, mothers would be recruited. Reflecting on the challenges faced during the recruitment of the main sample for the English study (Stage I), the researchers utilised the snowballing sampling method for recruitment of the participants for this adaptation. While this approach has the disadvantage of a self-selecting sample, it ensured in this case a reasonable sample size to test the reliability of the measures.

The sample group comprised 33 females aged between 30 years old and 45 years old (*M*ean age= 34.9, *SD*= 4.46) with various experience of parenting. All participants were from Saint-Petersburg and recruited through word of mouth. The number of their children varied between one and three children in the family (*M*=1.67, *SD*= .78), the age of the children also varied between 1 to 13 years old (*M*ean age= 7.01, *SD*= 4.29).

Procedures. Similar to Group 1, participants from Group 2 were asked to complete questionnaires twice with a period of a month in between. The booklets containing the relevant measures were sent to them via email.

Measures: Child's characteristics. Child measures included The Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997) and Emotion regulation checklist (Shields & Ciccheti, 1998). Both measures are detailed in Chapter 4 (see Subchapter 4.6.2).

The SDQ includes 5 subscales: hyperactivity/inattention, emotional symptoms, conduct problems, peer problems and pro-social behaviour. In the early stages of planning the current project, the SDQ was not available in Russian. However, a Russian version has subsequently been published (Slobodskaya et al, 2015). A comparison with the adapted version used in the current study and the published SDQ revealed some minor differences in some phrasing, use of synonyms or slight variations in sentence construction in some items. However, the meaning seems broadly equivalent and the majority of items were identical to the back-translation conducted for the current study.

The levels of reliability for the child characteristic measures in the Russian sample and their comparison with the internal consistency levels of the same measures of the English sample group are presented in Table 7.6

Parenting and home environment measures. Another three measures were tested among Group 2: Expression of Affection (EAF; Hetherington & Clingempeel, 1992), Parenting Daily Hassles (PDH; Crnic and Greenberg, 1990) and Confusion, hubbub, and order scale (CHAOS- SF; Matheny, Wachs, Ludwig, & Phillips, 1995). Similar to child measures, these parenting questionnaires (see Subchapter 4.6.1) and home environment measure (see Subchapter 4.6.3) are discussed in Chapter 4. Reliability coefficients for the parenting and home environment scales are reported in the Table 7.6

The examination of adaptation. Analysis of the adapted measures included the assessment of internal and external consistency, and an examination of the descriptive statistics which are displayed in Table 7.5.

Table 7.5

Descriptive statistics for SDQ, ERC, EAF, PDH, CHAOS-SF at Time 1 and Time 2 (N=33)

Variables	*Time 1*			*Time 2*		
	Mean	*SD*	*Range*	*Mean*	*SD*	*Range*
SDQ						
Hyperactivity/ inattention	4.84	2.23	8.00	4.44	2.18	7.00
Emotional symptoms	2.66	2.27	7.00	2.41	2.12	7.00
Conduct problems	1.91	1.37	5.00	1.88	1.29	4.00
Peer problems	2.63	1.93	8.00	2.47	1.88	8.00
Total difficulties score	.48	.22	.96	.45	.19	.76
Pro-social behaviour	6.16	2.49	10.00	6.56	2.55	10.00
ERC						
Lability/Negativity	1.97	.46	2.07	1.93	.46	2.00
Emotion Regulation	3.26	.35	1.25	3.22	.39	1.50
EAF						
EAF: Total Score	3.86	.55	2.22	3.84	.63	2.72
PDH						
PDH: frequency	1.96	.34	1.05	1.97	.37	1.55
PHD: intensity	2.34	.50	2.05	2.40	.54	2.10
CHAOS-SF						
CHAOS-SF: Total Score	2.32	.73	3.00	3.17	.73	3.17

Table 7.6 illustrates an acceptable level of internal consistency across all measures tested on mothers (*N*=33). The five subscales of the SDQ displayed relatively low but acceptable levels of reliability, with Cronbach's alpha broadly comparable to the English sample at Time 1 (*N*=68). Although, Cronbach's alpha for the hyperactivity (α= .66 Time 1 and Time 2) and conduct problems (α= .67; α= .66 at Time 1 and Time 2 respectively) subscales were somewhat lower among the Russian sample compared to the English Sample (α= .79 for both subscales); the level of internal reliability for the emotional symptoms (α= .64; α= .65 at Time 1 and Time 2 respectively), peer problems (Time 1 α= .56; Time 2 α= .60) and pro-social behaviour (Time 1 α= .78; Time 2 α= .86) subscales were larger than those measured in the England study (Cronbach's alpha for SDQ: peer problem α= .55, pro-social behaviour α= .67).

It was also established (see Table 7.7) that both subscales (lability/negativity and emotion regulation) of the ERC measure repeatedly had good consistency levels across two time points and that is comparable to the reliability level in England. Parenting measures (EAF & PHD) displayed good internal reliability, specifically Cronbach's alphas computed at Time 1 were higher than at Time 2 and were comparable to main study. Finally, the measure of the home environment assessed using the CHAOS-SF displayed higher levels of internal consistency (Time 1 α= .69; Time 2 α= .71) than that found in the English sample at Time 1 (α= .50).

Overall, the consistency level for child-related measures among the Russian sample were acceptable (Cicchetti, 1994) and reflective of the Cronbach's alpha obtained among the main English sample.

Table 7.6

Internal consistency for SDQ, ERC, EAF, PDH, CHAOS-SF during Russian adaptation at Time 1 and Time 2 (N=33) and comparison with English sample (Time 1; N=68)

Variables	*Cronbach's α Russia. Time 1*	*Cronbach's α Russia. Time 2*	*Cronbach's α England. Time 1*
SDQ			
Hyperactivity/ inattention	.66	.66	.79
Emotional symptoms	.64	.65	.51
Conduct problems	.67	.66	.79
Peer problems	.56	.60	.55
Pro-social behaviour	.78	.86	.67
ERC			
Lability/Negativity	.86	.88	.71
Emotion Regulation	.60	.68	.65
EAF			
EAF: Total Score	.69	.78	.70
PDH			
PDH: frequency	.69	.75	.70
PHD: intensity	.73	.80	.82
CHAOS-SF			
CHAOS-SF: Total Score	.69	.71	.50

In order to identify the stability of child-related and parenting measures, the external consistency was calculated by utilisation of the test-retest methodology. Table 7.7 demonstrates Pearson's correlations between the two assessment points set a month apart among Russian mothers (*N*=33). Across all of the measures, the level of external reliability ranged between acceptable and good.

Table 7.7

Test-retest reliability for SDQ, ERC, EAF, PDH, CHAOS-SF (N=33)

Variables	*Test- Retest*	*Pearson's Correlation*
	SDQ	
Hyperactivity/ inattention	TIME 1 TIME 2	.86**
Emotional symptoms	TIME 1 TIME 2	.79**
Conduct problems	TIME 1 TIME 2	.74**
Peer problems	TIME 1 TIME 2	.90**
Pro-social behaviour	TIME 1 TIME 2	.87**
	ERC	
Lability/Negativity	TIME 1 TIME 2	.91**
Emotion Regulation	TIME 1 TIME 2	.82**
	EAF	
EAF: Total Score	TIME 1 TIME 2	.86**
	PDH	
PDH: frequency	TIME 1 TIME 2	.85**
PHD: intensity	TIME 1 TIME 2	.84**
	CHAOS-SF	
CHAOS-SF: Total Score	TIME 1 TIME 2	.92**

**p<.05, ** p<.01 (two-tailed)*

7.5 Adaptation of interaction dyadic measures

The initial step of the adaptation of both the child characteristics measures and interaction tasks involved a back-translation procedure of the instructions by the same translators who translated the self-reported questionnaires discussed earlier. Similarly, the instructions were translated first into Russian by one person, then back into English by another translator. This time, the two translated versions of the English instructions were successfully matched, possibly due to the simple direct instructions and explanations used in both tasks.

The second step of the adaptation was to recruit a small number of mother-child dyads. This helped to ensure the testing of instructions and tasks through the identification of possible issues and irregularities. Furthermore, this provided the opportunity to train the researcher who worked with the Russian sample in the testing procedure in a naturalistic setting and allowed them to raise any questions and concerns. The researcher's training was particularly significant in order to preserve all administrative procedures (such as counterbalancing the tasks). In order to establish this training, three families were recruited through the application of an opportunity sampling method.

The home visits to the recruited families (N=3) consisted of two parts: the first involved assessing the child's cognitive, emotional and social abilities and the second part involved two types of interaction tasks involving the mother-child dyad.

During the first part of the visit, the assessment of the child's abilities included a set of tasks identical to those in Stage I, excluding the BPVS measure. Both BPVS and the verbal fluency tasks were measures of verbal functioning. However, for the purpose of this study, verbal fluency was more appropriate for the adaptation as it was a simple measure which did not involve a complex scoring system.

General cognitive abilities were represented by working memory and verbal fluency. A variation of the number recall task, which is a subtest of the Kaufman Assessment Battery for Children (KABC-II; Kaufman & Kaufman, 2004) was replaced with an earlier adaptation of one of the subtests included in the Russian version of Wechsler Intelligence Scale for Children (WISC; Filimonenko, 1993). The subtest of WISC includes a forward and backward digit span task which measures working memory. Similarly, to KABC-II subtest's, the WISC subtest's version of the forward digit span task involved the child repeating a series of single digit numbers of increasing length. Once the child has failed, the experimenter suggested another series of numbers the same length as the previous unsuccessfully recalled numbers. The score equals the number of digits the child could successfully repeat. The length of number rows ranged from two to nine.

The child's social abilities were characterized by ToM and measured with two tasks: Unexpected transfer task (UTT; Wimmer & Perner, 1983) and Unexpected contents task (UCT; Perner et al, 1987). The final measure was *The Assessment of Children's Emotion Skills* (ACES; Schultz, Izard, & Bear, 2004), the adaptation of which tested and evaluated children's skills of emotion attribution accuracy. The specifics of all measures, including the verbal fluency task, UTT, UCT and ACES were detailed in Chapter 4 (see Subchapter 4.6.2).

The second part of the home visit involved the testing of the interaction tasks. As in the main study conducted among English families, two types of interaction measures were used in Study 3. The first set of tasks aimed to examine the nature of the scaffolding interaction and behaviour displayed by the mother and child during problem-solving activities. Three scaffolding tasks were copied from Stage I, as described in Chapter 4. All stimuli required for processing these tasks were identical to stimuli used among the English sample and provided to the Russian collaborator.

The second type of interaction task was intended to test the use of mental state utterances in the dyadic conversation and used the same Picture Task described in Chapter 4. The participants were offered the same set of 12 static pictures that had been used in Stage I to examine a range of social contexts with a variety of expressed emotions (for example, a picture where the mother is telling off a child). It was crucial to establish if the Russian families identified these pictures in the same way as English families. Potential cultural variations in the pictures were described and interpreted could have had an impact on how this task was analysed. However, through an informed observation of mother-child's conversations, no significant differences between the two samples were identified. For example, the pictures that were perceived as more negative among the English mother-child dyads were discussed comparably within the Russian families.

It was concluded from testing the adapted measures that the dyadic interaction tasks were appropriate to use for Russian families with children aged four-five years. The substance of the tasks themselves was clear and the participants did not have any questions related to the tasks' subjects. The scaffolding tasks were too difficult for the children to solve independently, however, with some support from mothers, the children were capable of completing them.

The visit to the first family was organised and administered by the main researcher which provided an opportunity for another the collaborating researcher to learn about the specifics of the data collection process, ask questions and clarify details. The second and third visit were administered by the trainee-researcher under the guidance of the main researcher who was there to address any issues with the process or conduct as they occurred. Three visits were deemed adequate for the trainer-researcher to become familiar with the procedure and tasks and be able to replicate an identical procedure of data collection among the Russian sample group.

To sum up, the differences in cultural organisation that are reflected in social processes and policies may potentially lead to cross-cultural variations in scaffolding practices between English and Russian families. Such comparison is possible while the research design, methods and procedures correspond to both countries. To ensure that the required measures were reliable and comparable between samples, a process of thorough adaption was undertaken, including the procedures of back-translation, confirmation of face validity and examination of internal and external reliability. The testing of adapted measures revealed that levels of internal consistency and reliability across all measures in the Russian language were equivalent to the reliability results gained in the English language.

CHAPTER 8. A PRELIMINARY INVESTIGATION OF THE CULTURAL DIFFERENCES IN RUSSIA AND ENGLAND

Cultural influences are emphasised as one of the central aspects of a child's development according to the bioecological framework (Bronfenbrenner, 1979; Bronfenbrenner & Morris, 2006). The current chapter presents the first attempt at understanding the inter-relationship between the dimensions of behaviour displayed during scaffolding interactions between mother and child in the Russian sample group. The specificity of the recruitment process, selection of participants and their demographic information, along with the administrative procedures required to conduct Stage IV of the whole research project, are discussed. Preliminary relationships between the dimensions of the mother's and child's behaviour observed during the problem-solving task and their person characteristics, as well as contextual factors, are then examined among the Russian families. Finally, the results obtained are compared as patterns with results gathered from within the English sample group. However, it is crucial to note, that the cross-cultural comparisons are exploratory and the small sample size recruited in Russian would not allow for a truly representative cross-cultural comparison.

Due to the lack of existing scientific literature about parental scaffolding practices in Russia, an investigation of scaffolding as a bidirectional process, between mother and child, was planned based on existing evidence from Western literature (see Chapter 2). In particular, identification of potentially relevant aspects of the participant's person characteristics (general cognitive, social and emotional abilities) along with contextual factors (household chaos, over-crowdedness and number of children) could be applied to the Russian population.

Based on an assumption that there are differences in cultural organisations and practices (for example, educational institutions) which are reflected in social processes and policies in Russia and England, it was hypothesised that *there will be cross-cultural differences in maternal scaffolding practices (quality of instruction, contingency, positive affect, negative affect and over-control), in the child's behaviour (level of difficulty (time), amount of help required, autonomy, on task behaviour, positive affect, negative affect and noncompliance) and dyadic intersubjectivity displayed during scaffolding interactions among the Russian sample and the English sample at Time 1.*

However, a number of cross-cultural studies have also suggested that variations within a culture (for example, personality traits) are significantly higher than variations in such characteristics across cultures (McCrae & Terracciano, 2008). In relation to the scaffolding process, while the tutoring techniques could be affected culturally, the prerequisites of these behavioural dimensions are likely to have larger variations within the culture than across them. For example, maternal education has been consistently related to maternal use of appropriate scaffolding within different countries (Carr & Pike, 2012; Lowe et al., 2013; Neitzel & Stright, 2004). Therefore, it was hypothesised that *there will be no cross-cultural variations in the patterns of relationships between maternal and child's person characteristics, contextual factors and dimensions of behaviour displayed during scaffolding interactions in each country.*

Thus, it was expected that the mother's and child's behaviour during problem-solving situations might vary between the two countries; however, the aspects (person characteristics and contextual factors) that are related to the dimensions of behaviour are more likely to be consistent.

8.1 Recruitment

The recruitment in Russia took place between January and November 2015 in Saint-Petersburg. Saint-Petersburg was chosen as a large urban centre where there was a higher likelihood of recruiting the required sample size. Moreover, Saint-Petersburg is a cosmopolitan city which consists of a diverse population and could be representative of other cities in Russia as well. All data collected in Russia was done by the assistant of the qualified Collaborator-Researcher from Saint-Petersburg State University, Psychology Faculty as a part of their PhD work experience.

As this study was planned as a preliminary investigation into the nature of scaffolding practices in Russia the process of recruitment was not required to be extensive, but to gain a small sample group of mother-child dyads. However, the researcher still faced some issues in recruiting to the study. While the process of recruitment in England was time-consuming, the results were fruitful. However, that experience could not be fully replicated in Russia, and the process of recruitment had its own nuances due to cultural aspects. For example, the most successful approach in England was the recruitment of mothers through 'mum's groups' in social channels, such as Facebook. This approach was unsuccessful in Russia, possibly because it is quite unusual to invite strangers into your home and families would be more likely to agree to participate in a laboratory setting. Over the three months of advertising the study, only two mothers agreed to participate in the study and only under the agreement that the testing took place at the Psychology faculty. Still, both dropped out before the testing date. In both cases, fathers were opposed to the requirement that their child would be recorded on video. Moreover, the data collection at the laboratory was not an ideal option as it would reduce the ecological validity and increase potential bias during the cross-cultural comparison given that data for Stage I/ II was collected only at participants' households.

Nevertheless, the engagement with the official education facilities was more successful in Russia than in England. This method had limitations when employed in England; however, in Russia, 37.5% of participants (*N*=6) were recruited from four kindergartens that had been approached by the researcher. With official endorsement of the kindergarten's authority, families were more open and engaging. That consequently led to the snowball recruitment approach or 'word of mouth' from one parent to another. This approach was the most successful through which a further 62.5% of mother-child dyads (*N*=10) were recruited.

8.2 Participants. Russian Sample

The main criterion for selection of the participants recruited in the English sample was the child's age; to start primary school in England, children must be four years old. Therefore, the Russian sample was also recruited based on the children's age criterion (regardless of their schooling experience) in order to rigorously identify the similarities or compare the differences in scaffolding interaction across the two cultures. This element provided an understanding of the differences/commonalities in their schooling and kindergarten experience along with its impact on the process of maternal scaffolding.

The main inclusion criteria were:

- Children's age: four-five years old.
- Ability to speak Russian, but not mandatory as a first language, for both mother and child.
- Parents needed a basic level of literacy in order to complete questionnaires.

Following the selection procedure, the exclusion criteria was identified as:

- Children with special education needs (SEN) would not be able to complete a range of tasks measuring their general cognitive abilities.

A total of 16 mother-child dyads were involved in the study (see Table 8.1). The children participants group consisted of 10 (62.5%) females and 6 (37.5%) males aged between four years two months and five years two months (*M*ean age 59.5 months; *SD*= .71). Mothers had a mean age of 33 years (*SD*= 7.07). The ethnic demographics of participants in the Russian group consisted exclusively of 100% white Russian families (*N*= 16). Subsequently, 100% of families had the Russian language as their mother tongue. A substantial number of mothers were married, while 18.75% (*N*= 3) were single-parent families.

18.75% of mothers (*N*=3) had a diploma equivalent to the English higher national diploma, 68.75% (*N*=11) had an undergraduate degree, and 12.5% of mothers (*N*=2) had a PhD qualification. Similar to mothers, the majority of fathers held of an undergraduate degree (76.9%, *N*=10), while only 7.7% [2](*N*= 1) of fathers had the equivalent of an English A-Level qualification and 15.4% (*N*= 2) held a higher national diploma or its equivalent. The absence of participants with a Master's degree could be explained by the fact that the Russian Federation only introduced a two-tier education (bachelor and master) in October 2007 in line with the Bologna Process, so most of the parents would have already finished their higher education with a qualification higher than Bachelor but lower than Masters, entitled 'Specialist'.

Only a quarter of mothers (*N*=4) were 'stay at home' mothers, while 25% of mothers (*N*=4) worked part-time and 50% worked full time. 100% (*N*=13) of fathers worked full-time, between 40 and 70 hours a week. The same type of scheme (Hughes & Ensor, 2009) that was implemented among the English sample was used to code the Russian parents' occupations.

Only one mother (6.2%) was categorised as unskilled labour, and 12.5% (*N*=2) held a job that required a particular set of skills. A quarter of mothers (*N*=4) held their most recent occupation as a technical or administrative role and finally, a substantial number of mothers- 56.3% (*N*=9) had a managerial or professional occupation. The distribution of the types of the occupations observed among fathers had a similar pattern. An equal number of jobs requiring skilled labour and technical/administrative duties were held by 18.8% of fathers (*N*=3) while seven fathers (43.8%) had managerial or professional trade.

The mean number of people living in the participants' household was *M*=4.2 (*SD*= 1.07) while the number of rooms was *M*= 2.01 (*SD*= .77). Regarding the family structure,

[2] Fathers N= 13

50% (*N*=8) of children did not have any siblings, 25% (*N*= 4) of children had one sibling, and 25% (*N*=4) had two or more siblings.

In contrast to the English sample, Russian mothers on average were approximately five years younger than mothers recruited in England. A significant difference was the diversity of the sample groups - while the English sample consisted of a variety of ethnic groups, all Russian participants belonged to the same ethnicity. There was a more substantial percentage of single-parent households in the Russian sample compared to the English. The level of education was also distributed somewhat differently due to dissimilarities that exist in the educational set up. However, the proportion of participants that gained a level of higher education among families (mothers and fathers) in both countries were relatively similar. In Russia, the percentage of working mums was significantly higher than in England. The same pattern was identified across both countries related to parental occupations. The similarities in education and occupation suggested that participants in Russia and England belong to comparatively the same economic class.

Finally, the number of people that lived in the household was the same and equals approximately four people. Data showed that household space was organised differently in Russia. People were more likely to live in an apartment, and often rooms are used as a sleeping and living space at the same time, therefore, instead of the number of bedrooms, the total room number was gathered. Moreover, even the total number of rooms (*M*= 2.01, *SD*= .77) of the average household in the Russian sample was substantially smaller than the average number of bedrooms in participants' houses in England (*M*=3.47, *SD*= .94) which indicated a higher over crowdedness among Russian families.

Table 8.1

Demographic characteristics for Russian (N=16) and English sample groups (N=68)

Demographic characteristic	*Russian sample*	*English sample*
Sample size	16	68
Child's characteristics		
Age	59.5 (.71)	60.3 (3.99)
Gender female (%)	62.5% (N=10)	35% (N=24)
Gender male (%)	37.5% (N=6)	65% (N=44)
Mother's characteristics		
Age	33.00 (7.07)	38.1 (4.65)
Language		
Testing was conducted in original language of participants (%)	100% (N=16)	73.5% (N=52)
Second language (%)	0% (N=0)	26.5% (N=16)
Marital status		
Married (%)	81.25% (N=13)	95.6% (N=65)
Single (%)	18.75% (N=3)	4.4% (N= 3)
Education		
Less than university degree (%)	18.75% (N=3)	16% (N=11)
Undergraduate degree (%)	68.75% (N=11)	38% (N=26)
Postgraduate degree (%)	12.5% (N=2)	45% (N=31)
Work commitments		
No work commitments (%)	25% (N=4)	44.1% (N=30)
Part-time work (%)	25% (N=4)	42.7% (N=29)
Full-time work (%)	50% (N=8)	13.2% (N=9)
Occupation		
Unskilled labour (%)	6.2% (N=1)	5.9% (N=4)
Skilled labour (%)	12.5% (N=2)	13.3% (N=9)
Administrative/technical occupations (%)	25% (N=4)	27.9% (N=19)
Managerial/professional occupations (%)	56.3% (N=9)	52% (N=36)
Contextual Factors		
People live in household	4.2 (1.07)	4.0 (.77)
Rooms in household	2.01 (.77)	3.47 (.94)
Family structure		
No siblings	50% (N=8)	17.6% (N=12)
One sibling	25% (N=4)	64.8% (N= 44)
Two or more siblings	25% (N=4)	17.6% (N=12)

Mean scores with SD in brackets/ Numbers of participants with percentages in brackets

8.3 Administration procedure

For the cross-cultural study, a comparison of the processes occurring during the scaffolding interaction at home in Russia and England was conducted. It was fundamental to ensure that procedures and methods used in both studies were identical.

All families recruited for Stage IV were visited at home to guarantee the naturalistic settings for the mother-child dyads and make them as comfortable as possible. Each testing session commenced with an introduction to the study and clarifications of questions, concerns or issues participants had.

The duration of the home visit lasted approximately 90 minutes. Participants themselves chose the location of testing; usually, it was the area where the dyad would typically engage in similar educational activities. Prior to the home visit, the researcher agreed that siblings, if present during the testing session, would be occupied and minimally involved in the session.

The two-part testing procedure was adopted from Stage I / Stage II (study conducted in England). Firstly, the observation of the mother-child scaffolding interactions and the picture task took place. The role of the researcher was limited to recording these interactions with minimal engagement, unless it was required, such as answering questions about the tasks. Secondly, mothers completed self-reports about their emotional abilities and parenting life and reports about the household environment and child's emotional and behavioural adjustment. Meanwhile, the researcher assessed a number of person child characteristics. The assessment order and types of tasks within each part of testing were counterbalanced.

At the end of the home visit, each family was debriefed and had a chance to ask relevant questions about the study and results.

8.4 Measure reliability

The internal consistency of the quantitative measures used at the Stage IV was evaluated by Cronbach's α and presented in the Table 8.2. Overall, an acceptable level of internal consistency was identified for a majority of variables, however a few subscales had Cronbach's α noticeably lower level than in Stage I/II (English study) or Stage III (the measure adaptation for the Russian population). Specifically, two subscales of SDQ: emotional symptoms (α= .35) and peer problems (α= .10) of the child and one subscale of ERC: emotion regulation (α= .22). These potentially could be explained by the uniqueness of the sample group (for example, demographics or sample size (*N*=16) as Cronbach's α is a representation of the scores on a measure from a specific sample of respondents. Due to the low reliability of these variables, they were excluded from further analyses.

Table 8.2

The internal consistency for person and contextual characteristics in Russia (N=16)

Variables	*Cronbach's α*
Mother's Person Characteristics	
Parenting	
Expression of affection	.93
Parenting stress intensity	.83
Parenting stress frequency	.48
Emotional abilities	
Emotion Intelligence	.76
Reappraisal	.88
Suppression	.73
Child's Person Characteristics	
Behavioural adjustment	
Hyperactivity/ inattention	.62
Emotional symptoms	.35
Conduct problems	.62
Peer problems	.10
Pro-social behaviour	.77
ERC	
Lability/Negativity	.71
Emotion Regulation	.22
Contextual factors	
CHAOS-SF	
CHAOS-SF: Total Score	.67

8.4.1 Reliability of coding schemes

Analyses of Scaffolding Tasks

The mother's, child's and dyadic behaviour during the joint problem-solving activity was observed and coded on a 5-point Likert scale ranging from 1- low to 5-high. In order to analyse scaffolding interactions between the Russian mother-child dyads, the final version of the scaffolding coding scheme developed for Stage I was utilised and back-translated into the Russian language.

The mother's behaviour was coded using five dimensions: quality of instruction, positive affect, negative affect, contingency and over-control. The child's behaviour during the scaffolding interaction was judged against seven dimensions: positive affect, negative affect, on task behaviour, amount of help required, noncompliance, autonomy and level of difficulty. Finally, dyadic behaviour was represented by two dimensions: intersubjectivity and conflict.

Due to the small sample recruited in the Stage IV (N=16), it was decided to increase the percent of the double-coded data required for the reliability analyses; specifically, 50% (32 videos) of all scaffolding interactions observed by two coders. The researcher-collaborator was introduced to the coding scheme and trained to use it during the observation of videos gathered during the pilot testing of the scaffolding tasks. Any disagreements during the process of double-coding were solved through discussion. The level of inter-rater reliability was assessed through the intraclass correlation (ICC) computed by Pearson correlation analyses. The results were acceptable and ranged between good and excellent (Cicchetti, 1994), statistically significant and above .79 (see Table 8.3).

Table 8.3

Inter-rater reliability for the observed behavioural dimensions of scaffolding in Russia (N=16)

Behavioural dimensions	*ICC*
Mother's Scaffolding Behaviour	
Quality of instruction	.92
Contingency	.96
Positive Affect	.87
Negative Affect	.87
Over-control	.90
Child's Scaffolding Behaviour	
Level of difficulty (time)	.99
Amount of help required	.98
On Task	.95
Autonomy	.88
Positive Affect	.98
Negative Affect	.86
Non-compliance	.90
Dyad's Scaffolding Behaviour	
Intersubjectivity	.79
Conflict	1

Analyses of Picture Task

Each verbal interaction during the picture tasks was video recorded and later transcribed. To analyse the transcripts, the same coding scheme (Ruffman et al., 2002) that was used among the English sample was adopted. This coding scheme assessed utterances including the task-based behaviour of the child or the elements of the picture. These utterances might have incorporated multiple categories of mental state talk.

Participants' mental state talk was coded with five mental state categories (desire- желания, emotion- эмоции, modulation of assertion- степень утверждения, cognitive- когниции and other mental state- иные психические состояния) and one non-mental state category. The desire utterances referred to states of wishing or liking something such as 'want' – 'хотеть' and 'love'- 'любить'. The states represented diverse emotional categories based on internal affective terms such as 'happy' – 'счастливый', 'angry'- 'злой', 'sad'- 'грустный'. The modulation of assertion states referred to some level of doubt, e.g. ‘seems’- ‘кажется’, ‘maybe’- ‘может быть’. Finally, the cognitive category included speech signified thoughts and knowledge (‘думать', ‘знать', ‘помнить'). The other mental states related to terms like ‘remember’- ‘помнить', ‘dream’- ‘мечтать', ‘imagine’- ‘воображать’. Other utterances were coded as a non-mental state category.

There are a number of cross-cultural studies featuring participants from non-Western cultures (Doan & Wang, 2010; Taumoepeau, 2015; Wang, 2006) that utilised the mental state talk coding scheme (Ruffman et al., 2002) described above. In the present study, the procedure of data coding was adopted from the cross-cultural study by Doan and Wang (2010), specifically, data was coded in the original language. Thus, all data collected in Russia was coded by a native Russian speaker. The training procedure ensured that the same definitions of the mental state categories that were used to code the English dataset were applied against the Russian data. Finally, a bilingual coder (the author) independently coded the Russian dataset again in order to test the reliability.

The picture task inter-rater agreement was achieved by calculating Cohen’s Kappa for 100% (N=16) of data which was double-coded by two trained coders. The level of inter-rater reliability was high, and Cohen’s Kappa fluctuated between .94 and 1. In particular, Cohen’s k for cognitive mental states category was .99, for emotion mental states .96, for desire mental states 1, for modulation of assertion .93, for other mental states 1, finally, for non-mental states .98.

8.5 Preliminary analyses

Table 8.4 demonstrates the descriptive statistics (means, standard deviations and range values) for all observed and measured variables in Russia (N= 16) and in England at Time 1 (N= 68).

Table 8.4

Descriptive statistics for behavioural dimensions of scaffolding, person and contextual characteristics in Russia (N=16) and England (Time 1; N= 68)

Variables	*Russia*			*England*		
	Mean	*SD*	*Observed Range*	*Mean*	*SD*	*Observed Range*
			Mother's Scaffolding Behaviour			
Quality of instruction	4.23	.63	2.75- 5.00	3.91	.58	2.33- 5.00
Contingency	4.13	.62	3.00- 5.00	3.73	.56	2.25- 4.75
Positive Affect	3.00	.84	2.00- 4.75	2.80	.70	1.50- 4.50
Negative Affect	1.25	.40	1.00- 2.50	1.21	35	1.00-2.67
Over-control	1.81	.75	1.00- 3.75	1.97	.71	1.00- 4.50
			Mother's Person Characteristics			
Education	5.88	1.15	4.00- 8.00	6.19	1.36	2.00- 8.00
Parenting						
Expression of affection	4.08	.93	2.94- 6.89	3.88	.44	3.11- 5.00
Parenting stress frequency	1.76	.24	1.30- 2.15	2.01	.31	1.20- 2.70
Parenting stress intensity	1.93	.50	1.00- 2.85	2.18	.52	1.00- 3.60
Emotional abilities						
Emotion Intelligence	5.37	.48	4.23- 6.17	5.42	.59	4.07- 6.50
Reappraisal	5.05	1.08	3.00- 6.60	5.11	1.04	2.00- 7.00
Suppression	3.08	1.17	1.25- 5.25	2.75	.94	1.00- 4.75
Mental State Talk						
Cognitive States	.09	.06	.00- .21	.24	.10	.02- .49
Emotion States	.13	.08	.05- .32	.13	.07	.01- .33
Desire States	.03	.03	.00- .10	.05	.03	.00- .15
Modulation of assertion States	.09	.06	.00- .24	.07	.05	.00- .23
Other Mental States	.04	.04	.00- .19	.02	.02	.00- .11
			Child's Scaffolding Behaviour			
Level of difficulty (time)	196.53	81.06	60.50-393.50	211.63	62.19	112.50-402.00
Amount of help required	2.78	.63	1.50- 3.75	2.78	.57	1.67- 4.00
On Task	4.55	.66	2.50- 5.00	4.53	.44	3.50- 5.00
Autonomy	3.66	.72	2.25- 5.00	3.75	.61	2.25- 4.75
Positive Affect	2.69	.81	1.25- 4.25	2.11	.67	1.00-3.75
Negative Affect	1.16	.38	1.00- 2.50	1.30	.38	1.00- 3.00
Noncompliance	1.45	.53	1.00- 3.00	1.40	.35	1.00- 2.67
			Child's Person Characteristics			
Age	55.56	3.85	50.00- 62.00	60.32	3.99	51.00- 69.00
General cognitive abilities						
Working memory	2.81	.68	1.50- 3.50	3.66	.97	2.00- 5.50
Verbal fluency	9.42	1.90	6.67- 13.67	10.46	2.11	4.00- 16.33
Behavioural adjustment						

Variables	*Mean*	*SD*	*Observed Range*	*Mean*	*SD*	*Observed Range*
Hyperactivity/ inattention	.71	.39	.20- 1.60	.77	.46	.00- 1.60
Conduct problems	.30	.22	.00- .80	.33	.26	.00- 1.00
Pro-social behavior	1.35	.45	.40- 2.0	1.63	.34	.60- 2.0
Emotional abilities						
Emotion recognition	.70	.13	.38- .88	.60	.16	.13- .94
Lability/Negativity	1.69	.26	1.20- 2.07	1.77	.28	1.13- 2.47
Social understanding						
Theory of Mind	3.44	1.46	1.00- 5.00	3.65	1.63	.00- 5.00
Cognitive States	.03	.04	.00- .15	.03	.04	.00- .13
Emotion States	.08	.06	.00- .19	.09	.07	.00- .38
Desire States	.02	.03	.00- .06	.03	.04	.00- .30
Modulation of assertion States	.06	.05	.00- .19	.02	.03	.00- .10
Other Mental States	.01	.02	.00- .06	.01	.02	.00- .10
Dyadic behaviour						
Intersubjectivity	3.91	.49	3.25- 4.75	3.69	.56	2.00- 4.75
Conflict	1.00	0	1.00- 1.00	1.04	.12	1.00- 1.67
Contextual factors						
Household chaos	2.06	.61	1.33- 3.83	2.11	.51	1.00- 3.50
Crowding index	2.21	.99	1.00- 5.00	.89	.25	.33- 1.33
Younger siblings	.13	.34	.00- 1.00	.28	.48	.00- 2.00
Older siblings	.63	.81	.00- 2.00	.74	.59	.00- 2.00
Total number of siblings	.75	.86	.00- 2.00	1.01	.64	.00- 3.00

All variables measured among the Russian sample group were examined for normal distribution using Kolmogorov-Smirnov and Shapiro-Wilk tests, along with the assessment of skewness and kurtosis (Appendix K: Tables K.1-K.2). The assumption of normality was not met for two out of five dimensions of the mother's behaviour, specifically maternal negative affect and over-control. A similar tendency was revealed when the child's dimensions, such as negative affect, on task behaviour and noncompliance, were not-normally distributed (except dimensions of autonomy and level of difficulty). These results corresponded with the results obtained by the normality tests among the English sample group. Thus, as variables were not normally distributed, further analyses were required to be non-parametric.

It was also identified that some of the child's variables were not-normally distributed, specifically working memory, theory of mind and aspects of mental state talk (cognitive, desire and other). On the other hand, almost all maternal variables were normally distributed, except education, emotion and other mental state talk. Also, the number of children (younger, older and total number) in the household was not-normally distributed.

Corresponding with previously conducted analyses for the English sample (see Chapter 5-6), gender related differences were tested among the following variables: maternal scaffolding behaviour (quality of instruction, contingency, positive affect, negative affect and over-control), dimensions of the child's behaviour (level of difficulty, amount of help required, autonomy, on task, positive/ negative affect and noncompliance) and the child's related variables, specifically parenting aspects (expression of affection and parenting stress), child's person characteristics (general cognitive and emotional abilities, social understanding) and finally, contextual factor (household chaos). Earlier it was identified that some of these variables were not-normally distributed, thus the Mann-Whitney U-test was employed to compare two independent sample groups.

The results of the Mann-Whitney U test between the two gender groups (male N= 6, female N= 10) suggested that significant gender differences were not identified in either the mother's nor the child's behaviour during problem-solving interactions. Except for maternal quality of instruction (p> .05), mothers provided better instruction techniques for girls than for boys. Also, significant differences based on the children's gender were identified in the mother's use of emotion mental states (p> .03), with the same direction as the maternal quality of instruction.

8.6 The nature of scaffolding interaction in the Russian sample

Observation of 64 scaffolding interactions (four interactions per family), which included 16 mother-child dyads in Russia, is a relatively small-scale study in order to understand the nature of scaffolding interactions within the Russian population which could later be used for more in-depth investigation. The limitation of the sample size reduced the opportunity to understand any bidirectional influences of maternal scaffolding on the dimensions of the child's behaviour and vice versa during problem-solving situations. However, it still provided some level of understanding of the relationship between the mother's and child's behaviour and the links between these behavioural dimensions and dyadic intersubjectivity. The Spearman's Rank correlation coefficient was utilised to investigate these relationships. This type of analysis is a nonparametric statistical tool that tests the correlation between the ranks of two variables. While this test is recognised as a measure of the monotonic relationship between variables, it was also suitable to accommodate a small sample size and to identify the patterns between the study variables (Field, 2013).

Table 8.5 demonstrates the relationship between the dimensions of the behaviour of the mother, child and both of them together as a dyad. The results of the Spearman correlation indicated a significant negative association between the maternal quality of instruction and her negative affect (rs= -.57, p < .05). Also, it was suggested that maternal over-control behaviour was highly negatively correlated with contingency (rs= -.75, p < .01) and positivity (rs= -.56, p< .05) during scaffolding interactions. Specifically, Russian mothers, who provided a better quality of instruction were less negative in the joint problem-solving interactions with their children. Moreover, mothers who used more appropriate scaffolding techniques and were more positive were less likely to display over-control behaviour.

On the other hand, children who spent more time completing the task with their mother were less concentrated on the task (rs= -.51, p < .05) and more negative (rs= -.71, p< .01). Furthermore, it was identified that the amount of help required to complete the task was strongly negatively related to the child's on task behaviour and positively with noncompliance. Interestingly, noncompliance also negatively related to the child's ability to concentrate on the task (rs= -.68, p< .01) and moreover, it was positively linked with children's negative affect observed during learning interactions at home (rs= .56, p< .05).

The Spearman correlation analyses revealed that the maternal quality of instruction was positively associated with the amount of help required by the child in order to complete the tasks (rs= .55, p< .05). Specifically, the mothers who provided poor quality instruction were likely to have children who needed more support in task accomplishment. Furthermore, the maternal contingency correlated to the child's autonomy (rs= .55, p< .05). In particular, mothers who were able to provide an appropriate level of support during scaffolding interactions had children who displayed autonomous behaviour.

Moreover, higher maternal positive affect related to higher child's positivity (rs= .50, p< .05) and lower child's on task behaviour (rs= -.59, p< .05). Neither maternal negative affect nor over-control behaviour were linked with dimensions of the child's behaviour during scaffolding interactions among the Russian participants.

Finally, only maternal quality of instruction (rs= .65, p< .01) and contingent behaviour (rs= .59, p< .05) were positively associated with dyadic intersubjectivity, while none of the child's behavioural dimensions were significant.

8.6.1 Comparison of associations within scaffolding interaction between Russia and England

A similar analysis was conducted earlier to test the relationship between the dimensions of the behaviour of the mother, child and both of them together as a dyad among English participants (Chapter 5, Table 5.2). However, to test these relationships, the Pearson correlation analysis was used as opposed to Spearman's rank correlations. To ensure that the process of comparison is rigorous, the Spearman's rank correlations were calculated for the English sample and, as it showed very similar results to the initial analyses, it was decided to proceed with a comparison to the original results obtained by the Pearson correlation analysis.

Maternal scaffolding behaviour. In comparison to results obtained among the English sample, only two relationships were identified in the analyses of maternal scaffolding behaviour. Specifically, mothers who provided a better quality of instruction had less negativity and more appropriate use of scaffolding associated with less controlling behaviour.

Interestingly, in Russian mothers group, a strong, significant relationship between the quality of instruction and contingency was not identified at all. Moreover, it was observed that controlling behaviour and quality of instruction was not negatively associated with each other. For example, mothers who exhibited highly controlling behaviour also used questioning and precise explanations in parallel with each other.

Furthermore, the results obtained from the Russian sample contained no evidence that mothers who display more negative affect use less appropriate scaffolding or were less positive as it was identified among English mothers. Finally, only among the Russian sample was it identified that mothers who displayed more warmth and encouragement were less controlling.

Child's behaviour in scaffolding interactions. In relation to the child's behaviour during problem-solving situations, there were a few patterns revealed by similar results in Russia and England. In particular, children who were able to concentrate on the task required less time and support from their mother to complete it. Children who were more positive and responsive to their mother were less negative towards them. Finally, children who displayed higher levels of noncompliance were more negative and displayed less on task behaviour.

Also, a few differences were identified between the child's behaviour observed in scaffolding interactions among the Russian and English sample groups. In the Russian sample group, it was suggested that the child's negative affect was related to a higher level of task difficulty and noncompliance was linked with large amounts of help required to finish the task. Comparatively, by testing the English sample group, it was established that the children who spent more time on the task and needed more help were less independent and had higher positivity. Moreover, children who could concentrate on the task were more autonomous and required less help from their mothers. Finally, English children who displayed more negative affect also displayed less on task behaviour during learning at home interactions with their mothers.

Examination of bidirectional relationship between the behavioural dimensions of mother and child. Similarities across both countries were established through two links between the mother's and child's behaviour as displayed during problem-solving interactions. Specifically, mothers who used contingent behaviour were most likely to have children who were able to act autonomously. Also, positive, warm and responsive mothers had children who were also positive. Additionally, there was another significant relationship between the maternal quality of instruction and the amount of help required. However, in the Russian sample, this relationship was positive, while in English it was negative.

On the other hand, another negative association specific to the Russian sample group was observed between maternal positive affect and the child's on task behaviour. Meanwhile, the number of identified correlations between maternal scaffolding and the child's behaviour of the English participants were more significant. For example, mothers who were controlling and transferred less responsibility for the task accomplishment had children who needed more help, were less autonomous and displayed less concentration on the task during the scaffolding interaction. Furthermore, maternal disapproval or rejection of the child was linked with an increased amount of time the child spent on completing the task and the lower on task behaviour observed during the tutoring interaction at home. Finally, lower appropriate use of scaffolding techniques used by the mother were related to more time and support the child required to accomplish the problem-solving task.

In the English sample, dyadic intersubjectivity was associated with almost all behavioural dimensions of the mother and child (except for the child's level of difficulty and noncompliance). While testing the Russian sample, only maternal quality of instruction and contingency were significantly related to the mutual understanding of the mother and child.

Table 8.5

Correlation between behavioural dimensions of scaffolding interactions in Russia (N= 16)

	Variables	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*
1	Maternal Quality of instruction	-												
2	Contingency	.39	-											
3	Positive Affect	.16	.38	-										
4	Negative Affect	-.57*	-.47	-.40	-									
5	Over-control	-.34	-.75**	-.56*	.42	-								
6	Child's level of difficulty (time)	.27	.23	.34	-.31	-.14	-							
7	Amount of help required	.55*	-.05	.34	-.33	.04	.44	-						
8	Autonomy	-.10	.55*	.19	-.08	-.49	-.21	-.47	-					
9	On Task	-.32	-.19	-.59*	.20	.25	-.51*	-.60*	.03	-				
10	Positive Affect	-.42	.09	.50*	.22	-.09	-.36	-.17	.18	-.11	-			
11	Negative Affect	.22	.21	.12	-.25	-.25	.71**	.38	-.16	-.28	-.52*	-		
12	Noncompliance	.10	.03	.35	-.08	-.18	.41	.53*	.09	-.68**	-.08	.56*	-	
13	Dyad Intersubjectivity	.65**	.59*	.05	-.31	-.40	.04	.15	.31	-.19	-.14	-.09	-.03	-

**p*<.05, ** *p*<.01

8.7 Characteristics associated with mother and child behaviour in the Russian sample

Similar with the previous analyses, due to the small sample size of the Russian group (*N*=16), the Spearman correlation analyses was used to test the relationship between the behavioural dimensions displayed during scaffolding interactions and the number of mother, child and contextual variables measured during the home visit in Russia (see Table 8.6). The connections identified between the scaffolding behaviour of the mother and the variables examined is highlighted followed by the association between the child's dimensions with the same variables.

The Spearman correlation analyses revealed that mothers who, during tutoring interaction with their child, use more sophisticated ways of explanation, guidance and questioning of the task, interestingly, used less mental states from the category 'other' in their speech (rs= -.50, p< .05). Furthermore, mothers who were more negative (rs= -.75, p< .01) and controlling in the scaffolding of their child (rs= -.50, p< .05) had children with lower levels of emotion regulation, in particular, lability/negativity.

Meanwhile, maternal level of education was positively correlated with contingency and negatively correlated with maternal negative affect and over-control. Specifically, mothers who had higher levels of education were able to use more appropriate scaffolding to support their child (rs= .66, p< .01), were less negative (rs= -.57, p< .05) and less controlling (rs= -.59, p< .05). Furthermore, mothers who had a higher level of emotional intelligence displayed less negative affect (rs= -.52, p< .05).

Interestingly, maternal use of desire mental states was positively related to negative affect (rs= .61, p< .05) and negatively with positive affect (rs= -.55, p< .05). Also, the mother's use of the modulation of assertion states was significantly linked with over-control behaviour (rs= .50, p< .05).

Finally, only one contextual factor related to maternal scaffolding behaviour was observed in Russia. Mothers who had older children displayed less positivity, encouragement and warmth with the child-participant during problem-solving situations (rs= -.52, p< .05).

In relation to the child's behaviour observed during scaffolding interactions, it was identified that aspects of the child's behavioural adjustment were significantly related to dimensions of behaviour. Specifically, children who scored higher on the scale of conduct problems took less time to complete the task (rs= -.65, p< .01) and displayed less negative affect ($rs = -.61$, $p < .05$) during the tutoring interactions at home. Furthermore, the child's pro-social behaviour negatively related to observed negativity ($rs = -.50$, $p < .05$).

Similarly, the child's emotional abilities related to the behavioural dimension observed during the scaffolding process. In particular, children who were able to successfully recognise the emotions of other people required less time ($rs = -.56$, $p < .05$) and support from their mothers to complete the task ($rs = -.76$, $p < .01$) and were more able to remain on task ($rs = .68$, $p < .01$).

Finally, the child's behaviour was found to correlate with aspects of their mental state talk. As such, children who used more cognitive mental states ($rs = .55$, $p < .05$) and modulation of assertion mental states in their speech ($rs = .50$, $p < .05$) were more likely to concentrate, to be persistent and energetic about the task.

There were only two maternal person characteristics correlated with dimensions of the child's behaviour observed during the scaffolding process. Use of emotion mental states by the mother was negatively associated with the child's positive affect ($rs = -.54$, $p < .05$). Specifically, mothers who more often used mental states with reference to their emotions had children who displayed less positivity during their joint learning interaction. However, the use of mental states from the category 'other' by the mother positively related to the child's level of difficulty ($rs = .53$, $p < .05$) and noncompliance ($rs = .64$, $p < .01$).

Finally, the child's autonomy negatively related to the number of siblings (younger, older and total number of siblings), suggesting that children were less likely to act independently if they had siblings. However, children who had more older siblings were more likely to concentrate on the task ($rs = .61$, $p < .05$) and display less noncompliance behaviour ($rs = -.56$, $p < .05$).

8.7.1 Comparison of the patterns of association in Russia and England

During the initial analyses presented in Chapter 5, it was identified that maternal quality of instruction and contingency were highly correlated as were the child's dimensions - amount of help required and autonomy. Thus, composite scores for these two pairs of statistically related variables were calculated. In further analyses (see Chapter 6) child's negative affect was excluded as this behaviour was not stable across two time points. Therefore, through these analyses, the original five variables (maternal quality of instruction, maternal contingency, child's amount of help required, autonomy and negative affect) were reduced to two variables (maternal scaffolding strategy and child's autonomy). These new variables were used to explore the relationship between behavioural dimensions displayed during scaffolding interaction, person characteristics and contextual factors among the English sample group (see Chapter 6).

However, the analyses between behavioural dimensions observed during scaffolding interactions in Russia did not identified similar links between behavioural dimensions (see Table 8.5). As a result, the calculation of the composite scores between two set of variables (1. maternal quality of instruction and maternal contingency, 2. child's amount of help required and autonomy) was not possible. Therefore, in order, to achieve a more precise pattern comparison between the two countries, it was decided to utilise the Spearman correlation analyses across all behavioural dimensions, including the original five variables (maternal quality of instruction, maternal contingency, child's amount of help required, autonomy and negative affect), as per the Russian sample group, for analysis of the English sample (see Table 8.7). The results of two tests were then compared.

Table 8.7 illustrates a more significant number of relationships between the maternal scaffolding behaviour, person characteristics and contextual factors, with fewer significant correlations between these variables and the child's behaviour observed during learning interactions at home within the English sample at Time 1.

It was identified that children with higher levels of emotion regulation had mothers who provided more sophisticated techniques of explanation ($rs= .42, p< .01$) and support ($rs= .27, p< .05$) during joint problem-solving. This finding is particularly interesting as these results were not established among the Russian participants. However, another aspect of the child's emotion regulation (lability/negativity) was negatively associated with maternal negative affect and controlling behaviour. It suggested that, in England, mothers' scaffolding is associated with the child's ability to manage emotion while in Russia, maternal rejection/ disapproval and over-control was linked with the child's difficulty to deal with their emotions successfully. Also, in England, mothers who displayed more positive affect while assisting their child in task-solving had children with higher levels of hyperactivity ($rs= .29, p< .05$) and pro-social behaviour ($rs= .30, p< .05$). Finally, mother's negativity, disapproval or rejection was associated with the child's lower level of theory of mind ($rs= -.25, p< .05$).

Maternal quality of instruction correlated with each of the tested domains (cognitive, emotional and social abilities). Specifically, mothers who provided a high quality of questioning and instruction were more educated (*rs*= .36, *p*< .01), with a higher level of emotional intelligence (*rs*= .45, *p*< .01) and used a larger number of cognitive (*rs*= .45, *p*< .01), emotion (*rs*= .36, *p*< .01) and modulation of assertion mental states (*rs*= .28, *p*< .05) in their speech. Interestingly, the use of cognitive mental states by the mother was associated with almost every aspect of scaffolding behaviour except for over-control. Maternal contingency, similar to the dimension of quality of instructions, was related with the level of education (*rs*= .30, *p*< .05) and emotional intelligence (*rs*= .33, *p*< .01). Additionally, contingency was linked with aspects of parenting, specifically, mothers who used more appropriate ways to scaffold their child scored higher on the scales of affection (*rs*= .25, *p*< .05) and experienced lower levels of parenting stress (*rs*= -.24, *p*< .05).

While levels of education and traits of emotional intelligence were both related to dimensions of maternal scaffolding behaviour across two countries, the patterns of these correlations were not precisely the same. Generally, in Russia, it was identified that these variables were linked with negative aspects of scaffolding behaviour, specifically negative affect and over-control as opposed to constructive behaviour (quality of instruction and contingency). The exception was the positive relationship between contingency and level of education which was similar across both countries.

Finally, it was determined that mothers who had more older children display more controlling behaviour with their participating child (*rs*= .31, *p*< .05).

Regarding dimensions of the English child's behaviour during scaffolding interactions with their mother at Time 1, the amount of required help by the child and the level of their autonomy were related to their general cognitive and social abilities. Meanwhile, children were more likely to concentrate on the tasks when they had a higher level of verbal abilities (*rs*= .26, *p*< .05). Interestingly, the child's negativity observed in the Russian sample was not related to this aspect of behavioural adjustment; however, it negatively correlated with conduct problems and pro-social behaviour. Also, for Russian children, general cognitive abilities were not significant for the dimensions of behaviour, but emotional recognition was, while in England the opposite was true.

Maternal use of mental states in their day-to-day talk was significantly associated with the child's on task behaviour and positivity. Children who were more positive during scaffolding interactions had mothers who mentioned less mental states from the 'other' category. In the Russian sample, that was somewhat different as more positive children had mothers who used less emotion mental states in their speech.

Finally, the amount of help required by the child (*rs*= .31, $p < .05$), their autonomy (*rs*= -.26, $p < .05$) and on task behaviour (*rs*= .25, $p < .05$) related to the total number of siblings in the household. Also, it was suggested that children were more noncompliant when their household was identified as chaotic (*rs*= -.25, $p < .05$).

The Spearman correlation analyses for testing data from two countries identified only two similar relationships between behavioural dimensions and person and contextual variables. Specifically, consistent with previous research (Carr & Pike, 2012; Lowe et al., 2013; Neitzel & Stright, 2004), both Russian and English mothers who had higher levels of education were able to use more appropriate and contingent strategies to support their child during problem-solving interactions (Russia: *rs*= -.66, $p < .01$; England: *rs*= .30, $p < .05$). Furthermore, children, who had more older siblings were less independent while completing the tasks with their mother (Russia: *rs*= -.68, $p < .01$; England: *rs*= -.26, $p < .05$).

To sum up, the small-scale comparison showed minimal similarities in the patterns of relationship between the dimensions of behaviour and person/contextual characteristics across Russia and England.

Table 8.6

Correlation between behavioural dimensions of scaffolding, person and contextual characteristics in Russia (N=16)

Variables	*QI*	*C*	*PA*	*NA*	*OC*	*LD Time*	*AH*	*A*	*OT*	*PA*	*NA*	*N*
						Child's variables						
Working memory	-.15	.21	.15	.08	-.03	.08	-.30	.45	.31	-.12	.22	.06
Verbal Fluency	-.01	.28	.30	.21	-.05	-.19	-.04	.14	.03	.47	-.02	.01
Hyperactivity/ inattention	.35	.25	-.29	-.30	-.03	.25	.20	.04	-.42	.10	-.26	.09
Conduct problems	-.11	-.22	.46	-.07	-.05	-.65**	-.44	.21	.24	.36	-.61*	-.41
Pro-social behaviour	.13	.10	.14	.04	.33	-.25	-.07	.05	.13	-.06	-.50*	-.39
Emotion recognition	-.33	.18	-.16	.38	-.18	-.56*	-.76**	.38	.68**	.25	-.26	-.48
Lability/Negativity	.27	.33	.07	-.75**	-.50*	.34	.13	.07	-.21	0	.18	-.01
Theory of mind	-.36	-.10	-.25	-.02	.13	.09	-.08	-.19	.01	.30	.32	.12
Cognitive Mental States	-.16	.03	.16	-.07	-.06	-.21	-.05	-.04	.55*	-.25	.15	-.26
Emotion Mental States	.47	.39	.15	-.34	-.25	.09	.15	.36	-.20	-.19	.38	.25
Desire Mental States	-.19	-.13	.30	.10	-.01	-.11	.03	-.04	0	.07	-.02	-.04
Modulation of assertion Mental States	-.29	-.01	-.29	.03	.24	-.24	-.01	-.09	.50*	-.06	.01	-.24
Other Mental States	-.50*	-.31	-.23	.47	-.01	.09	-.26	-.06	-.09	.13	-.20	-.09
						Maternal variables						
Education	.43	.66**	.08	-.57*	-.59*	-.03	.17	.27	-.02	-.02	.30	.15
Expression of affection	-.21	0	-.14	.31	.11	.21	-.01	.03	-.02	-.13	.05	.04
Parenting stress frequency	.01	-.21	.02	.12	-.11	-.09	-.29	-.26	.14	.08	.06	-.19
Parenting stress intensity	.15	-.15	.22	-.32	-.22	-.02	.17	-.33	-.07	-.12	.32	-.01
Emotion Intelligence	.22	.14	-.00	-.52*	-.02	.07	.14	.05	.09	-.22	-.22	-.10
Reappraisal	.17	.10	-.05	.03	.03	-.25	-.07	.18	.31	.14	-.29	-.12
Suppression	-.20	-.13	-.27	.01	.32	0	.07	-.34	-.07	-.19	.32	.11

Variables	*QI*	*C*	*PA*	*NA*	*OC*	*LD Time*	*AH*	*A*	*OT*	*PA*	*NA*	*N*
Cognitive Mental States	-.20	-.29	.08	-.11	.20	-.14	.07	-.03	.28	-.04	.02	-.14
Emotion Mental States	.37	-.11	-.32	.19	.14	.08	.13	.12	.14	-.54*	.26	.10
Desire Mental States	-.38	-.22	-.55*	.61*	.28	.01	-.29	-.15	.36	-.09	.07	-.18
Modulation of assertion Mental States	-.13	-.38	-.26	.11	.50*	.35	.26	-.25	-.25	-.45	.20	.24
Other Mental States	0	.09	.01	-.05	-.05	.53*	.17	.02	-.41	-.23	.37	.64**
Contextual variables												
Household chaos	.06	-.06	.15	.12	-.13	.14	-.15	-.25	.02	.12	-.16	-.29
Crowding index	.12	.14	.11	-.05	-.13	.49	-.07	-.03	.05	-.21	.14	-.12
Younger siblings	.06	-.31	.19	.11	.19	.41	.13	-.50*	-.32	-.02	.25	.08
Older siblings	-.16	-.28	-.52*	.24	.27	-.40	-.18	-.50*	.61*	-.12	-.07	-.56*
Total number of siblings	-.07	-.38	-.42	.24	.30	-.21	-.08	-.68**	.43	-.17	.08	-.46

QI- quality of instruction; C- contingency; PA- positive affect; NA- negative affect; OC- over-control; LD- level of difficulty; AH- amount of help required; A- autonomy; OT-on task; N- noncompliance

**p<.05, ** p<.01*

Table 8.7

Correlation between behavioural dimensions of scaffolding, person and contextual characteristics in England (Time 1; N=68)

Variables	*QI*	*C*	*PA*	*NA*	*OC*	*LD Time*	*AH*	*A*	*OT*	*PA*	*NA*	*N*
						Child's variables						
Working memory	.06	.04	-.16	-.07	-.02	-.18	-.31**	.12	.19	.00	-.03	-.11
Verbal Fluency	.19	.15	.06	.06	-.23	-.10	-.42**	.33**	.26*	-.08	-.08	-.17
Hyperactivity/ inattention	.11	-.10	.29*	-.16	-.07	.07	.04	-.01	0	.04	-.07	-.19
Conduct problems	-.04	-.13	.02	-.12	.08	-.11	-.02	-.13	-.16	.06	.06	-.21
Pro-social behaviour	.11	.09	.30*	.07	.10	.10	.02	.07	.07	.23	-.03	.07
Emotion recognition	.20	.15	.09	-.04	-.03	-.02	-.09	.18	.09	.14	-.05	-.16
Lability/Negativity	.02	-.14	.16	-.09	.12	.02	.07	-.01	-.23	.15	.15	-.03
Emotion Regulation	.42**	.27*	.14	-.12	-.09	.15	-.02	.00	.11	.17	.01	.09
Theory of mind	.10	.12	.08	-.25*	-.12	-.12	-.36**	.32**	.06	-.03	.10	.02
Cognitive Mental States	.09	-.06	.06	-.05	-.07	.17	.12	.14	.18	.00	-.22	-.04
Emotion Mental States	.10	.02	.02	-.11	-.17	.20	.11	.20	.08	-.04	-.22	-.01
Desire Mental States	.14	-.06	.19	.03	-.14	.11	-.11	.19	.06	.20	-.03	-.04
Modulation of assertion Mental States	-.04	-.20	.13	.03	.14	.00	-.07	.03	.03	.17	.16	-.05
Other Mental States	-.03	-.05	.01	.00	-.06	.15	.03	.11	-.08	.10	-.12	-.03
						Maternal variables						
Education	.36**	.30*	.01	-.23	-.13	-.02	-.14	.23	.09	-.20	.00	-.01
Expression of affection	-.07	.25*	.09	.11	-.12	.08	-.09	.11	.07	.03	-.07	.04
Parenting stress frequency	.19	.03	.09	-.15	-.13	-.04	-.07	-.02	-.03	.22	.09	-.09
Parenting stress intensity	-.07	-.24*	.12	-.17	.10	.12	.20	.05	-.05	.14	.10	.05
Emotion Intelligence	.45**	.33**	.13	-.07	-.12	-.01	-.07	-.05	.18	-.16	-.09	-.03
Reappraisal	.14	-.05	.10	-.09	.06	.21	.05	.04	-.01	.18	-.08	.09

Variables	*QI*	*C*	*PA*	*NA*	*OC*	*LD Time*	*AH*	*A*	*OT*	*PA*	*NA*	*N*
Suppression	-.18	.07	-.14	-.09	-.08	-.09	-.06	.17	.06	-.08	.20	.01
Cognitive Mental States	.45**	.25*	.25*	-.28*	-.08	.06	-.17	.04	.28*	-.04	-.10	-.13
Emotion Mental States	.36**	.08	.19	-.17	-.11	.23	.00	.06	-.16	.15	.06	.11
Desire Mental States	-.14	-.17	-.01	-.04	-.01	-.19	-.08	.00	-.09	.01	-.01	-.12
Modulation of assertion Mental States	.28*	-.03	-.10	-.06	.05	-.04	-.06	-.10	.04	.02	-.15	-.11
Other Mental States	-.03	.01	.10	-.18	-.06	-.17	-.05	.06	.08	-.27*	.06	-.11
Contextual factors												
Household chaos	-.06	-.17	.12	.18	.20	.04	.19	-.23	-.18	.14	-.01	-.25*
Crowding index	-.22	-.18	-.21	.09	-.12	-.08	.11	.05	-.11	.03	.09	-.21
Younger siblings	-.24	-.09	-.09	.12	-.02	.14	.23	-.14	-.22	.04	.04	-.03
Older siblings	.10	-.09	.15	.11	.31*	.10	.10	-.23	-.08	.16	.13	-.15
Total number of siblings	-.16	-.17	.04	.18	.21	.17	.31*	-.26*	-.25*	.16	.15	-.16

QI- quality of instruction; C- contingency; PA- positive affect; NA- negative affect; OC- over-control; LD- level of difficulty; AH- amount of help required; A- autonomy; OT-on task; N- noncompliance

**p<.05, ** p<.01*

8.8 Summary of findings

1. The small-scale comparison of patterns between the behavioural dimensions displayed during collaborative problem-solving interactions identified some similarities in relationships within the dimensions of maternal scaffolding behaviour, child's dimensions, inter-relationship between mother's and child's behaviour and dimensions of their behaviour in relation to dyadic intersubjectivity. For example, mothers who used contingent behaviour most likely had children able to act autonomously. Also, positive mothers had children who was also positive. However, the differences in correlational patterns were more prevalent across behaviour displayed by the mother-child dyad in both countries.
2. Comparison of the association patterns obtained from Russian and English samples identified similarities in the relationship between maternal education and the use of appropriate scaffolding techniques. Also, the same pattern was revealed between the number of older children and autonomous behaviour. The notable differences between the two cultures were observed in relationships between the dimensions of scaffolding behaviour and the children's emotion regulation. Moreover, in contrast with the English children, Russian children's cognitive abilities were not statistically significant, while an understanding of emotions in others was linked with dimensions of the child's behaviour exhibited during collaborative problem-solving.

CHAPTER 9. DISCUSSION

The learning interaction at home between the mother and child during homework-like activities was assessed as part of the complex ecological system. Such a theoretical framework provided grounds for including elements of culture (Rogoff, 1990), family (Neitzel & Stright, 2003) and the individual characteristics of both the mother and child, (Carr & Pike, 2012; Mermelshtine & Barnes, 2016; Mulvaney et al., 2006). Collaborative problem-solving was understood as a proximal process (Mermelshtine, 2016; Mulvaney et al., 2006), specifically a continuous interaction during which children engaged with their mothers and had an opportunity to promote their knowledge, skills or abilities (Bronfenbrenner & Morris, 2006).

Successful maternal scaffolding involves four essential elements, specifically, the provision of high quality instructions in a contingent manner along with positive emotional support and respect of the child's autonomy. On the other hand, scaffolding interaction is an interdependent process in which the role of the child is critical (Mulvaney et al., 2006). Thus, the complexity of the bidirectional nature of this type of interaction was explored, through an examination of the patterns that guided the aspects of behaviour evident during the interaction. Furthermore, three central elements of the bioecological theory, person, context and time, were assessed in order to investigate individual variations in the behaviour of mother and child exhibited in scaffolding interactions which was treated as a proximal process (Bronfenbrenner & Evans, 2000). Moreover, there was an attempt to learn more about the cultural variations of scaffolding practices and behaviour by adapting measures and tasks into Russian, and evaluating the pattern of behaviour identified.

The study hypotheses were partially supported by the results obtained through examination of mother-child dyads in England and in Russia. Each of the hypotheses are discussed in turn.

9.1 The nature of scaffolding interaction: interrelationships between mother and child behaviour

The observation of 68 mother-child dyads in England provided a number of findings and supported the theoretical assumption that the nature of scaffolding interactions is bidirectional (Mascolo, 2005; Pianta et al., 1991; Rogoff, 1990). To achieve such an investigation of behavioural practices, an observational coding scheme was developed. The coding scheme assumed that the child's input during a problem-solving situation is essential (Deater-Deckard et al., 1997; Mulvaney et al., 2006). Also, the coding scheme enabled an individual examination of the mother's and child's behaviour and their behaviour as a dyad together, through the assessment of verbal and non-verbal clues. The mother's behaviour was assessed using the following dimensions: scaffolding strategies (comprised of the level of quality of instruction that the mother provided to the child and her contingent behaviour during the scaffolding interaction), over-control, positive and negative affect. The child's exhibited behaviour was rated by the dimension of the child's level of difficulty, on task behaviour, autonomy (consisting of the amount of help required and autonomous behaviour), non-compliance, positive and negative affect. The high level of inter-rater agreement between the two independent coders is evidence of the reliability of the coding scheme.

The exhibited dimensions of behaviour by both the mother and child was consistent across the two time points, except for the child's negative affect. This dimension was excluded from further analyses due to the potential violation of the cross-lagged analysis's key assumption (consistency). The examination of the relationship between the dimensions revealed that mothers who used more appropriate scaffolding strategies (represented by the high quality of instruction and use of contingent behaviour) were more likely to transfer responsibility to their children for the task accomplishment at the seven months' follow-up. Furthermore, behaviour related to aspects of negative affect observed during the baseline visit was a significant contributor to the selection of poorer scaffolding strategies by the mother at the follow up visit. Similar results were discovered by Neitzel and Stright (2003), who established that maternal emotional support led mothers to use a stronger instructional manner and transfer of responsibility to the child. It is possible that the lack of emotional support could be a prerequisite of less successful scaffolding practices which, in turn, reflect the mothers' ability to transfer responsibility for the task. This is a hypothetical pattern of the relationship between the dimensions of scaffolding behaviour; the exact pattern of the predictive relationship is not clear as, similar to current research, Neitzel and Stright's (2003) research was also based on a modest sample size (N=68).

At both time points, cross-sectional analysis suggested that the child's ability to work independently led to the mother's use of more appropriate scaffolding strategies. Although the longitudinal analysis did not identify this relationship. This finding is curious, as previous research claimed an opposite direction of the relationship, specifically, maternal scaffolding predicted the child's academic competences such as the ability to work autonomously (Mattanah et al., 2005). However, these studies did not account for the child's role or behaviour in the scaffolding interaction.

Currently the predicative relationship in the child's behaviour exhibited during collaborative problem-solving remains unclear. Results suggested that children who were more able to concentrate on the task at Time 1, spent less time completing the tasks at Time 2. Furthermore, if children spent more time and therefore demonstrated a higher level of difficulty at the baseline, they were more likely to be less autonomous at the follow up visit. The research by Grolnick, Ryan and Deci (1991) supported the notion of a relationship between the children's achievement and autonomy. It is possible that children who are capable of staying on task require less time to complete it and, as a result, were able to act more independently due to experiencing success with task accomplishment previously.

Moreover, the cross-lagged autoregressive analyses, performed by hierarchical multiple regressions, revealed a reciprocal relationship between the child's autonomy and maternal over-control. As such, maternal over-control was negatively predicted by the child's level of autonomy, while child's ability to work on problem-solving situations independently was explained by less controlling mothers. However, the longitudinal analyses identified the direction of these relationships, recognising that the child's autonomy at Time 1 was a unique contributor to maternal over-control. This highlighted that autonomous behaviour was a cause of controlling behaviour approximately seven months later and not vice versa. There is a large body of research (Deci, Driver, Hotchkiss, Robbins, & Wilson, 1993; Eccles et al., 1991; Grolnick et al, 2002; Grolnick & Ryan, 1989) that examined the role of autonomy support and children's positive outcomes. Similarly, Grolnick and colleagues (2002) identified the negative impact of maternal controlling behaviour on the child's independent performance during homework-like tasks. However, as the role of the child is almost always assumed to be passive, there was no research to test the opposite relationship. It is likely that the current research may change the general understanding of principles which determine the mother's over-control behaviour, which lead to the child's negative outcome. With an account of previous findings, children who are less successful during previous problem-solving interactions, may be more dependent on their parents during the learning activities and this leads to maternal controlling behaviour as was identified in the longitudinal analyses.

Additionally, it was identified that maternal negativity during tutoring interactions determines the child's inability to act autonomously later in time. Thus, this may be a combination of the child's high level of difficulty and lack of emotional support from mother which explains why the children could not work on the task without seeking parental help and approval.

While not directly suggesting an impact of negative affect, this is still in line with current results. Leerkes and colleagues (2011) emphasised the importance of maternal emotional support during collaborative problem-solving to promote children's skills, such as help-seeking and task persistence.

Furthermore, the results suggested that more controlling mothers had children who were more compliant later in time. This finding is consistent with other research in the field. For example, Blandon and Volling (2008), identified that less controlling parental instruction during a clean-up task was a significant predictor of passive non-compliance in children of a similar age to the current sample.

Results of the cross-sectional analyses at both time points consistently identified the reciprocal relationship between maternal positive affect and the child's positive affect. Generally, the idea of parental positive affect associating with the child's positive outcomes (for example, pro-social behaviour and social competence skill) is highly discussed in the literature (Emde, Biringen, Clyman, & Oppenheim, 1991; Denham, Mitchell-Copeland, Strandberg, Auerbach, & Blair, 1997; Kochanska & Aksan, 1995). Maccoby highlighted the importance of mutual positivity in the mother-child dyads in terms of children's willingness to comply with their mother's instructions (Maccoby, 1983; Parpal & Maccoby, 1985). Furthermore, the longitudinal analysis in the current study indicated that over time, the child's higher positive affect was explained by their mother's lower negative affect, as opposed to higher positive affect. These results are suggestive of a causal relationship in which less disapproving and rejecting mothers had children who were more positive approximately seven months later and potentially related to mutual positive affect between mother and child.

While there is a limited amount of empirical evidence that could directly support the findings in the current study, there was substantial theoretical notions that stipulated that the child was an active participant of the tutoring process (Elbers, 1996; Forman & McPhail, 1993; Griffin & Cole, 1984; Palincsar, 1986; Rommetveit, 1985; Rogoff, 1990; Wertsch, 1985), who was partially responsible for the successful scaffolding interaction (Mascolo, 2005). For example, results that suggested reciprocal relationship between the child's autonomy and maternal over-control are in line with Sameroff's transactional model (Sameroff & Mackenzie, 2003). The transactional model considers parent-child relationships as a continuous process, comprised of bidirectional cumulative effects between parents and their child.

Thus, the findings provided evidence to support Hypotheses 1 and 2. The current study made an attempt to uncover the complexity of the relationship between the mother's and child's behaviour during the collaborative problem-solving interaction. With a greater understanding of the processes occurring within scaffolding interactions, this new knowledge could be utilised as part of an intervention for parents to teach them how to more efficiently provide support and help promote the academic success of their child. For example, simple recommendations could be provided as a leaflet distributed in the children's centre, welcome days at primary schools or an online video to guide parents.

9.2 The role of intersubjectivity in scaffolding interaction

In relation to the dyad's intersubjectivity, the results of cross-sectional analyses at both time points consistently suggested a reciprocal relationship between the mother's behaviour and intersubjectivity. Specifically, at both time points, the dyads had a higher level of mutual understanding when the mother used more appropriate scaffolding strategies and vice versa.

Furthermore, at Time 1, maternal positive affect and intersubjectivity had a positive bidirectional relationship, while at Time 2, the inter-relationships were identified between maternal negative affect and intersubjectivity. It could be possible that older children are more likely to share an understanding with less rejecting mothers compared to encouraging mothers. Moreover, at each time point a bidirectional relationship between the child's positive affect and the dyad's intersubjectivity was established. As revealed earlier, there are bidirectional links between the mother's and child's positive attitudes towards each other, therefore it is likely that mutual intersubjectivity could be a mediator of this relationship. Children who were more autonomous were more likely to be part of a dyad where the mother and child shared joint goals and strategies in order to complete the tasks. It possible that warmer and more positive attitudes towards each other as well as an understanding of shared responsibility helps to develop a rapport and shared mutual understanding of the problem. In support of this, Rommetveit (1985) suggested that the process of cooperation is critical for the establishment of intersubjectivity.

However, longitudinal analyses did not support any of these links after controlling for autoregressive affects. The cross-lagged autoregressive analyses provided evidence of a single relationship; mothers who were part of the dyads with a higher level of mutual understanding were less controlling later in time. This finding indicates that if the dyad is able to develop a rapport in which they share goals, strategies to complete the task and appropriately coordinating their actions, mothers do not need use controlling techniques because the child is able to similarly understand the task and, therefore, is able to complete it independently. While much research has stressed the importance of the dyad's intersubjectivity during problem-solving interactions (Deater-Deckard & Petrill, 2004; Harrist & Waugh, 2002; Kim & Kochanska, 2012; Kochanska, 2002; Rogoff, 1990; Van Lier, 1996) and specifically to child's cognitive (Mulvaney et al., 2006) and social abilities (Deater-Deckard & Petrill, 2004), the current research attempts to identify the role of the dyad's behaviour in the complex nature of the scaffolding interaction, making this study pioneering in this area as no other project has attempted to achieve this. As such Hypotheses 3 and 4 were partially supported.

9.3 Individual differences in mother and child behaviour in scaffolding interaction

Within the ecological framework an investigation of the individual differences that may be prerequisites of the mother's and child's behaviour exhibited during collaborative problem-solving was conducted. Previously it was established, that a number of maternal characteristics such as cognitive ability (Mulvaney et al., 2006), or more specifically, level of education (Carr & Pike, 2012; Neitzel & Stright, 2003, 2004; Rogoff et al., 1993), social abilities such as mind-mindedness (Degotardi & Sweller, 2012; Meins,1997), and aspects of parenting (Carr & Pike, 2012; Pratt et al., 1988) contribute to the maternal tutoring skills. Regarding the determinants of scaffolding behaviour in relation to child characteristics, the research is much more limited, although children's cognitive ability has been linked to aspects of maternal scaffolding (Carr & Pike, 2012; Mulvaney et al., 2006). Research has mostly been focused on the outcomes of the scaffolding (Bernier et al., 2010; Fagot & Gauvain, 1997; Hammond et al., 2012; Hughes & Ensor, 2009; Landry et al., 2002; Lowe et al., 2014; Mattanah et al., 2005; Neitzel & Stright, 2003, 2004; Pacifici & Bearison, 1991) with less focus on the determinants of behaviour (Carr & Pike, 2012; Mermelshtine & Barnes, 2016; Tamis-LeMonda, Kuchirko, & Song, 2014). A wide range of person and context characteristics were identified as hypothetical and tested as potential contributors to mother and child scaffolding behaviour. In adopting this approach, this thesis has addressed a gap in the existing literature.

The first step of the current investigation was a zero-order correlation analyses which measured the association between scaffolding behaviours and mother, child and contextual characteristics. Following this, an autoregressive cross-lagged analyses was used to establish the individual differences in the dimensions of scaffolding behaviour during problem-solving situations. This analysis revealed that specific maternal scaffolding strategies were associated with aspects of children's cognitive, social and emotional abilities. Specifically, cross-sectional analysis identified that a child's higher VMA led to the use of more appropriate scaffolding strategies by their mother. Such a relationship was previously established in the literature. For example, Carr and Pike (2012) established an association between the child's VMA and maternal use of contingent scaffolding. Another of the child's person characteristics, behavioural adjustment (peer problems), was linked with maternal scaffolding strategy. Children who experienced more peer-related problems most likely had mothers who used more directive, less receptive and flexible scaffolding techniques. Similarly, Clark and colleagues (2008) provided evidence of the association of the child's ability to regulate and adjust their behaviour with responsive parenting.

Furthermore, several maternal characteristics, such as level of education and use of mental state talk, were linked to the appropriate use of scaffolding strategies. The current results suggest that a higher level of education is related to more appropriate use of scaffolding support which is highly consistent with the existing literature (Carr & Pike, 2012; Neitzel & Stright, 2003, 2004; Rogoff et al., 1993). Additionally, the higher the volume of the cognitive mental state talk used by the mother predicted more successful tutoring behaviour displayed during collaborative problem-solving. The problem of the relationship between maternal mental state talk and scaffolding techniques is overlooked in the literature, but there is evidence that suggests the importance of maternal social abilities such as maternal mind-mindedness (Ereky-Stevens, 2008; Meins, 1997).

Interestingly, maternal emotional intelligence was associated with maternal scaffolding strategy at both time points during the zero-correlation analyses, but this characteristic did not become statistically significant in the cross-lagged analyses. Although research specifically relating to maternal emotional intelligence in relation to scaffolding practices is limited, previously it was revealed that emotional abilities (Bradley et al., 1997; Pomerantz et al., 2005) are highly related to the successful use of tutoring techniques by the mother. Thus, it would be curious to investigate the relationship between the mother's emotional intelligence and scaffolding strategies further.

The crowding index used here as a measure of home environment was associated with the dimension of maternal scaffolding strategies. Moreover, the cross-lagged autoregressive analyses confirmed that household crowding, over and above other characteristics, made a unique contribution to the maternal use of scaffolding strategies approximately seven months later. This suggests that individual variation in behaviours which tend to be consistent such as the use of scaffolding strategy among highly educated, middle class mothers may be explained by contextual factors, such as household environment, rather than person characteristics. The negative impact of a disruptive and over-crowded home environment was discussed earlier in the context of children's academic success (Downey 1995, 2001; Kuo & Hauser, 1997; Steelman et al., 2002; Powell & Steelman, 1993). It is possible that among families with a similar socio-economic background to the current sample group, maternal contingent scaffolding is a mediator between household environment and children's academic achievements.

In relation to maternal positive affect, within each time point, it was identified that the children's higher pro-social behaviour was positively related to the mother's positive affect. Similar results were revealed by Pettygrove and colleagues (2013) in their observation of parent-child dyads in which they identified that parental socialisation techniques (including praising and encouragement) were associated with children's pro-social behaviour. However, longitudinal analysis revealed that maternal positive affect was predicted by the number of siblings present in the home. Mothers who had older children were more likely to exhibit positivity and warmth approximately seven months later. Previous research has provided similar results in relation to maternal positive affect and sibling birth order. A group of researchers concluded that mothers were more positive with their second-born children (Moore, Cohn, & Campbell, 1997; Ward, Vaughn, & Robb, 1988). While the current research did not test the positive affect of the mother towards all her children, the unique contribution of previous parental experience to a scaffolding interaction with a younger child was established. A possible explanation for this is that previous parental experience, specifically having experience with an older child or children, contributes to mothers' parenting knowledge enabling them to use positive patterns of behaviour and provide support and encouragement to the child during problem-solving interactions. On the other hand, parents of older children may also have valued the opportunity for one-to-one quality time away from older children that the problem-solving interaction provided and thus, displayed more positive affect towards the younger child.

Furthermore, maternal negative affect was a stable behaviour over time, specifically, mothers who were rejecting or disapproving of their children's behaviour at the baseline visit exhibited similar patterns at the follow up visit. However, none of the measured variables relating to children's or mothers' characteristics explained the individual variances in maternal negative affect. This suggests that there are different factors that may contribute to maternal negativity among white, middle-class families, such as mental health issues, marital difficulties or general level of stress (Crnic & Low, 2002;

Deater-Deckard & Scarr, 1996; Hoffman et al., 2006). Also, it is likely that the experimental set up and the observed interaction might have forced mothers to exhibit less negative affect than they would display usually while interacting with their children due to the effect of social desirability. This was also reflective on the mutual conflictual behaviour which was not present during the observed interactions as the majority of mothers did not response to the child negative affect or non-compliance during the problem-solving interactions.

Over-control behaviour and lack of transfer of responsibility to the child during collaborative problem-solving interactions were associated with a number of the child's person characteristics, maternal use of cognitive mental state talk and again the number of older children in the household. However, testing the predictive nature of these variables in explaining maternal over-control proved inconsistent across the longitudinal analysis. At the initial visit, it was identified that mothers were more controlling if they had more older children, while the cross-sectional analyses at the follow up visit suggested that children's lower theory of mind led to the maternal inability to provide the child with the freedom to complete the task. However, once tested longitudinally, it was revealed that over and above other variables, maternal cognitive mental state talk was a significant contributor. Mothers who used a large amount of cognitive mental states in their day-to-day conversations with children were less controlling during scaffolding interactions approximately seven month later.

On reflection, it is noteworthy that such inconsistency in the results, in particular, the role of the child's theory of mind, requires further examination. The age of participating children ranged between four-five years old. This age is a borderline age for the development of theory of mind understanding (Hughes et al., 2007; Sterck & Begeer, 2010). The ability to recognise mental states and perceptions of other people is not a gradual process but usually on in which there is a step change once the child is able to grasp the false believe concept (Astington & Lee, 1991; Joseph & Tager-Flusberg, 1999; Schult, 2002). While the cross-lagged analyses suggested that maternal over-control predicted children's theory of mind over time, it is possible that this process is reciprocal as the opposite relationship was identified at the follow up visit- children's theory of mind negatively predicted maternal over-control. By the second visit, a larger number of children were able to understand the principles of false believe tasks. Thus, a third assessment point would be recommended to examine the relationship between maternal controlling behaviour and the child's theory of mind.

As the current research adopted a cross-lagged design, the impact of the dimensions of maternal scaffolding behaviour on the child's, mother's and contextual characteristics was also tested. It was identified that mothers who provide less controlling and appropriate contingent support with less negative affect towards their child enhanced the child's theory of mind. Similar results were identified by research conducted by Galende and colleagues (2012) in which they identified that more successful scaffolding strategies, represented by age-appropriate, flexible and cognitive support, along with promotion of independence, contributed to the child's higher theory of mind. Such findings could potentially be explained by the promotion of the child's independent thinking and problem-solving.

Some person and contextual characteristics did not associate to maternal scaffolding behaviour despite previously identified evidence in the literature (see Chapter 2 and 3). In particular, household chaos was highly related to the child's cognitive and academic outcomes (Berry et al., 2016; Deater-Deckard et al., 2009; Evans, Kliewer, & Martin, 1991; Hughes & Ensor, 2009; Shelleby et al., 2014; Vernon-Feagans et al., 2012; Wang, Deater-Deckard, Petrill, & Thompson, 2012). Wachs (1993) stipulated that parents are less engaging and attentive in interaction with their children when they live in a noisy, unregulated and crowded household. A study by Valiente and colleagues (2007) revealed that household chaos impacted parental ability to manage a child's negative emotions. This indirect evidence could be indicative of the importance of household context in scaffolding regulation. However, in the current sample, which comprised of affluent mothers who did not work full-time and therefore who may have time and resources to support order in the house, the household chaos was not significant for the individual variances of scaffolding behaviour. It is possible that a disorganised home is a contributing factor on the tutoring practices among different SES or ethnic groups.

Another group of variables that were not related to the displayed scaffolding behaviour was parenting characteristics, specifically, parenting stress and warmth. For example, a study conducted by Gerstein & Poehlmann-Tynan (2015) revealed that parenting insensitivity was a mediator between parenting stress and the child's behavioural adjustment. On the other hand, parental warmth and responsiveness led to a child's positive cognitive outcomes and better regulatory abilities (Kochanska & Kim, 2013; Simpkins et al., 2006). Landry and colleagues (1996) identified that maternal positive mind-sets related to the use of successful scaffolding practices. A possible explanation for the absence of the relationship between parenting stress and dimensions of scaffolding is the age of the child. Commonly, parenting stress is measured among parents with young children or children with some health difficulties, while the average age of children was 60 months and none of them had any ill-health. In relation to positive parenting, the scale used in the current study, Expression of Affection (Hetherington & Clingempeel, 1992), might not have precisely measured the complex psychological construct of positive, responsive and warm parenting that is proven to be related to scaffolding, but was more reflective of joint activities and shared interests. The use of alternative measures or a more diverse sample could potentially help replicate the existing evidence.

Overall, Hypothesis 5 could be considered partially confirmed, specifically by revealing the role of maternal characteristics and contextual factors in individual variations in dimensions of maternal scaffolding behaviour. However, due to the exploratory nature of the current research, a substantial number of child's and mother's person characteristics were not significant in testing the variation of maternal behaviour during collaborative problem-solving interactions.

Similarly, the child's behaviour, and its individual variations, exhibited during problem-solving interactions with their mother was, to some extent, explained by the child's person and contextual characteristics, suggesting that Hypothesis 6 was partly supported and is discussed further. The child's level of difficulty, on task behaviour, autonomy, positive affect and non-compliance were observed as central to the mutual problem-solving with mother. Firstly, zero-order correlation identified several maternal characteristics which were related to the child's behaviour but none of them were identified as significant during the cross-lagged autoregressive analyses.

As expected, the cross-lagged autoregressive analyses identified the longitudinal effects of the child's cognitive abilities, represented by verbal mental age, to three out of five behavioural dimensions. Specifically, the child's behaviour was related to the dimensions of learning capabilities such as level of difficulty, ability to concentrate and work on the task independently. This finding is supported by a substantial amount literature which relates cognitive abilities and academic success (Busato, Prins, Elshout, & Hamaker, 2000; Elshout & Veenman, 1992; Eysenck, 1970; Neisser et al., 1996; Pintrich, Cross, Kozma, & McKeachie, 1986; Sternberg & Kaufman, 1998).

The child's level of difficulty was reflective of the time the child spent on the task. While they could stop at any point without completing the task, for the majority of children, the level of difficulty is representative of how much time was required by them to finish the task with the support of their mother. None of the maternal or contextual variables were associated with this dimension. However, it was identified that children who better regulated their emotions could work on the tasks for longer periods of time approximately seven months later. Similarly, Graziano and colleagues (2007) discussed the important role of emotion regulation in relation to the child's cognitive processing and autonomous learning. Additionally, cross-sectional analyses revealed that children who scored higher on the peer problem scale were more likely to spend more time completing the task. Previously, in the literature, it was established that a child's peer relationship is positively linked with aggressiveness and behavioural problems, but negatively associated with academic achievements (DeRosier, Kupersmidt, & Patterson, 1994; Olson & Hoza, 1993; Pettit, Clawson, Dodge, & Bates, 1996).

Interestingly, Trentacosta and Izard (2007) established the effect of the child's emotion regulation in relation to attention problems. The current analyses of stability and inter-dependence of the child's behaviour identified that their ability to stay on task was a significant predictor of how difficulty they found the task. Further investigation of individual variations of the child's level of difficulty suggested that emotion regulation is a unique contributor. Zero-order correlation identified a significant relationship between the child's inability to regulate emotions and stay focused on the task; however, the regression analyses did not support this relationship. It is possible that future research might identify, with a certain level of likelihood, that the child's ability to regulate emotions is a determinant of how well the child can concentrate on task and, as a result, the amount of time the child spent to complete it.

Curiously, it was also identified that the child's inability to concentrate on the task led to increased frequency of parenting stress approximately seven months later. This finding is suggestive that children who are more distracted during joint activities with their mothers may indeed be contributing to a general level of parental stress. Future investigation could explore specific behaviours that mothers find most stressful and to what degree of distraction. Although not directly comparable, by taking these results to a much further degree, previous research has found that parents of children who struggle with attention deficit hyperactivity disorder (ADHD) experience greater levels of parenting stress (Podolski & Nigg, 2001; Theule, Wiener, Rogers, & Marton, 2011).

In addition to their verbal mental age, the child's autonomy during joint problem-solving was, once again predicted by the contextual factor: the number of older siblings the child had. Children participating in the current study were more likely to be independent and less reliant on their mother's help when they did not have older siblings or when they had fewer of them. One explanation for this is that children who have older siblings may get a lot of support not only from their parents but also from their older siblings, as opposed to children who were only children or who had younger siblings. In terms of application, parents could potentially provide their younger children with more opportunities and encourage autonomy during collaborative problem-solving. This could be especially beneficial as the results also indicated that children who were more independent during scaffolding interactions with their mothers had a higher level of working memory and theory of mind approximately seven months later.

Although previous research provides extensive evidence that maternal scaffolding promotes the child's working memory as part of general executive function (Bernier et al., 2010; Hammond et al., 2012; Hughes & Ensor, 2009; Landry et al., 2002; Lowe et al., 2014), the current research did not find evidence of this relationship. However, the results suggest that maternal negative affect contributes to the child's autonomy, which, in turn, promotes the child's executive function. The acknowledgement of the child's involvement in learning at home could help to scrutinise the well-established pattern somewhat differently and so is further discussed within this subchapter.

The child's positive affect was consistent across the two time points, particularly, children who exhibited warmth and positivity at the baseline visit were most likely to demonstrate similar patterns of these behaviours at the later time point. The cross-sectional analyses at the follow up visit suggested that children who are more able to regulate their emotions are more likely to display positive affect during tutoring interactions. This could be indicative that older children are more capable of regulating their emotions which therefore leads them to have more positive attitudes during collaborative interactions. A more extensive study with a larger number of the follow up testing points, with the child increasing in age, could help to test this notion that as children get older, if they develop the ability to regulate their emotions, this leads to display of more positive affect.

The child's behaviour indicating non-compliance was stable across time; however, there was no predictive relationship identified within each cross-sectional analysis. However, the longitudinal analysis revealed that the child's inability to recognise emotions of other people led to non-compliant behaviour over time. This could potentially explain that, while children are perceived by the observer, parent or carer as 'difficult', rebellious or objecting, it could actually be a consequence of the child's inability to recognise and understand what the collaborating partner feels. Previously, children's emotional knowledge (ability to recognise emotion and label emotions) was examined in relation to the school competence (Izard et al., 2001). The results suggested that a lack of emotion knowledge could be damaging to the teacher-learner rapport and decrease the quality of the learning process.

Finally, cross-lagged analyses revealed that, over and above other person characteristics, maternal use of cognitive mental states during day-to-day conversations led to the dyad demonstrating higher levels of intersubjectivity approximately seven months later. This may suggest that mothers who manage to provide rich verbal mentalisation of cognitive processes in the conversation, by utilising cognitive mental state talk, could promote dyadic shared understanding. In particular, by using mental states like ‘think’ and ‘know,’ the mother could better help the child to understand shared goals and strategies in order to complete the task. Previously, it was suggested that parental mental state talk enhanced the child’s social-cognitive understanding (Baptista et al., 2017; LaBounty, Wellman, Olson, Lagattuta, & Liu, 2008; Ruffman et al., 2002). As such, research by Ensor and colleagues (2014) revealed that extensive use of cognitive mental states by mothers with their toddlers predicted the child’s ability to understand theory of mind at age 6. This finding provides support for the current results and may potentially explain the relationship between maternal cognitive mental state talk and intersubjectivity, as if children of such mothers better understand different people’s theory of mind, they more likely to develop intersubjectivity, a shared understanding with their mothers.

Additionally, cross-sectional analyses identified that a child’s person characteristics also predicted the dyad’s intersubjectivity. Specifically, the child’s working memory and emotion regulation ability had a positive, unique contribution to the shared understanding during collaborative problem-solving interactions. Both characteristics are highly related to the child’s executive functions (Gyurak et al., 2009; Patrick, Blair, & Maggs, 2008). A large body of research associates executive functions with academic success (Clark, Prior, & Kinsella, 2000; Lan, Legare, Ponitz, Li, & Morrison, 2011), the development social abilities and higher abilities for self-regulated learning (Garner, 2009). All of these outcomes could be crucial for the better establishment of the mutual understanding in mother-child dyads. Moreover, the current findings are supported by the theoretical works of Wertsch (1984), who noted the importance the child’s regulatory abilities play in the development of intersubjectivity. Thus, Hypothesis 7 could be considered partially confirmed, as it identifies the role of mother and child’s person characteristics on the individual variations of dyad intersubjectivity.

9.4 Preliminary investigation of scaffolding practices in Russia and comparison with England

The important role of culture was acknowledged within the bioecological theory (Bronfenbrenner, 1979; Bronfenbrenner & Morris, 2006). However, knowledge about the use of parental scaffolding practices in Russian culture is very limited. Therefore, within the time and resources available, the current study conducted exploratory research in order to gain some initial level of understanding about the Russian dyads' behavioural patterns occurring during learning interactions at home. Furthermore, a preliminary investigation in understanding cross-cultural variations between the dimensions of scaffolding and its determinants in Russia and England was conducted.

The Russian sample group was relatively similar to the English participants as both samples comprised of highly educated mothers, the majority of which held technical or professional occupations. However, the majority of Russian mothers had full-time or part-time work commitments, while almost half of the sample in England were full-time stay-at-home mothers.

There are various potential explanations for this fact. Firstly, such a difference is possible due to the number of children in the household. Half of the Russian sample had only one child, thus opportunities to work were more available for women, whereas in England, families were larger. Secondly, it is possible that the larger number of occupied mothers was due to the existing policies in relation to maternity leave in Russia, specifically, women return to full-time work usually once her child reached age 3 years old and the child then attends state nursery. In England, on the other hand, mothers were required to return back to work a lot sooner and faced an issue of salary vs childcare costs. If the second reason is reflective of the real state of affairs then children in two countries get different levels of attention from their mothers. In Russia, full time interaction with their mother up until the age of three and then a lack of attention due to the mother's full-time work. Meanwhile in England, some children would attend childcare facilities as early as six months old, while others would have their mother's attention as she is full-time at home. Another interesting difference between the two groups was that while the number of people living in the household was approximately the same, the number of rooms in the Russian families' homes was notably less.

In relation to the bidirectional nature of scaffolding among Russian families, maternal appropriate support during joint problem-solving was moderately related to the child's autonomy. This pattern was also identified during the observation of mother-child dyads in England.

Furthermore, children were more likely to seek parental help when the mother provided high quality cognitive support among the Russian dyads. Interestingly, within the English sample group, this relationship was negative and suggested that low quality maternal instructions were related to a higher amount of help required by the child to complete the task. There are various explanations for this finding. The exposure to formal educational set up in the UK might provide the child with a clearer understanding of learning interactions and promote autonomous behaviour. Therefore, during learning interactions at home, children from England would request less help as they already had experience of independent problem-solving, so within interactions with parents, the appropriate scaffolding would provide the required level of support. It would be curious to test this once the Russian children have gained some formal 'pedagogical experience' and to examine if the reverse relationship would disappear, which would suggest that the role of schooling is important in the dynamic of mother-child interaction, or if the relationship would remain, thereby signifying the role of cultural differences.

Literature suggested that Russian parents, in general, could be more authoritarian and controlling during problem-solving interactions with their children (Olsen et al., 2002; Shvedovskaya & Archakova, 2015). If so, by providing less contingent scaffolding, mothers in Russia might solve the tasks themselves or give clear directive instructions as opposed to open questions and guidance, thus children do not need to ask for additional support or explanations. However, when mother's in Russia used more sophisticated techniques, children might feel the need to request more help in order to complete the tasks.

Maternal emotional support, consisting of praising, encouragement and warmth towards the child among Russian mothers, was highly related to the child's positive affect during scaffolding interactions. This pattern was also observed among English mother-child dyads across each observational point.

In Russia, it was identified that the mother's positive affect was negatively linked with the child's on task behaviour, suggesting that more positive mothers had children who were more distracted and less focused on the task. In England, on the other hand, maternal negative affect was associated with the same dimension of the child's behaviour. It is possible that maternal positivity could be perceived by Russian children as permissive behaviour and therefore they are more distracted and less orientated on task completion.

Finally, in Russia, maternal higher quality of instruction and contingency support was associated with the dyad's higher intersubjectivity. This is reflective of the results in the UK that have been discussed earlier. Interestingly, the child's behaviour was not associated with intersubjectivity in the Russian sample group. A larger sample would help to clarify if this relationship was not there or if the correlation was not strong enough to be identified within this current Russian sample size. The current results suggest that the observed dimensions of the child's behaviour are not relevant to the mutual understanding between child and mother during collaborative problem-solving interactions.

9.5 Individual differences in maternal scaffolding behaviour among Russian mothers

Correlation analyses was conducted to identify a preliminary relationship between maternal scaffolding behaviour and a range of child's, mother's and contextual characteristics in this small sample of Russia families. Maternal contingent behaviour was associated with the level of the mother's education in Russia. This finding is not only consistent with findings of the English study, but also with the body of research focused on this area (Carr & Pike, 2012; Neitzel & Stright, 2003, 2004; Rogoff et al., 1993). Moreover, in the Russian sample, it was identified that a higher-level of education was associated with lower disapproval, rejection and over-control exhibited by the mother. It could be suggested that Russia mothers who were exposed to higher levels of education had more extensive experience of learning and were therefore more aware of the importance of reducing negativity in relation to the task and more able to pass on the responsibility for task accomplishment to the child.

In Russia, mothers who exhibited more negative patterns of behaviour such as rejection or disapproval of their child during collaborative problem solving were most likely to have a lower level of emotional intelligence. Furthermore, the results revealed that children's inability to regulate emotion was highly related to the more dysfunctional aspects of maternal behaviour such as negative affect and over-controlling behaviour. Also, children's ability to recognise emotions in other people was highly related to the ability to concentrate on the task and require less help to accomplish the task.

Whereas in England, a similar pattern was identified which was manifested differently. Sophisticated maternal scaffolding practices (quality of instruction and contingency) were related to a higher level of emotional intelligence. Also, among the English sample group, successful maternal scaffolding practices were linked to the child's ability to regulate their emotions. Furthermore, English children who were less able to understand the mental states of different people, as opposed to understanding the emotional state of different people, required more help and were less autonomous.

These findings suggest that the role of emotional abilities in both the mother and child are crucial in the scaffolding interactions in both countries. However, the ways dyads are processing their emotions and the emotions of other people seem to be different. In Russia, low emotional abilities in both the mother and child related to negative attitudes during the scaffolding interaction while in England, high emotional abilities were linked with a higher quality of scaffolding support. Additionally, the child's behaviour, which was reflective of the learning process in Russia, related to the recognition of emotions, while in England it was related to the recognition of mental perspectives of other people.

Furthermore, an interesting pattern was revealed between the maternal aspects of mental state talk and the mother's scaffolding behaviour. In Russia, there was no relationship identified between maternal cognitive mental state talk and dimensions of scaffolding behaviour. In contrast, in England, maternal use of cognitive mental states in day-to-day conversation with their child related to almost every dimension of behaviour displayed during learning interactions at home. However, in Russia, the use of desire and modulation of assertion mental states correlated with dimensions of maternal behaviour. Currently it remains unclear why such differences appeared within each sample group. Potentially, it could be explained by the cultural or linguistic differences; however, further exploration of the cultural variations of the use mental state talk by mothers and children in relation to scaffolding practices would be beneficial.

Finally, in Russia, similar to England, the findings suggested that children who had older siblings were less autonomous. Additionally, the number of older siblings related to more compliant and on task behaviour during problem-solving interactions. Interestingly, the crowding index, which was notably higher among the Russian sample group, was not related to any of behavioural dimensions observed during the tutoring interaction. This potentially could be explained by the cultural settings, in particular, commonly Russian urban areas predominantly comprised of block-apartments as opposed to English individual houses, which are inevitably small in size and the ratio of person per room (not bedroom) is significantly higher. Thus, it is likely that the household crowding is a social norm in Russia which is accepted as the usual home environment and does not impact maternal tutoring during collaborative problem-solving.

To summarise, through the small scale of the Russian study, it was not possible to test the causal interrelationship between mother's and child's behaviour, and to conduct full-scale cross-cultural comparison of the variations of these behaviour between the Russian and English samples. However, the correlation analyses enabled the pattern comparison and identified the relationship between the mother's and child's behaviour exhibited during tutoring interactions are relatively similar and also support the notion of scaffolding as a bidirectional process. There were also patterns which indicated similarities in relation to the strong associations between variables (for example, maternal contingency and amount of help required to the child). However, in the different countries, this relationship had different directions. The differences in the patterns, in relation to emotion abilities and use of mental state talk, could potentially imply that the prerequisites of scaffolding practices are culturally varied. Moreover, these findings not only support the debate about cultural variations in scaffolding practices (Bae et al., 2014; Rogoff, 1990, 2003; Rogoff et al., 1993; Tharp & Gallimore, 1988; Vygotsky, 1930-1934/ 1978), but also suggest a specific direction for the further examination of such differences between Russian and English cultures. As such Hypotheses 8 and 9 were partially supported.

9.6 Strengths and contributions

The adaptation of Process-Person-Context-Time (PPCT) model as an overarching theoretical framework guided the current study and has a number noteworthy strengths.

Firstly, the problem of reciprocity and the bidirectional nature of the scaffolding relationship (Granott, 2005; Rogoff, 1990; Wood et al., 1976) was tackled directly by the new coding scheme development. The adopted PPCT model emphasised scaffolding interaction as a proximal process in which 'the relationships of people with environments are bidirectional' (Griffore & Phenice, 2016, p.11). The bidirectional model suggests an assumption that there is a mutual influence and interdependent dyadic outcome (Belsky, 1984; Kochanska et al., 2010). In order to understand the dynamic between the mother and her child during collaborative problem-solving, a new coding scheme assessed separately the mother's behaviour, the child's behaviour as well as dyadic behaviour. While the role of the child's involvement in the scaffolding process has been acknowledged in numerous theoretical works (Elbers, 1996; Litowitz, 1997; Mascolo, 2005; Mercer & Littleton, 2007), until now there has been limited empirical exploration in relation to the extent to which the child's behaviour influences aspects of maternal and dyadic behaviour during problem-solving situations. The current research revealed the complexity of the inter-relationship between the dimensions of behaviour between the mother and her child. For example, cross-lagged analyses suggested that maternal controlling behaviour was explained in part by the child's lack of independence during problem-solving interactions earlier in time. Also, the role of intersubjectivity in scaffolding interactions was discussed. While the results were mixed in relation to scaffolding, this study could be grounds for further investigation to evolve understanding of the role of mutual intersubjectivity in scaffolding interactions. Specifically, it is possible that the dyad's intersubjectivity plays the role of mediator in the positive affect of mother and child.

The second notable strength of this study was an exploration of a wide range of individual characteristics determining the dimensions of behaviour displayed during learning interactions at home. In line with the PPCT model, a substantial number of person's characteristics of both the mother and child were tested. Although, only a handful of these characteristics were significant, the important role of contextual factors on dimensions of maternal scaffolding was identified, which provided a novel perspective to the scaffolding prerequisites and potentially offered new directions for future investigations into the role of contextual factors in the collaborative problem-solving. Moreover, the study suggests that appropriate maternal scaffolding techniques promote the children's theory of mind over time.

Finally, there was an attempt to examine cultural differences in the scaffolding process, completing the PPCT model. The adaptation of all measures, including the bidirectional assessment of the coding scheme for the Russian population, laid the foundation for the exploration of scaffolding interactions in Russia and moreover, enabled the preliminary testing of cultural variations between Russia and England.

9.7 Limitations and future directions

While the bioecological theory allows the inclusion of an extensive number of factors relevant to an examination of scaffolding interaction, it is crucial to acknowledge that within the time and resources available, there were some constraints to implementing all elements of this theory. For example, Tudge and colleagues (2009) suggested that 'a minimum requirement would be to evaluate the differential influence of two microsystems (home and school, for example) or two macrosystems (middle- and working-class families or adolescents from different cultural groups) on the activities and interactions of interest' (p. 202). Nevertheless, in the current research, only aspects of one microsystem were tested, in particular, family. Additionally, there was an attempt to test cross-cultural variations, but this was only on a very small-scale. The inclusion of the neighbourhood factor as another microsystem could help to address the requirements for the assessment of the scaffolding interactions within the bioecological framework, as there is an extensive body of research indicating the role of neighbourhood in child's development (Barnes et al., 2006; Hart, Atkins, & Matsuba, 2008; Leventhal & Brooks-Gunn, 2000).

Furthermore, the current study had only two measurement points, which was the required minimum in order to test the relationship between the dependent and independent research variables over time. However, future studies would benefit from the inclusion of more than two time points for further clarity. In the current two point study, there were some inconsistencies identified at each time point which could, in part, be due to children's rapid development at this age in which natural variations and change could have influenced findings. For example, children participated in this study at an age crucial for theory of mind development. Usually at age four-five, children gain an understanding that other people have mental state which differ from their own and they acquire false belief understanding (Hughes et al., 2007; Sterck & Begeer, 2010). The results of the current research revealed interesting links between scaffolding behaviour and theory of mind. However, another point of measurement could ground such findings and reveal longer term relationships between scaffolding when theory of mind development is perhaps more stable.

Additionally, the two measurement points in the current study were approximately seven months apart from each other. The initial design of the current research aimed to access collaborative problem-solving of children at the beginning and the end of the academic year. Due to the difficulties of the recruiting process (see Subchapter 4.4), in order to address the scope of the current research project, specifically deadlines and available resources, the period of the seven months was chosen. This was a relatively short time to examine any variations in observed behaviours or individual differences (Caruana, Roman, Hernández-Sánchez, Solli, 2015; Wolfe, 1999) and thus, a longer period of time between measurement points could provide more insightful information.

The exploratory nature of the current research provided an opportunity to gather a large amount of quantitative and observational data. Complications occurred during the participants recruitment process which led to obtaining a modest sample size, which, in turn, had an impact on the statistical power of the conducted analyses (see Subchapter 4.9.4). This issue was tackled though the utilisation of minimisation of independent variables, two-tailed tests and bootstrapping methods (du Prel et al., 2009; Mooney & Duval, 1993). Also, the modest sample size had an impact on the selection of the statistical tools in Stage I/II, specifically, autoregressive cross-lagged analyses calculated by number of Hierarchical Multiple Regressions. Further, due to the power and correlational nature of the conducted analyses, the interpretation of the results requires some caution. A larger sample size would provide an opportunity to access the bidirectional nature of the scaffolding process in a more comprehensive manner through the utilisation of nested models, for example, through Actor-Partners Independent Model (Cook & Kenny, 2005).

Furthermore, within the current study, the majority of mothers were white, well-educated and affluent enough to afford to spend time at home with their children. Thus, the results obtained are based on the observations of these mother-child dyads and cannot easily be generalised to the general population as both ethnicity and mother's education are significant influences on childrearing (Carr & Pike, 2012; Mermelshtine & Barnes, 2016). Although the findings of the current study contribute to existing knowledge and could be utilised in developing recommendations to parents from a particular background. Future research would benefit from a larger heterogeneous sample group with a greater variety of families from different ethnic and socio-economic backgrounds in order to clarify the identified links with more sophisticated statistical tools. It is expected that similar results would be found with mothers on a lower income and/or working full time but cannot be certain without further investigation.

Furthermore, while the number of the social and emotional variables included into the current examination is extensive, it is likely that mother and child's behaviour displayed during collaborative problem-solving could be explained by their personality. Specifically, maternal personality was previously linked with scaffolding-like behaviour (Neitzel & Stright, 2004; Prinzie et al., 2009). Further, the child's temperament, which is the foundation of the personality, is linked with the child's cognitive development and academic outcomes (Blair, 2002; Leerkes et al., 2008). Higher negativity and difficult temperament among young children were negatively associated with their behavioural adjustment in the school settings and lower attainment (Blair, 2002). Therefore, it would be curious if any further research of individual differences in scaffolding behaviour could include the combination of traits related to the personality of both the mother and child as well as their social and emotional abilities. Such research would be particularly interesting to conduct with panel design to investigate the temporal relations between these individual factors and behaviour displayed in scaffolding interactions through the examination of mediation and moderation patterns.

Due to the extensive and time-consuming process of participant recruiting which led to a modest sample size it was decided to concentrate on the involvement of mothers as opposed to mothers and fathers. Such a decision is in line with literature in this field, which usually involve only mothers (Carr & Pike, 2012; Neitzel & Stright, 2003; Mulvaney et al., 2006). Furthermore, it is still the case that mothers are most likely to be more involved in supporting their children with homework than fathers and thus perhaps engage more frequently in the type of interaction being observed (Lindberg, Hyde, & Hirsch, 2008; Peters et al., 2008). On the other hand, there is sufficient evidence that fathers play a crucial role in the child's development of cognitive and emotional abilities (Flouri & Malmberg, 2012; Ramchandani & Iles, 2014).

Conner and colleagues (1997) identified the differences in the use of scaffolding techniques by the mother and father. However, despite these variations, it was revealed that, regardless of which parent was involved in the scaffolding process, parental support was equally important to the child's success in task accomplishment. Such differences between parents may be particularly interesting considering the bidirectional relationship between the parent and the child and the dynamic of the problem-solving interaction. Moreover, in the current study it was identified that maternal scaffolding enhanced the child's theory of mind approximately seven month later and it is possible that paternal scaffolding may be an essential contributor to the development of the child's other capabilities. Thus, future research may benefit from the inclusion of the fathers in the observations of collaborative problem-solving interactions in order to assess the dynamic and complexity of the interaction between both parents and their child, along with an assessment of the unique contribution of paternal scaffolding to the child's developmental outcomes.

One of the most interesting findings that requires further investigation was the bidirectional relationship between positive affect of mother and child along with the relationship of their positive affect and dyad intersubjectivity. Future research might benefit from a deeper investigation into these patterns, specifically focused on exploring if families who are warmer and more positive towards each other are more likely to develop a rapport and shared mutual understanding of the problem. This could be possible through testing of mediation and moderation effects of these behavioural dimensions. Furthermore, future investigation could provide a clearer understanding of the impact of mutual understanding on the individual process during learning interactions at home. For example, the use of a fine-grained scheme which is widely used in scaffolding research (Carr & Pike, 2012; Conner & Cross, 2003; Meins, 1997; Pratt et al., 1988; Wood et al., 1978) would enable investigation into immediate changes in the behaviour of both the mother and child in response to the level of their shared understanding of the task.

Another direction for the future research could be an investigation of parental experiences in relation to scaffolding practices. The current results suggested that parents who had older children were more supportive, encouraging and positive, however the explanation of this remains unclear. To extend the gathered findings in the current research, a future direction could be the development of a qualitative examination that provides an opportunity for mothers who have several children to reflect on their parenting experiences and the different ways in which they dealt with each of them.

Finally, within the available time and resources, the investigation in Russia was preliminary and exploratory. Now that the first data has been obtained and measures have been adapted, it would be possible to extend the examination of scaffolding practices in Russia. Furthermore, testing through an examination of a more diverse and considerably larger sample of mother-child dyads in Russia should be conducted in order to use more sophisticate statistical analyses for cross-cultural comparison and, therefore, achieve an appropriate statistical power for the interpretation of the results.

9.8 Conclusion

In conclusion, the current study adopted the bioecological theory as a framework to gain a clearer understanding of the nature of the scaffolding process. The scaffolding process was examined as a proximal process, in which the roles of the mother's, child's and dyad's behaviour were examined followed by an examination of the individual differences of this behaviour based on person and contextual characteristics. The bidirectional nature of collaborative problem-solving was confirmed. The range of person and contextual characteristics were identified as unique contributors to the mother's and child's behavioural dimensions. The results suggested that maternal scaffolding and the child's autonomy explained the child's theory of mind later in time. The preliminary investigation into the behaviour of mother-child dyads during scaffolding interactions in Russia also demonstrated similar patterns to those found in England. However, the determinants of these dimensions of behaviour varied, specifically, the role of emotion abilities as a prerequisite of scaffolding behaviour in both countries.

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APPENDICES

APPENDIX A. Recruitment leaflet and poster

Would you like to participate in a research study?

We are conducting a study at Canterbury Christ Church University looking at how parents support their children's learning through play. As family members vary in the way they communicate and interact with their children, this may influence the process of learning at home and the child's future academic achievement.

Parents' support is especially important for children at the beginning of their school life and so I'm looking for mothers with children aged 4-5 (currently in reception or will start school in September) to participate in the study. This would involve two visits to your home, a familiar environment for your child. You and your child will play lots of fun games together and your child will be learning at the same time.

As a thank you, you will receive a £10 voucher and a DVD of you and your child playing together.

All your data will be secure and completely confidential as the study meets ethical guidelines.

If you would like to take part in this study or would like further information, please email: e.cooper352@canterbury.ac.uk

Thank you for your time.

Is your child in reception?
Can you help us with an international study about children's learning at home?

What is project about?

Parents' support is especially important for children at the beginning of their school life. We are inviting people to take part in an international research study to help us understand what makes children's learning at home a unique context for success.

What's involved for you?

We would like to talk to mothers and their children at home.
We play lots of games with you and your child- they not only have fun with us, but also learn at the same time!
For example, you will be given cut out shapes and asked to create fun designs.

As a small thank you, all families will receive a £10 gift voucher and DVD copy of you and your child enjoying yourselves playing the games.

Who are we looking for?

We'd like to talk to mothers who have reception age children (4-5 years old) to invite them to participate in this international study.
The project is funded by Canterbury Christ Church University.

How to contact us?

Ekaterina Cooper
Research Co-ordinator

e.cooper352@canterbury.ac.uk

APPENDIX B. The participant information sheet and Consent form

Learning Together @ Home

PARTICIPANT INFORMATION SHEET
A research study is being conducted at Canterbury Christ Church University (CCCU) by Ekaterina Cooper & Dr Amanda Carr.

We are conducting a study at Canterbury Christ Church University looking at how parents support their children's learning through play. As family members vary in the way they communicate and interact with their children, this may influence the process of learning at home and the child's future academic achievement.
It is important to read this information sheet first as it explains why the research is being conducted and what it will involve.

Purpose of this study
The purpose of the project is to learn how parents and children interact with each other through the play, specifically what support the parent provides the child. The study is also taking place internationally and so we will compare how parents and children from different countries do homework together.

Why have I been chosen?
We are looking for mothers whose children are just in the beginning their school life. In order to participate you must be the mother of a child between 4 and 5 years old. You and your child will both participate in the project. We are aiming to recruit 100 families from various schools in England.

What do I have to do?
You and child will be given a range of activities and tasks to complete, some together and some alone which will help us understand how can we support families to do homework together. This activities will be videotaped for later analysis. Parents will also be asked to fill in questionnaires about aspects of their child's behaviour, their own social and emotional understanding and aspects of their home environment. As a thank you, you will receive a £10 voucher and a DVD of you and your child playing together.

How long will I be in the study?
Researcher will visit your family twice at home over a period of four months, at the beginning and end of the school year. We may also contact parent in the future for the follow up research.

Confidentiality
All data and personal information will be stored securely on university premises in accordance with the Data Protection Act 1998 and the University's own data protection requirements. All data collected will be treated confidentially and will only ever be accessed by the named researchers above. After completion of the study, all data will

be made anonymous (i.e. all personal information associated with the data will be removed). Results of the study will be used in academic publications and presented at both academic and non-academic conferences. A summary of the results will also be shared with parents but this will contain no identifying information. All researchers working on the project have enhanced CRB (now DBS) clearance for working with children. In the highly unlikely event that your child's protection is the concern of the health and safety, the researcher must pass the information on to the project supervisor, who may involve the relevant authorities.

Deciding whether to participate

If you have any questions or concerns about the nature, procedures or requirements for participation, I will be happy to answer these before you decide to participate. Should you decide to participate, you will be free to withdraw your data at any time, without having to give a reason, by contacting me on the details below.

Contact Details:
Ekaterina Cooper
Doctoral student
Department of Psychology, Politics and Sociology
North Holmes Road, Canterbury, CT1 1QU
Email: e.cooper352@canterbury.ac.uk
Telephone: 07858 322178

Project supervisor: Dr Amanda Carr
Senior Lecturer in Psychology
Email: amanda.carr@canterbury.ac.uk, Tel 01227 767700 ext 3285

Consent Form

Title of Project: Learning Together @ Home

Name of Researcher: Ekaterina Cooper

Contact details:

Address	Department of Psychology, Politics and Sociology, Canterbury Christ Church University, North Holmes Road, Canterbury, CT1 1QU
Tel:	+44 (0) 7858 322178
Email:	e.cooper352@canterbury.ac.uk

Please initial box

1. I confirm that I have read and understood the information sheet for the above study and have had the opportunity to ask questions. ☐
2. I understand that mine and my child's participation is voluntary and that I am free to withdraw at any time, without giving any reason. ☐
3. I understand that any personal information that I provide to the researchers will be kept strictly confidential. ☐
4. I understand that the testing sessions will be videotaped for later analysis and I am happy for this to happen. ☐
5. I agree to take part in this research along with my child. ☐
6. I agree to be contacted in the future for follow up research. ☐

______________________	______________	________________
Your name	Date	Signature
Your child's name	Date of birth	
Researcher	Date	Signature

Use of Images:
Occasionally we may want to use clips of video for demonstration or teaching purposes (e.g., in a presentation or lecture). Please indicate below whether you are happy for us to use clips of you and your child for this purpose for up to a period of 5 years. If we do use your video footage your names will be masked or changed but your faces will be remained unmasked.

NB: This will not affect you taking part in the study.

I AGREE / DO NOT AGREE to our video data being used for demonstration purposes.

APPENDIX C. Researcher's booklet

Learning Together @ Home

Researcher booklet

Date _ _/_ _/_ _ _ _

Participant ID _ _ _

Completed by ______________

Date of birth (DD/MM/YYYY): __/__/____

Child's date of birth __/__/____

Marital status:

- ☐ Married/Civil partnership
- ☐ Partner–living with
- ☐ Partner–not living with
- ☐ Divorced/Separated
- ☐ Widowed
- ☐ Single, never married
- ☐ Other (Please describe):

____

Is English your first language?

- ☐ Yes
- ☐ No, _______________

Ethnicity:

- ☐ White British
- ☐ White Other
- ☐ Black British
- ☐ Black African
- ☐ Black Caribbean
- ☐ Indian
- ☐ Pakistani
- ☐ Bangladeshi
- ☐ Chinese
- ☐ Other (Please describe):

____

Highest level of education completed:

You

☐ No formal qualification

☐ CSE (Grade 2,3,4,5) or GCSE (D, E, F, G)

How many? _____________________

☐ CSE (Grade 1) or 'O' Level (A, B, C) or GCSE (A, B, C)

How many? ______________________

☐ 'A' Level, 'AS' Level

How many? ______________________

☐ Higher National Certificate (HNC)

☐ Higher National Diploma (HND)

☐ Undergraduate degree (Please describe):

____

☐ Postgraduate qualification (e.g. Masters, PhD)

____

☐ Other (Please describe):

____

Your partner

☐ No formal qualification

☐ CSE (Grade 2,3,4,5) or GCSE (D, E , F, G)

How many? _____________________

☐ CSE (Grade 1) or 'O' Level (A, B, C) or GCSE (A, B, C)

How many? _____________________

☐ 'A' Level, 'AS' Level

How many? _____________________

☐ Higher National Certificate (HNC)

☐ Higher National Diploma (HND)

☐ Undergraduate degree (Please describe):

____

☐ Postgraduate qualification (e.g. Masters, PhD)

____

☐ Other (Please describe):

____

Are you working at the moment or staying at home with children?

You

☐ Yes

Number of hours a week

____

☐ No

☐ Staying at home to look after the children

Your partner

☐ Yes

Number of hours a week

____

☐ No

☐ Staying at home to look after the children

What was/is your most recent occupation? (*Please state full job title*)

You	**Your partner**
___________________________	___________________________

How many people live in your household now? (*Including yourself*)

_______ adults (over 18 years) _______ children (less than 16 years)
_______ young adults (16- 18 years)

How many bedrooms in your house? _____________________

Date of Birth & Gender of Each:
(*Starting with the oldest*)

Sibling 1.	Age: __________	M / F	Older/Younger
Sibling 2.	Age: __________	M / F	Older/Younger
Sibling 3.	Age: __________	M / F	Older/Younger
Sibling 4.	Age: __________	M / F	Older/Younger

Interactional Tasks. Instructions

The Picture Task (mother and child)

Settings:

- Mother and child should be seated together in front of the laptop with the task.

Instruction:

- Mothers are given the set of 10 pictures and asked "*Can you look and talk about these pictures with ____ like you would with a bedtime story or looking at a magazine together*"

Scaffolding Tasks (mother and child)

Tangram

Settings:

Mother and child should be seated together. Show mother how it works first and give her a chance to practice (preferably while child is doing another task).

Instruction:

- To child: I'd like you to copy the pictures using these blocks and your mum is going to help you.
- To mother: Please help as and when your child needs it.

Dinosaurs bonds to 10

Instruction:

- To child: See how many different ways you can make 10. Here's one way to start you off... (and demonstrate with an example)
- To mother: *Please help as and when your child needs it*.

Card Sorting game

Instruction:

- To child: Now we will play the card sorting game. You need to put in one group everything that flies, everything that swims, everything that walks or runs.
- To mother: *can you help as and when child needs it.*

APPENDIX D. Mother's booklet

Learning Together @ Home

Parental booklet

Date _ _/_ _/_ _ _ _ Participant ID _ _
Completed by ______________________

In this booklet there are several questionnaires which ask you about the thoughts and feelings you experience as a parent on a daily basis. This is not a test and there are no right or wrong answers; everyone will have different answers as different people have different feelings. All information that is collected about you during the course of the research will be kept strictly confidential and will be stored on our database separately from your personal details, so please answer as honestly as you can.

Please read these instructions carefully before you start.

All of the following questions ask you to put an 'X' in the box next to your answer.

For example:

	Like it very much	Do like it	It's OK	Don't like it	Don't like at all
I like skiing	**X**				

Each section has its own set of instructions so please read them carefully.

Part One: Your home

Below are some things that happen in most homes. Please read each item carefully and put an 'X' in the box next to the response that best describes your home.

		Definitely Untrue	Somewhat Untrue	Not really	Somewhat True	Definitely True
1.	The children have a regular bedtime routine (e.g., same bed each night, a bath before bed, reading a story)					
2.	You can't hear yourself think in our home					
3.	It's a real zoo in our home					
4.	We are usually able to stay on top of things					
5.	There is usually a television turned on somewhere in our home					
6.	The atmosphere in our house is calm					

This section is about the things that parents and children sometimes do together. Please indicate how common it is for you and your child to do the following things.

How often do you and your child:		Not at all in last month	Not at all in last week but at least 1 in last month	Once or twice in the last week	3 or 4 times in the last week	5 or 6 times in the last week	Every day	More than once a day
1	Spend time together							
2	Give each other a hug, kiss, pat on the back or other physical sign of affection							

	How often do you and your child:	Not at all in last month	Not at all in last week but at least 1 in last month	Once or twice in the last week	3 or 4 times in the last week	5 or 6 times in the last week	Every day	More than once a day
3	Play games, sports, etc., together							
4	Visit friends or relatives							
5	Buy or make a gift for another family member							
6	Laugh together about something							
7	Work on school work together							
8	Go for a walk, bike, ride, swim, picnic, fishing, jogging, exercising, to the beach, etc.							
9	Go to or give a party together							
10	Build or make something together (e.g., make a model, cook a meal, repair something)							
11	Play a musical instrument, sing together or listen to music together							
12	Praise or give a compliment to each other							
13	Go out together shopping or for dinner, to a film, or museum, to get a snack							
14	Get extra privileges, (e.g., staying up late)							
15	Get extra money or something special like a surprise gift							
16	Go to see him/her perform or display his/her work or skills in a sporting event, concert, play, art show, etc.							
17	Talk about something that is worrying or concerning her/him							
18	Participate in a hobby together (e.g., stamp collecting, model building, woodwork, sewing)							

The statements below describe a lot of events that routinely occur in families with young children. These events sometimes make life difficult. Please read each item and circle how often it happens to you and then circle how much of a 'hassle' you feel that it has been for you over the last six months. If you have more than one child, these events can include any or all of your children.

	EVENT	How Often It Happens				Hassle (low to high)
1	Continually cleaning up messes of toys or food	Rarely	Sometimes	A lot	Constantly	1 2 3 4 5
2	Being nagged, whined at, complained to	Rarely	Sometimes	A lot	Constantly	1 2 3 4 5
3	Meal-time difficulties with picky eaters, complaining etc.	Rarely	Sometimes	A lot	Constantly	1 2 3 4 5
4	The kids won't listen or do what they are asked without being nagged	Rarely	Sometimes	A lot	Constantly	1 2 3 4 5
5	Baby-sitters are hard to find	Rarely	Sometimes	A lot	Constantly	1 2 3 4 5
6	The kids schedules (like pre-school or other activities) interfere with meeting your own household needs	Rarely	Sometimes	A lot	Constantly	1 2 3 4 5
7	Sibling arguments or fights require a 'referee'	Rarely	Sometimes	A lot	Constantly	1 2 3 4 5
8	The kids demand that you entertain them or play with them	Rarely	Sometimes	A lot	Constantly	1 2 3 4 5
9	The kids resist or struggle with you over bed-time	Rarely	Sometimes	A lot	Constantly	1 2 3 4 5
10	The kids are constantly underfoot, interfering with other chores	Rarely	Sometimes	A lot	Constantly	1 2 3 4 5
11	The need to keep a constant eye on where the kids are and what they are doing	Rarely	Sometimes	A lot	Constantly	1 2 3 4 5

	EVENT	How Often It Happens				Hassle (low to high)
12	The kids interrupt adult conversations or interactions	Rarely	Sometimes	A lot	Constantly	1 2 3 4 5
13	Having to change your plans because of unprecedented child needs	Rarely	Sometimes	A lot	Constantly	1 2 3 4 5
14	The kids get dirty several times a day requiring changes of clothing	Rarely	Sometimes	A lot	Constantly	1 2 3 4 5
15	Difficulties in getting privacy (eg. in the bathroom)	Rarely	Sometimes	A lot	Constantly	1 2 3 4 5
16	The kids are hard to manage in public (grocery store, shopping centre, restaurant)	Rarely	Sometimes	A lot	Constantly	1 2 3 4 5
17	Difficulties in getting kids ready for outings and leaving on time	Rarely	Sometimes	A lot	Constantly	1 2 3 4 5
18	Difficulties in leaving kids for a night out or at school or day care	Rarely	Sometimes	A lot	Constantly	1 2 3 4 5
19	The kids have difficulties with friends (eg. fighting, trouble, getting along, or no friends available)	Rarely	Sometimes	A lot	Constantly	1 2 3 4 5
20	Having to run extra errands to meet the kids needs	Rarely	Sometimes	A lot	Constantly	1 2 3 4 5

Part Two: About your child

For each statement below, please put an 'X' in the box that indicates the most appropriate response for your child. It would help us if you answered all items as best as you can, even if you are not absolutely certain or if the statement sounds silly! Please give your answers on the basis of your child's behaviour over the last six months.

		Not True	Sometimes True	Certainly True
1	Considerate of other people's feelings			
2	Restless, overactive, cannot stay still for long			
3	Often complains of headaches, stomach-aches or sickness			
4	Shares readily with other children (treats, toys, pencils etc.)			
5	Often has temper tantrums or hot tempers			
6	Rather solitary, tends to play alone			
7	Generally obedient, usually does what adults request			
8	Many worries, often seems worried			
9	Helpful if someone is hurt, upset or feeling ill			
10	Constantly fidgeting or squirming			
11	Has at least one good friend			
12	Often fights with other children or bullies them			
13	Often unhappy, down-hearted or tearful			
14	Generally liked by other children			
15	Easily distracted, concentration wanders			
16	Nervous or clingy in new situations, easily loses confidence			
17	Kind to younger children			
18	Often lies or cheats			
19	Picked on or bullied by other children			
20	Often volunteers to help others (parents, teachers, other children)			

		Not True	Sometimes True	Certainly True
21	Thinks things out before acting			
22	Steals from home, school or elsewhere			
23	Gets on better with other adults than with other children			
24	Many fears, easily scared			
25	Sees tasks through to the end, good attention span			

Please rate how often your child exhibits the following behaviours or emotional states by putting an 'X' in the box next to each statement.

		Never	Sometimes	Often	Always
1	My child is cheerful				
2	Exhibits wide mood swings (for example, her/his emotional state is difficult to anticipate because s/he moves quickly from very positive to very negative emotional states)				
3	Responds positively to neutral or friendly overtures by adults				
4	Transitions well from one activity to another (for example, does not become anxious, angry, distressed, or overly excited when moving from one activity to another)				
5	Can recover quickly from episodes of upset or distress (for example, does not pout or remain sullen, anxious or sad after emotionally distressing events)				
6	My child is easily frustrated				
7	Responds positively to neutral or friendly overtures by peers				
8	Tantrums easily				
9	My child Is able to delay gratification				

		Never	Sometimes	Often	Always
10	Takes pleasure in the distress of others (for example, laughs when another person gets hurt or punished; enjoys teasing others)				
11	Can modulate excitement in emotionally arousing situations (for example, does not get 'carried away' in high-energy play situations, or overly excited in inappropriate contexts)				
12	S/he Is whiny or clingy with teachers				
13	My child is prone to disruptive outbursts of energy and exuberance				
14	Responds angrily to limit-setting by adults				
15	Can say when s/he is feeling sad, angry or mad, fearful or afraid				
16	Seems sad or listless				
17	Is overly exuberant when attempting to engage others in play				
18	Displays flat affect (for example, expression is vacant and unexpressive; child seems emotionally absent)				
19	Responds negatively to neutral or friendly overtures by peers (for example, speaks in an angry tone of voice; or responds angrily and aggressively)				
20	My child is impulsive				
21	S/he is empathic toward others; shows concern or sadness when others are upset or distressed				
22	Displays exuberance that others find intrusive or disruptive				
23	Displays appropriate negative affect (for example, anger, fear, frustration, distress) in response to hostile, aggressive or intrusive acts by peers				
24	Displays negative affect when attempting to engage others in play				

Part Three: About you

Please answer each statement below by marking with (X) the in the box next to the response that best reflects your degree of agreement or disagreement with that statement. There are seven possible responses to each statement ranging from 'Completely Disagree' to 'Completely Agree'.
Do not think too long about the exact meaning of the statements. Work quickly and try to answer as accurately as possible.

		Completely Disagree	**Mostly Disagree**	**Somewhat Disagree**	**Neither Agree Nor Disagree**	**Somewhat Agree**	**Mostly Agree**	**Completely Agree**
1	Expressing my emotions with words is not a problem for me.							
2	I often find it difficult to see things from another person's viewpoint.							
3	On the whole, I'm a highly motivated person.							
4	I usually find it difficult to regulate my emotions.							
5	I generally don't find life enjoyable.							
6	I can deal effectively with people.							
7	I tend to change my mind frequently.							
8	Many times, I can't figure out what emotion I'm feeling.							
9	I feel that I have a number of good qualities.							
10	I often find it difficult to stand up for my rights.							
11	I'm usually able to influence the way other people feel.							
12	On the whole, I have a gloomy perspective on most things.							

		Completely Disagree	Mostly Disagree	Somewhat Disagree	Neither Agree Nor Disagree	Somewhat Agree	Mostly Agree	Completely Agree
13	Those close to me often complain that I don't treat them right.							
14	I often find it difficult to adjust my life according to the circumstances.							
15	On the whole, I'm able to deal with stress							
16	I often find it difficult to show my affection to those close to me.							
17	I'm normally able to "get into someone's shoes" and experience their emotions.							
18	I normally find it difficult to keep myself motivated.							
19	I'm usually able to find ways to control my emotions when I want to.							
20	On the whole, I'm pleased with my life.							
21	I would describe myself as a good negotiator.							
22	I tend to get involved in things I later wish I could get out of.							
23	I often pause and think about my feelings.							
24	I believe I'm full of personal strengths.							
25	I tend to "back down" even if I know I'm right.							
26	I don't seem to have any power at all over other people's feelings.							
27	I generally believe that things will work out fine in my life.							
28	I find it difficult to bond well even with those close to me.							
29	Generally, I'm able to adapt to new environments.							
30	Others admire me for being relaxed.							

The questions below involve two distinct aspects of your emotional life. One is your emotional experience, or what you feel like inside. The other is your emotional expression, or how you show your emotions in the way you talk, gesture, or behave. Although some of the following questions may seem similar to one another, they differ in important ways.

		Completely Disagree	Mostly Disagree	Somewhat Disagree	Neither Agree Nor Disagree	Somewhat Agree	Mostly Agree	Completely Agree
1	When I want to feel more positive emotion (such as joy or amusement), I change what I'm thinking about.							
2	I keep my emotions to myself							
3	When I am feeling positive emotions, I am careful not to express them.							
4	When I'm faced with a stressful situation, I make myself think about it in a way that helps me stay calm.							
5	I control my emotions by not expressing them.							
6	When I want to feel more positive emotion, I change the way I'm thinking about the situation.							
7	I control my emotions by changing the way I think about the situation I'm in.							
8	When I am feeling negative emotions, I make sure not to express them.							
9	When I want to feel less negative emotion, I change the way I'm thinking about the situation.							

APPENDIX E. Child's booklet

Learning Together @ Home

Canterbury Christ Church University

Learning Together @ Home

Child booklet

Date _ _/_ _/_ _ _ _ Participant ID _ _ _

Completed by ______________

Digit Span

Forward:

I will tell you a few numbers and once I'll be finish speaking, I would like you to repeat then back to me in EXACTLY the same order. Ok? Let's try

Practise: (2-7; 1-5-2)

First round	Second round	Score
3-8-6	6-1-2	3
3-4-1-7	6-1-5-8	4
8-4-2-3-9	5-2-1-8-6	5
3-8-9-1-7-4	7-9-6-4-8-3	6
5-1-7-4-2-3-8	9-8-5-2-1-6-3	7
1-6-4-5-9-7-6-3	2-9-7-6-3-1-5-4	8
5-3-8-7-1-2-4-6-9	4-2-6-9-1-7-8-3-5	9

Backward: Now we will play a slightly different game, I'll tell you the numbers again, BUT this time I'd like you to repeat them in the reverse order (backwards). For example, I will say one-two-three and you will say three-two-one. Do you understand?

Let's practice (7-1; 2-6-1) Ready for real game?

First round	Second round	Score
2-5	6-3	2
5-7-4	2-5-9	3
7-2-9-6	8-4-9-3	4
4-1-3-5-7	9-7-8-5-2	5
1-6-5-2-9-8	3-6-7-1-9-4	6
8-5-9-2-3-7	4-5-7-9-2-8-1	7
6-9-1-6-3-2-5-8	3-1-7-9-5-4-8-2	8

Verbal fluency (60 sec each):

Now we will play a game and check how many words you know. I going to name something and I want you to name as many as possible of this type of things.

A cat is an animal. Can you name as many ***animals*** as you can think of?

An apple is a food. Can you name as many ***type of food*** as you can think of?

Red is a colour. Can you name as many ***colours*** as you can think of?

Unexpected Transfer (Sally-Anne) Task

Place the dolls in their separate bags on each side of the table. Place the two bowls equidistant from the participant.

"Can you check that the bowls are empty? Could you now put the lids on the bowls?"

Bring out Sally and the ball. "This is Sally. Sally is playing with her ball."

Make Sally play with the ball. "She is tired now, so she puts the ball in the BLUE bowl and goes away"

Put the ball in the blue bowl and put the lid on, and place Sally in the bag. "She can't hear us and she can't see us."

"This is Anne." Take Anne out of the bag. "She wants something to play with. She looks in the BLUE bowl and finds the ball and plays with it."

Make Anne find the ball and play with it. "She has finished playing with it now and puts the ball in the RED box and goes away."

Put the ball in the red bowl and replace lid. Put Anne back in her bag.
"Sally has woken up now and wants her ball."

Take Sally out of her bag.

<u>**Section 1:** Belief/Justification Questions</u>

Belief Question: *Where will Sally look first?* (1 point)__________________

Correct (Blue) ☐ Incorrect ☐

Justification Question: *Why will she look there first?* (1 point) ___________

Correct (She left it there) ☐ Incorrect ☐

<u>**Section 2: Control Questions**</u>

Control Question 1: *Where did Sally put the ball in the beginning?* __________

Correct ☐ Incorrect ☐

Control Question 2: *Where is the ball now?* ____________________________

Correct ☐ Incorrect ☐

Total Score (for Section 1; max score 2):

Unexpected Contents (Smarties) Task

"This is Jack. I'm going to put him in my bag where he can't see or hear us."

Take out the Smarties. Point to the packet. "What do you think is in here?"

If 'don't know' or wrong answer, ask "What are these?" pointing to the picture of the Smarties on the box. Then ask "So what's in here?" (If still don't know or wrong answer, abandon test.)

"Let's have a look." Tip the packet onto the table. "Look, there are pencils inside. There aren't any Smarties. Let's put the pencils back inside."

Point to the packet. "So do you remember what's in here?"

(If still 'don't know' or wrong answer, open and show.) "So what's in here?" (If still 'don't know' or wrong answer, abandon test.)

Self Question: *When I first showed you this box, all closed up like this, what did you first think was in there?* (1 point)

Correct (Smarties) ☐ Incorrect ☐

"Now let's get Jack." *Take the doll out of the bag.*

Other Question: *Remember Jack didn't see or hear what was inside. When we first show Jack this box, before she looks inside, what will she say is in there?* (1 point)

Forced Choice: *Will Jack say there are Smarties or pencils in the box?*

Correct (Smarties) ☐ Incorrect ☐

Justification Question: *Why will Jack say there are …..... in there?* (1 point)

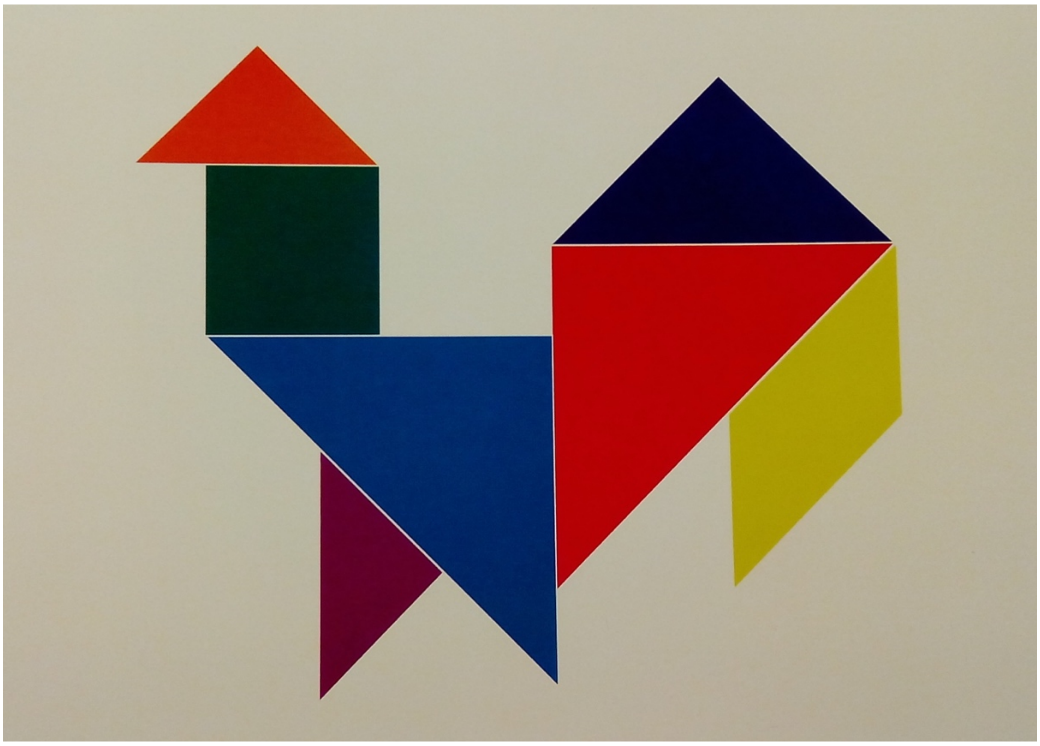
Total score (max 3 points): __________

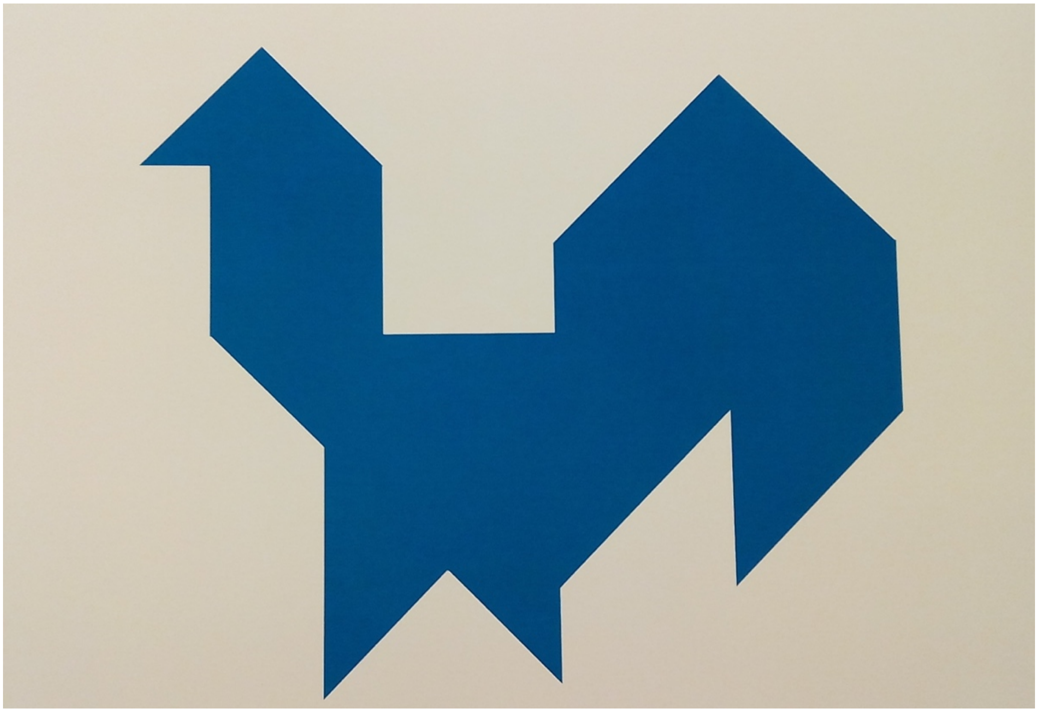
BPVS

ACES

APPENDIX F. Example of the scaffolding tasks

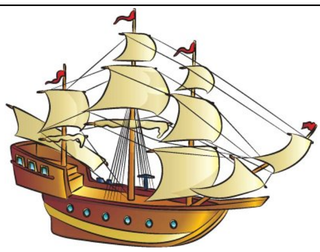
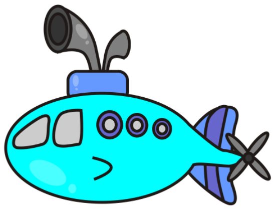
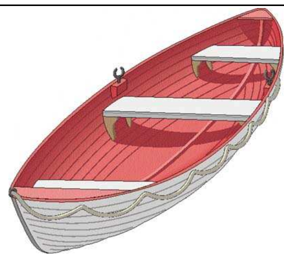
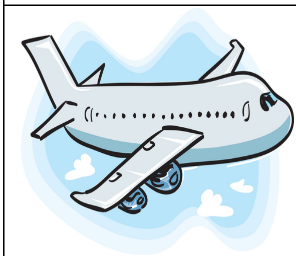
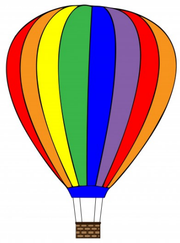
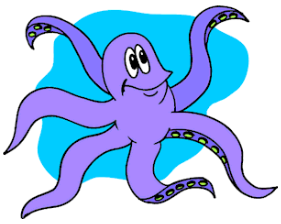
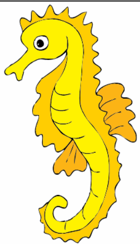
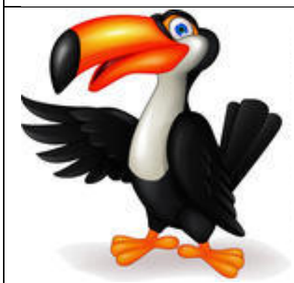
1. Tangram puzzle





2. *Card Sorting game*

It can…	*Animals*	*Vehicle*
????		
????		

3. Number bond game

+

APPENDIX G. Tables: The interrelationship between mother and child behaviour in scaffolding interaction

Table G.1

Assessment of the normal distribution across all the behavioural dimensions at Time 1 and Time 2

Variables	Kolmogorov-Smirnov		Shapiro-Wilk		Skewness	Kurtosis
	Statistic	*p*	Statistic	*p*		
TIME 1						
Mother's Scaffolding Behaviour						
Quality of information	.12	.02	.97	.08	-.36	-.35
Contingency	.13	.01	.97	.10	-.35	-.26
Positive Affect	.16	.00	.95	.01	.54	-.07
Negative Affect	.27	.00	.63	.00	2.63	7.76
Over-control	.14	.00	.93	.00	.91	1.17
Child's Scaffolding Behaviour						
Level of difficulty (time)	.09	.20	.97	.07	.49	-.06
Amount of help required	.14	.00	.95	.02	-.20	-.79
On Task	.17	.00	.88	.00	-.68	-.46
Autonomy	.11	.06	.96	.06	-.38	-.47
Positive Affect	.15	.00	.95	.01	.60	-.27
Negative Affect	.25	.00	.76	.00	2.04	5.58
Non-compliance	.24	.00	.81	.00	1.71	3.70
Dyad's Scaffolding Behaviour						
Intersubjectivity	.09	.20	.96	.03	-.56	.77
Conflict	.52	.00	.34	.00	3.80	15.51
TIME 2						
Mother's Scaffolding Behaviour						
Quality of information	.15	.02	.96	.04	-.49	-.06
Contingency	.12	.00	.97	.07	.00	-.73
Positive Affect	.17	.00	.96	.03	.62	.39
Negative Affect	.38	.00	.59	.00	2.72	9.36
Over-control	.18	.00	.91	.00	.93	3.89
Child's Scaffolding Behaviour						
Level of difficulty (time)	.09	.20	.95	.01	.79	.96
Amount of help required	.13	.01	.97	.10	.35	.66
On Task	.29	.00	.74	.00	-1.35	.69
Autonomy	.12	.02	.96	.04	-.15	-.58
Positive Affect	.11	.06	.93	.00	.85	1.56
Negative Affect	.33	.00	.64	.00	2.34	5.79
Non-compliance	.23	.00	.84	.00	1.48	2.82
Dyad's Scaffolding Behaviour						
Intersubjectivity	.11	.08	.97	.18	-.39	.20
Conflict	.52	.00	.36	.00	3.63	14.13

Time 1: Degree of freedom (df)=68; *Time 2: Degree of freedom (df)*=63

Table G.2

Hierarchical regression analysis of mother's scaffolding dimensions predicting child's level of difficulty (N= 68). Time 1

Variables	*Model 1*			*Model 2*			*Model 3*			*Model 4*		
	B	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Scaffolding Strategy	-22.43	17.02	-.18	-25.08	17.43	-.20	-9.03	16.21	-.07	-2.04	19.10	-.02
Positive Affect				12.88	10.66	-.15	19.42	10.10	.22	17.82	10.53	.20
Negative Affect							59.26	32.07	.34	59.72	31.72	.34
Over-control										8.71	12.33	.10
Adjusted R^2		.02			.02			.10			.09	
F for change in R^2		2.24			1.84			3.50*			2.73*	

B- unstandardised beta coefficient; SE- standard error; β- standardised beta;

**p < .05. **p < .01. ***p < .001*

Table G.3

Hierarchical regression analysis of mother's scaffolding dimensions predicting child's on task behaviour (N= 68). Time 1

Variables	*Model 1*			*Model 2*			*Model 3*			*Model 4*		
	B	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Scaffolding Strategy	.16	.11	.18	.16	.11	.18	.07	.12	.07	-.06	.14	-.07
Positive Affect				.01	.09	.01	-.03	.09	-.05	-.00	.09	-.00
Negative Affect							-.34	.20	-.27	-.35	.20	-.28
Over-control										-.15	.07	-.25*
Adjusted R^2		.02			.00			.05			.08	
F for change in R^2		2.21			1.09			2.10			2.39	

B- unstandardised beta coefficient; SE- standard error; β- standardised beta;

**p < .05. **p < .01. ***p < .001*

Table G.4

Hierarchical regression analysis of mother's scaffolding dimensions predicting child's negative affect (N= 68). Time 1

Variables	*Model 1*			*Model 2*			*Model 3*			*Model 4*		
	B	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Scaffolding Strategy	.07	.12	.09	.07	.12	.10	.08	.13	.11	.17	.17	.23
Positive Affect				-.02	.07	-.03	-.01	.08	-.02	-.03	.08	-.06
Negative Affect							.04	.15	.03	.04	.15	.04
Over-control										.11	.09	.21
Adjusted R^2		-.01			-.02			-.04			-.02	
F for change in R^2		.56			.30			.22			.67	

B- unstandardised beta coefficient; SE- standard error; β- standardised beta;

**p < .05. **p < .01. ***p < .001*

Table G.5

Hierarchical regression analysis of mother's scaffolding dimensions predicting child's non-compliance (N= 68). Time 1

Variables	*Model 1*			*Model 2*			*Model 3*			*Model 4*		
	B	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Scaffolding Strategy	.05	.10	.07	.05	.10	.07	.09	.11	.13	.20	.13	.28
Positive Affect				.01	.08	.02	.03	.08	.06	.01	.08	.01
Negative Affect							.16	.14	.16	.17	.13	.17
Over-control										.13	.10	.27
Adjusted R^2		-.01			-.03			-.02			.02	
F for change in R^2		.36			.20			.58			1.28	

B- unstandardised beta coefficient; SE- standard error; β- standardised beta;

**p < .05. **p < .01. ***p < .001*

Table G.6

Hierarchical regression analysis of child's scaffolding dimensions predicting mother's negative affect (N= 68). Time 1

Variables	*Model 1*			*Model 2*			*Model 3*			*Model 4*			*Model 5*			*Model 6*		
	B	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Level of difficulty	.00	.00	.31	.00	.00	.25	.00	.00	.24	.00	.00	.24	.00	.00	.24	.00	.00	.24
On Task				-.18	.11	-.23	-.17	.13	-.21	-.17	.13	-.21	-.22	.18	-.27	-.22	.18	-.27
Autonomy							-.03	.10	-.04	-.03	.10	-.04	-.03	.10	-.04	-.03	.10	-.04
Positive Affect										-.01	.07	-.01	-.03	.07	-.06	-.03	.07	-.06
Negative Affect													-.12	.15	-.13	-.12	.17	-.13
Non-compliance																.00	.12	-.00
Adjusted R^2		.08			.12			.10			.09			.09			.07	
F for change in R^2		6.78*			5.39**			3.58*			2.65*			2.30			1.89	

B- unstandardised beta coefficient; SE- standard error; β- standardised beta;

**p < .05. **p < .01. ***p < .001*

Table G.7

Hierarchical regression analysis of mother's scaffolding dimensions predicting child's negative affect (N= 63). Time 2

Variables	*Model 1*			*Model 2*			*Model 3*			*Model 4*		
	B	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Scaffolding Strategy	-.02	.08	-.02	.00	.08	.00	.10	.09	.15	.07	.11	.11
Positive Affect				-.07	.04	-.17	-.02	.05	-.05	-.02	.05	-.04
Negative Affect							.39	.21	.40	.39	.22	.40
Over-control										-.03	.06	-.06
Adjusted R^2		-.02			.00			.10			.09*	
F for change in R^2		.03			.88			3.38*			2.53	

B- unstandardised beta coefficient; SE- standard error; β- standardised beta;

**p < .05. **p < .01. ***p < .001*

Table G.8

Hierarchical regression analysis of mother's scaffolding dimensions predicting child's non-compliance (N= 63). Time 2

Variables	*Model 1*			*Model 2*			*Model 3*			*Model 4*		
	B	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Scaffolding Strategy	.02	.11	.02	.00	.11	.01	.07	.12	.08	.08	.13	.10
Positive Affect				.05	.06	.10	.08	.06	.16	.08	.07	.16
Negative Affect							.07	.30	.22	.26	.30	.22
Over-control										.02	.09	.03
Adjusted R^2		-.02			-.02			.00			-.02	
F for change in R^2		.03			.28			.92			.68	

B- unstandardised beta coefficient; SE- standard error; β- standardised beta;

$*p < .05$. $**p < .01$. $***p < .001$

Table G.9

Hierarchical regression analysis of child's scaffolding behaviour at Time 1 predicting child's negative affect at Time 2. (N=63)

Variables	*Model 1*			*Model 2*			*Model 3*			*Model 4*			*Model 5*			*Model 6*		
	B	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Negative Affect	.10	.13	.13	.10	.13	.13	.00	.00	.09	.07	.15	.09	-.02	.16	-.02	.01	.15	.01
Level of difficulty				.00	.00	-.01	.00	.00	-.02	.00	.00	-.02	.00	.00	.05	.00	.00	.06
On Task							.-.07	.08	-.10	-.07	.08	-.10	-.13	.08	-.19	-.15	.10	-.21
Autonomy										.00	.07	.00	.02	.07	.03	.02	.07	.03
Positive Affect													-.13	.04	-.29*	-.13	.04	-.29*
Non-compliance																-.07	.19	-.08
Adjusted R2		.01			-.02			-.03			-.04			.01			.00	
F for change in R2		1.07			.53			.50			.37			1.15			.99	

B- unstandardised beta coefficient; SE- standard error; β- standardised beta;

**p* < .05. ***p* < .01. ****p* < .001

Table G.10

Hierarchical regression analysis of mother's scaffolding dimensions at Time 1 predicting child's level of difficulty at Time 2. (N=63)

Variables	Model 1			Model 2			Model 3			Model 4			Model 5		
	B	SE B	β	B	SE B	β	B	SE B	β	B	SE B	β	B	SE B	β
Child's Level of Difficulty	.57	.13	.50**	.60	.14	.53**	.60	.14	.53**	.56	.16	.49**	.57	.16	.50**
Maternal Scaffolding Strategy				22.04	14.32	.16	22.21	14.41	.17	26.99	14.55	.20	12.94	16.09	.10
Positive Affect							-.85	11.36	-.01	1.70	12.32	.02	3.56	12.89	.04
Negative Affect										22.51	37.39	.11	20.95	37.82	.10
Over-control													-16.94	11.80	-.18
Adjusted R^2		.24			.26			.24			.24			.25	
F for change in R^2		20.82***			11.70***			7.67***			5.85**			5.08**	

B- unstandardised beta coefficient; SE- standard error; β- standardised beta;

$*p < .05$. $**p < .01$. $***p < .001$

Table G.11

Hierarchical regression analysis of mother's scaffolding dimensions at Time 1 predicting child's on task behaviour at Time 2. (N=63)

Variables	*Model 1*			*Model 2*			*Model 3*			*Model 4*			*Model 5*		
	B	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Child's On Task	.36	.11	.42**	.35	.11	.41**	.35	.11	.41**	.30	.12	.35**	.35	.13	.41**
Maternal Scaffolding Strategy				.04	.09	.05	.05	.09	.06	-.01	.09	-.01	.08	.10	.12
Positive Affect							-.05	.07	-.10	-.07	.06	-.14	-.09	.06	-.16
Negative Affect										-.23	.16	-.21	-.21	.17	-.18
Over-control													.11	.07	.22
Adjusted R^2		.16			.15			.15			.16			.18	
F for change in R^2		12.90**			6.46**			4.53**			4.00**			3.71**	

B- unstandardised beta coefficient; SE- standard error; β- standardised beta;

**p < .05. **p < .01. ***p < .001*

Table G.12

Hierarchical regression analysis of child's scaffolding dimensions at Time 1 predicting mother's scaffolding strategy at Time 2. (N=63)

Variables	*Model 1*			*Model 2*			*Model 3*			*Model 4*			*Model 5*			*Model 6*			*Model 7*		
	B	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Maternal Scaffolding Strategy T1	.78	.08	.86**	.79	.08	.87**	.78	.08	.86**	.76	.08	.84**	.76	.08	.84**	.76	.08	.84**	.77	.08	.84**
Child's Level of Difficulty				.00	.00	.08	.00	.00	.10	.00	.00	.12	.00	.00	.11	.00	.00	.11	.00	.00	.11
On Task							.12	.06	.11	.10	.07	.09	.10	.07	.09	.09	.08	.08	.08	.08	.08
Autonomy										.05	.08	.05	.05	.08	.05	.05	.08	.05	.05	.08	.05
Positive Affect													.01	.05	.02	.01	.05	.01	.01	.05	.01
Negative Affect																-.03	.08	-.02	-.02	.09	-.02
Non-compliance																			-.02	.09	-.02
Adjusted R^2	.73			.73			.74			.73			.73			.72			.72		
F for change in R^2	165.91***			84.48***			58.81***			43.75***			34.43***			28.25***			23.81***		

B- unstandardised beta coefficient; SE- standard error; β- standardised beta;

**p < .05. **p < .01. ***p < .001*

Table G.13

Hierarchical Regression Analysis Predicting Mother's Positive Affect at Time 2 on Child's Scaffolding Dimensions at Time 1. (N=63)

Variables	*Model 1*			*Model 2*			*Model 3*			*Model 4*			*Model 5*			*Model 6*			*Model 7*		
	B	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Maternal Positive Affect T1	.52	.13	.48**	.52	.13	.49**	.52	.13	.49**	.51	.13	.48**	.51	.13	.48**	.53	.13	.49**	.53	.14	.49**
Child's Level of Difficulty				.00	.00	-.03	.00	.00	-.04	.00	.00	-.01	.00	.00	-.01	.00	.00	-.01	.00	.00	-.01
On Task							-.12	.20	-.07	-.18	.23	-.10	-.18	.24	-.10	-.24	.25	-.14	-.23	.25	-.13
Autonomy										.14	.21	.10	.14	.21	.10	.14	.21	.10	.14	.21	.10
Positive Affect													.00	.15	.00	-.03	.15	-.03	-.03	.15	-.03
Negative Affect																-.13	.32	-.06	-.14	.36	-.07
Noncompliance																			.03	.30	.01
Adjusted R^2		.22			.21			.20			.19			.18			.17			.15	
F for change in R^2		18.57***			9.17***			6.16**			4.70**			3.70**			3.07*			2.59*	

B- unstandardised beta coefficient; SE- standard error; β- standardised beta;

**p < .05. **p < .01. ***p < .001*

Table G.14

Hierarchical regression analysis of child's scaffolding dimensions at Time 1 predicting mother's negative affect at Time 2. (N=63)

Variables	*Model 1*			*Model 2*			*Model 3*			*Model 4*			*Model 5*			*Model 6*			*Model 7*		
	B	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Maternal Negative Affect T1	.60	.21	.63**	.59	.21	.62*	.64	.21	.68**	.65	.21	.68**	.65	.21	.69**	.66	.21	.69**	.66	.21	.69**
Child's Level of Difficulty				.00	.00	.02	.00	.00	.03	.00	.00	.03	.00	.00	.04	.00	.00	.03	.00	.00	.04
On Task							.14	.09	.20	.14	.09	.20	.14	.09	.19	.18	.10	.26	.17	.10	.24
Autonomy										.01	.06	.01	.01	.06	.01	.01	.06	.01	.01	.06	.01
Positive Affect													-.02	.06	-.04	.00	.06	.00	.00	.06	.00
Negative Affect																.10	.11	.12	.13	.12	.16
Non-compliance																			-.07	.10	-.08
Adjusted R^2	.39			.38			.40			.39			.38			.38			.38		
F for change in R^2	39.97***			19.69***			14.94***			11.02***			8.71***			7.45***			6.39***		

B- unstandardised beta coefficient; SE- standard error; β- standardised beta;

**p < .05. **p < .01. ***p < .001*

Table G.15

Simple linear regression of dyadic intersubjectivity at Time 1 predicting dyadic intersubjectivity at Time 2. (N=63)

Variables	*B*	*SE B*	*β*	*Adjusted R^2*	*F*
Intersubjectivity	.60	.11	.56**	.30	27.22***

B- unstandardised beta coefficient; SE- standard error; β- standardised beta

**p* < .05. ***p* < .01. ****p* < .001*

Table G.16

Hierarchical regression analysis of mother's scaffolding dimensions at Time 1 predicting dyadic intersubjectivity at Time 2. (N= 63)

Variables	*Model 1*			*Model 2*			*Model 3*			*Model 4*			*Model 5*		
	B	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Dyadic Intersubjectivity	.60	.11	.56**	.47	.14	.44**	.39	.14	.36**	.32	.14	.29*	.33	.15	.30*
Maternal Scaffolding Strategy				.23	.16	.20	.26	.16	.23	.20	.16	.17	.24	.17	.21
Positive Affect							.14	.08	.17	.12	.09	.14	.11	.09	.13
Negative Affect										-.40	.27	-.22	-39	.27	-.22
Over-control													.06	.10	.07
Adjusted R^2		.30			.31			.33			.35			.34	
F for change in R^2		27.22***			15.19***			11.00***			9.39***			7.49***	

B- unstandardised beta coefficient; SE- standard error; β- standardised beta;

**p < .05. **p < .01. ***p < .001*

Table G.17

Hierarchical regression analysis of child's scaffolding dimensions at Time 1 predicting dyadic intersubjectivity at Time 2. (N= 63)

Variables	*Model 1*			*Model 2*			*Model 3*			*Model 4*			*Model 5*			*Model 6*			*Model 7*		
	B	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Dyadic Intersubjectivity	.60	.12	.56**	.61	.12	.57**	.58	.13	.54**	.57	.14	.53**	.50	.15	.46**	.49	.16	.45**	.49	.17	.45**
Child's Level of Difficulty				.00	.00	.06	.00	.00	.09	.00	.00	.10	.00	.00	.05	.00	.00	.04	.00	.00	.04
On Task							.23	.16	.17	.21	.17	.15	.25	.18	.18	.27	.22	.20	.27	.23	.20
Autonomy										.04	.18	.04	.05	.18	.05	.05	.18	.05	.05	.18	.05
Positive Affect													.14	.10	.16	.15	.12	.18	.16	.12	.18
Negative Affect																.06	.22	.04	.06	.24	.04
Non-compliance																			-.02	.23	-.01
Adjusted R^2	.30			.29			.30			.29			.30			.29			.28		
F for change in R^2	27.22***			13.62***			10.02***			7.41***			6.36***			5.23***			4.40**		

B- unstandardised beta coefficient; SE- standard error; β- standardised beta;

**p* < .05. ***p* < .01. ****p* < .001

APPENDIX H. Tables and figures: The contribution of person and contextual factors to mother and child behavior in scaffolding interaction

Table H.1.1

Assessment of the normal distribution of person and contextual characteristics at Time 1

Variables	Kolmogorov-Smirnov Statistic	Kolmogorov-Smirnov *p*	Shapiro-Wilk Statistic	Shapiro-Wilk *p*	Skewness	Kurtosis
Child's Person Characteristics						
Working memory	.17	.00	.95	.01	.02	-.83
VMA	.08	.20	.98	.43	.28	.44
Hyperactivity/ inattention	.14	.00	.95	.01	-.09	-.92
Emotional symptoms	.20	.00	.91	.00	.58	-.56
Conduct problems	.20	.00	.89	.00	.77	.30
Peer problems	.23	.00	.87	.00	.92	.24
Pro-social behaviour	.16	.00	.89	.00	-.87	.45
Emotion recognition	.12	.03	.97	.11	-.47	.50
Lability/Negativity	.12	.03	.98	.23	-.06	.34
Emotion Regulation	.11	.05	.96	.05	-.41	-.13
Theory of mind	.30	.00	.79	.00	-.85	-.56
Cognitive MS	.17	.00	.86	.00	.99	.01
Emotion MS	.17	.00	.87	.00	1.66	3.83
Desire MS	.24	.00	.61	.00	4.14	23.54
Modulation of assertion MS	.21	.00	.82	.00	1.20	.73
Other MS	.41	.00	.51	.00	3.00	9.50
Mother's Person Characteristics						
Education	.28	.00	.81	.00	-1.52	2.78
Expression of affection	.09	.20	.97	.14	.50	-.01
Parenting stress intensity	.07	.20	.99	.58	.35	.45
Parenting stress frequency	.10	.10	.99	.74	-.20	-.06
Emotion Intelligence	.06	.20	.98	.41	-.22	-.46
Reappraisal	.12	.02	.96	.03	-.74	.52
Suppression	.11	.05	.97	.13	.21	-.79
Cognitive MS	.10	.20	.99	.56	.10	-.41
Emotion MS	.06	.20	.97	.13	.47	-.26
Desire MS	.09	.20	.95	.01	.72	.29
Modulation of assertion MS	.10	.19	.94	.00	.78	.20
Other MS	.20	.00	.79	.00	1.98	4.80
Contextual factors						
Household chaos	.13	.01	.97	.16	.47	.13
Crowding index	.23	.00	.83	.00	1.58	3.08
Younger siblings	.34	.00	.75	.00	.13	-.46
Older siblings	.45	.00	.58	.00	1.41	.92
Total number of siblings	.33	.00	.78	.00	.35	.75

Degree of freedom (df)=68

Table H.1.2

Assessment of the normal distribution of person and contextual characteristics at Time 2

Variables	Kolmogorov-Smirnov		Shapiro-Wilk		Skewness	Kurtosis
	Statistic	*p*	Statistic	*p*		
Child's Person Characteristics						
Working memory	.14	.00	.95	.02	-.42	.32
VMA	.06	.20	.99	.69	.33	.87
Hyperactivity/ inattention	.11	.07	.96	.03	.28	-.60
Emotional symptoms	.20	.00	.89	.00	.75	-.49
Conduct problems	.21	.00	.87	.00	.89	.99
Peer problems	.25	.00	.77	.00	1.71	2.94
Pro-social behaviour	.20	.00	.86	.00	-1.36	2.86
Emotion recognition	.16	.00	.91	.00	-1.21	2.75
Lability/Negativity	.08	.20	.98	.38	.37	.17
Emotion Regulation	.09	.20	.98	.23	.01	-.46
Theory of mind	.45	.00	.57	.00	-2.10	4.59
Cognitive MS	.24	.00	.68	.00	2.93	11.30
Emotion MS	.11	.09	.95	.01	.84	.92
Desire MS	.13	.01	.91	.00	.85	-.07
Modulation of assertion MS	.21	.00	.80	.00	1.45	1.65
Other MS	.18	.00	.84	.00	1.24	1.39
Mother's Person Characteristics						
Education	.28	.00	.81	.00	-1.49	2.53
Expression of affection	.09	.20	.97	.12	.54	.00
Parenting stress intensity	.09	.20	.98	.30	.31	.85
Parenting stress frequency	.12	.03	.98	.29	.53	1.09
Emotion Intelligence	.09	.20	.99	.67	-.24	.11
Reappraisal	.14	.01	.96	.06	-.35	1.00
Suppression	.10	.20	.98	.30	.30	-.33
Cognitive MS	.08	.20	.95	.01	.77	1.68
Emotion MS	.14	.00	.95	.01	.50	-.72
Desire MS	.13	.01	.92	.00	.92	.28
Modulation of assertion MS	.10	.20	.97	.20	.39	-.38
Other MS	.17	.00	.87	.00	1.58	3.57
Contextual factors						
Household chaos	.11	.04	.98	.40	.18	-.38
Crowding index	.22	.00	.83	.00	1.59	3.13
Younger siblings	.35	.00	.74	.00	.05	-.30
Older siblings	.46	.00	.57	.00	1.50	1.28
Total number of siblings	.35	.00	.77	.00	.65	1.44

Degree of freedom (df)=63

Table H.2

Hierarchical regression analysis of positive affect at Time 1 predicting the child's, mother's and contextual variables at Time 2. (N=63)

Variables	*Model 1*			*Model 2*		
	B	*SE B*	*β*	*B*	*SE B*	*β*
Hyperactivity/ inattention	.59	.08	.65**	.59	.08	.64**
Positive affect				.02	.06	.03
Adjusted R^2		.41			.40	
F for change in R^2		44.09***			21.78***	
Pro-social behaviour	.71	.13	.70**	.71	.13	.71**
Positive affect				-.01	.05	-.02
Adjusted R^2		.49			.48	
F for change in R^2		59.58***			29.53***	
Emotion regulation	.28	.15	.31*	.25	.14	.28
Positive affect				.09	.05	.21
Adjusted R^2		.08			.11	
F for change in R^2		6.49*			4.77*	
Reappraisal	.46	.10	.56**	.47	.11	.56**
Positive affect				-.08	.11	-.07
Adjusted R^2		.30			.29	
F for change in R^2		27.45***			13.83***	
Suppression	.50	.10	.48**	.53	.11	.52**
Positive affect				.20	.13	.14
Adjusted R^2		.22			.23	
F for change in R^2		18.40***			10.01***	
Older siblings	1.00	.00	1.00***	1.00	.00	1.00***
Positive affect				.00	.00	0.00
Adjusted R^2		1.00			1.00	
F for change in R^2		1000.00			1000.00	
Younger siblings	.93	.05	.96**	.94	.05	.96**
Positive affect				.04	.04	.05
Adjusted R^2		.91			.91	
F for change in R^2		633.39***			320.51***	

B- unstandardised beta coefficient; SE- standard error; β- standardised beta;
**p<.05; **p<.01, ***p<.001*

Table H.3

Hierarchical regression analysis of independent variables at Time 1 predicting maternal negative affect at Time 2. (N= 63)

Variables	*Model 1*			*Model 2*			*Model 3*		
	B	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Negative affect. Time 1	*.60*	*.21*	*.63**	.50	.20	.53**	.52	.20	.55**
Child's VMA				-.00	.00	-.15	-.00	.00	-.15
Peer Problems				.11	.17	.09	.11	.18	.10
Pro-social behaviour				-.10	.11	-.10	-.11	.12	-.12
Theory of Mind				.00	.02	.02	.01	.02	.03
Modulation of assertion				1.91	1.08	.19	1.83	1.10	.18
Mental States									
Maternal Reappraisal							.02	.03	.06
Cognitive Mental States							.03	.32	.01
Adjusted R^2		.39			.43			.41	
F for change in R^2		39.97***			8.80***			6.47***	

B- unstandardised beta coefficient; SE- standard error; β- standardised beta;
**p<.05; **p<.01, ***p<.001*

Table H.4

Hierarchical regression analysis of child's level of difficulty at Time 1 predicting the child's, mother's and contextual variables at Time 2. (N=63)

Variables	*Model 1*			*Model 2*		
	B	*SE B*	*β*	*B*	*SE B*	*β*
VMA	.85	.05	.87**	.82	.05	.84**
Level of Difficulty				-.02	.01	-.10
Adjusted R^2		.75			.75	
F for change in R^2		182.55***			94.39***	
Peer Problems	.69	.17	.51**	.70	.18	.52**
Level of Difficulty				.00	.00	-.04
Adjusted R^2		.25			.24	
F for change in R^2		21.27***			10.53***	
Emotion Regulation	.28	.14	.31*	.27	.15	.31
Level of Difficulty				.00	.00	.04
Adjusted R^2		.08			.07	
F for change in R^2		6.49*			3.26*	
Cognitive Mental States	.06	.30	.02	-.04	.34	-.02
Level of Difficulty				.00	.00	.23
Adjusted R^2		-.02			.02	
F for change in R^2		.03			1.58	
Modulation of assertion Mental States	.42	.12	.33**	.42	.12	.33**
Level of Difficulty				.00	.00	-.01
Adjusted R^2		.09			.08	
F for change in R^2		7.35**			3.62*	
Other Mental States	.22	.14	.30	.22	.15	.30
Level of Difficulty				.00	.00	.19
Adjusted R^2		.08			.10	
F for change in R^2		6.05*			4.30*	

B- unstandardised beta coefficient; SE- standard error; β- standardised beta;
**p<.05; **p<.01, ***p<.001*

Table H.5

Hierarchical regression analysis of independent variables at Time 1 predicting the child's positive affect at Time 2. (N= 63)

Variables	*Model 1*			*Model 2*			*Model 3*			*Model 4*		
	B	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Positive Affect. Time 1	*.40*	*.12*	*.42***	.36	.12	.38**	.34	.13	.36*	.33	.12	.34**
Child's Emotion Regulation				.34	.23	.18	.22	.23	.12	.22	.24	.12
Maternal Suppression							-.12	.08	-.18	-.10	.08	-.15
Other Mental States							-.83	3.80	-.03	-.45	3.62	-.02
Older siblings										.24	.20	.18
Adjusted R^2		.16			.18			.18			.20	
F for change in R^2		12.77**			7.75**			4.37**			4.09**	

B- unstandardised beta coefficient; SE- standard error; β- standardised beta;

**p<.05; **p<.01, ***p<.001*

Table H.6

Hierarchical regression analysis of child's positive affect at Time 1 predicting the child's, mother's and contextual variables at Time 2. (N=63)

Variables	*Model 1*			*Model 2*		
	B	*SE B*	*β*	*B*	*SE B*	*β*
Child's Emotion Regulation	.28	.14	.31*	.24	.14	.27
Positive Affect				.08	.05	.17
Adjusted R^2		.08			.09	
F for change in R^2		6.49*			4.27*	
Maternal Suppression	.50	.10	.48**	.52	.10	.50**
Positive Affect				.19	.18	.13
Adjusted R^2		.22			.22	
F for change in R^2		18.40***			9.91***	
Other Mental States	.47	.20	.46*	.44	.21	.43*
Positive Affect				.00	.00	-.12
Adjusted R^2		.20			.20	
F for change in R^2		16.19***			8.65***	
Older siblings	1.00	.00	1.00***	1.00	.00	1.00***
Positive Affect				.00	.00	.00
Adjusted R^2		1.00			1.00	
F for change in R^2		1000.00			1000.00	

B- unstandardised beta coefficient; SE- standard error; β- standardised beta;

**p<.05; **p<.01, ***p<.001*

Table H.7

Hierarchical regressions predicting the child's non-compliance at Time 1 (N= 68) and Time 2 (N= 63).

Variables	*Model 1*			*Model 2*			*Model 3*		
	B	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Child's Emotion Recognition	-.41	.30	-.18	-.45	.28	-.20	-.48	.30	-.21
Theory of mind	-.01	.03	-.05	-.02	.03	-.08	-.02	.03	-.09
Maternal Emotion MS				1.39	.74	.29	1.25	.70	.26
Crowding index							-.16	.10	-.20
Adjusted R^2		.00			.07			.10	
F for change in R^2		1.23			2.77*			2.28	
Child's Emotion Recognition	-.21	.31	-.08	-.23	.31	-.09	-.23	.30	-.09
Theory of mind	.09	.03	.26*	.08	.04	.23*	.06	.04	.17*
Maternal Emotion MS				-.50	.69	-.10	-.16	.67	-.03
Crowding index							-.03	.08	-.04
Adjusted R^2		.04			.03			.04	
F for change in R^2		2.28			1.68			2.20	

B- unstandardised beta coefficient; SE- standard error; β- standardised beta;

**p<.05; **p<.01, ***p<.001*

Table H.8

Hierarchical regression analysis of child's non-compliance at Time 1 predicting the child's, mother's and contextual variables at Time 2. (N=63)

Variables	*Model 1*			*Model 2*		
	B	*SE B*	*β*	*B*	*SE B*	*β*
Child's Emotion Recognition	.17	.14	.19	.17	.15	.19
Non-compliance				.00	.06	-.01
Adjusted R^2		.02			.01	
F for change in R^2		2.31			1.14	
Theory of mind	.23	.07	.37**	.23	.08	.37**
Non-compliance				.03	.32	.01
Adjusted R^2		.12			.11	
F for change in R^2		9.40**			4.63*	
Maternal Emotion Mental States	.42	.11	.46**	.39	.12	.42**
Non-compliance				.03	.02	.14
Adjusted R^2		.19			.20	
F for change in R^2		15.89***			8.69***	
Crowding index	1.00	.01	1.00***	.99	.01	.99***
Non-compliance				-.01	.01	-.01
Adjusted R^2		.99			.99	
F for change in R^2		6254.69***			3101.84***	

B- unstandardised beta coefficient; SE- standard error; β- standardised beta;
**p<.05; **p<.01, ***p<.001*

Table H.9

Hierarchical regression analysis of dyad's intersubjectivity at Time 1 predicting the child's, mother's and contextual variables at Time 2. (N=63)

Variables	*Model 1*			*Model 2*		
	B	*SE B*	*β*	*B*	*SE B*	*β*
Child's working memory	.40.	.11	.45**	.37	.12	.42**
Dyadic Intersubjectivity				.14	.21	.09
Adjusted R^2		.19			.18	
F for change in R^2		15.27***			7.88**	
VMA	.85	.05	.87**	.85	.06	.87**
Dyadic Intersubjectivity				-.19	1.21	-.01
Adjusted R^2		.75			.74	
F for change in R^2		182.55***			89.80***	
Emotion Regulation	.28	.14	.31*	.25	.14	.27
Dyadic Intersubjectivity				.08	.06	.15
Adjusted R^2		.08			.09	
F for change in R^2		6.49*			3.97*	
Maternal Cognitive Mental States	.67	.14	.58**	.68	.15	.59**
Dyadic Intersubjectivity				-.01	.02	-.03
Adjusted R^2		.33			.31	
F for change in R^2		30.83***			15.20***	

B- unstandardised beta coefficient; SE- standard error; β- standardised beta;
**p<.05; **p<.01, ***p<.001*

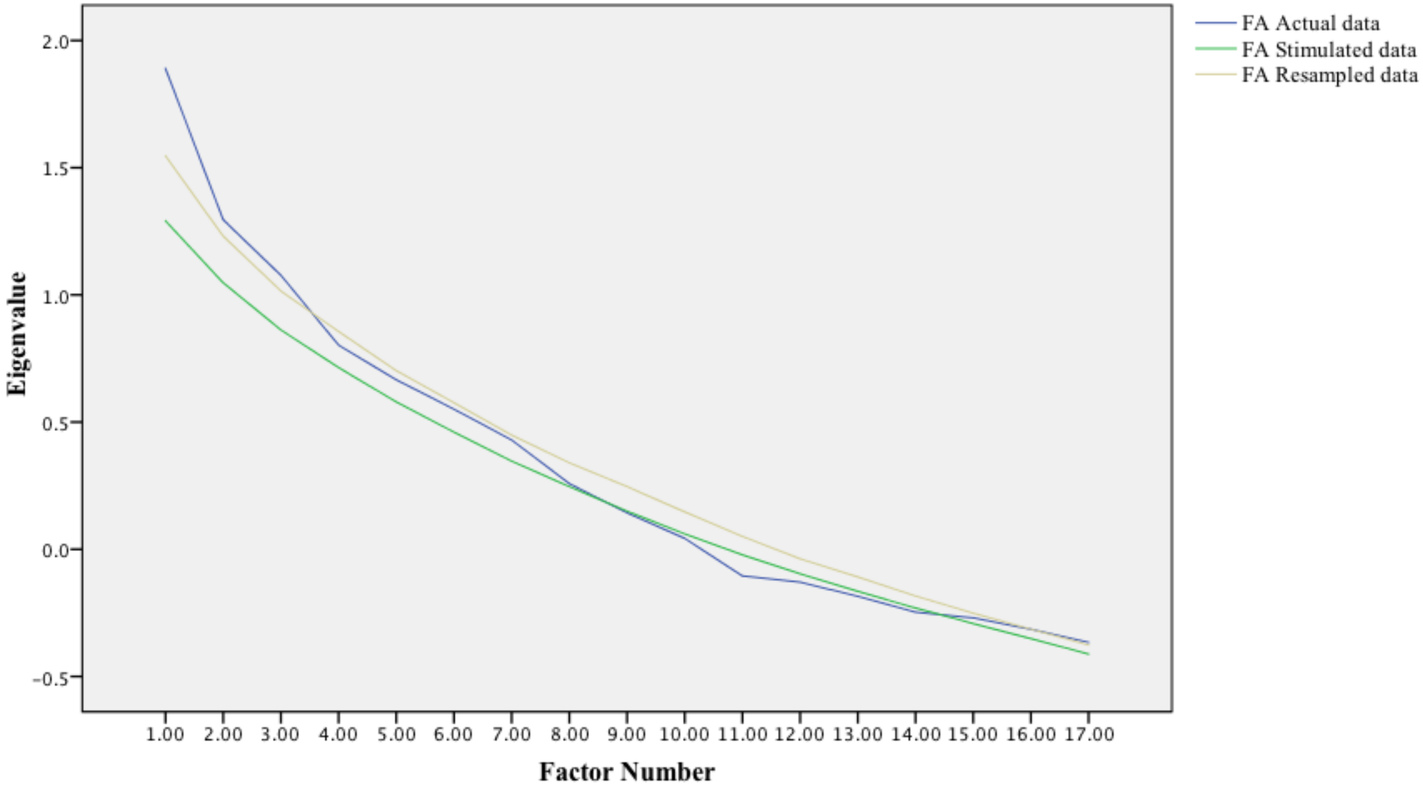


Figure H.1. *Scree plot illustrating the parallel analysis to identify the number of potential factors to reduce child's person characteristics*

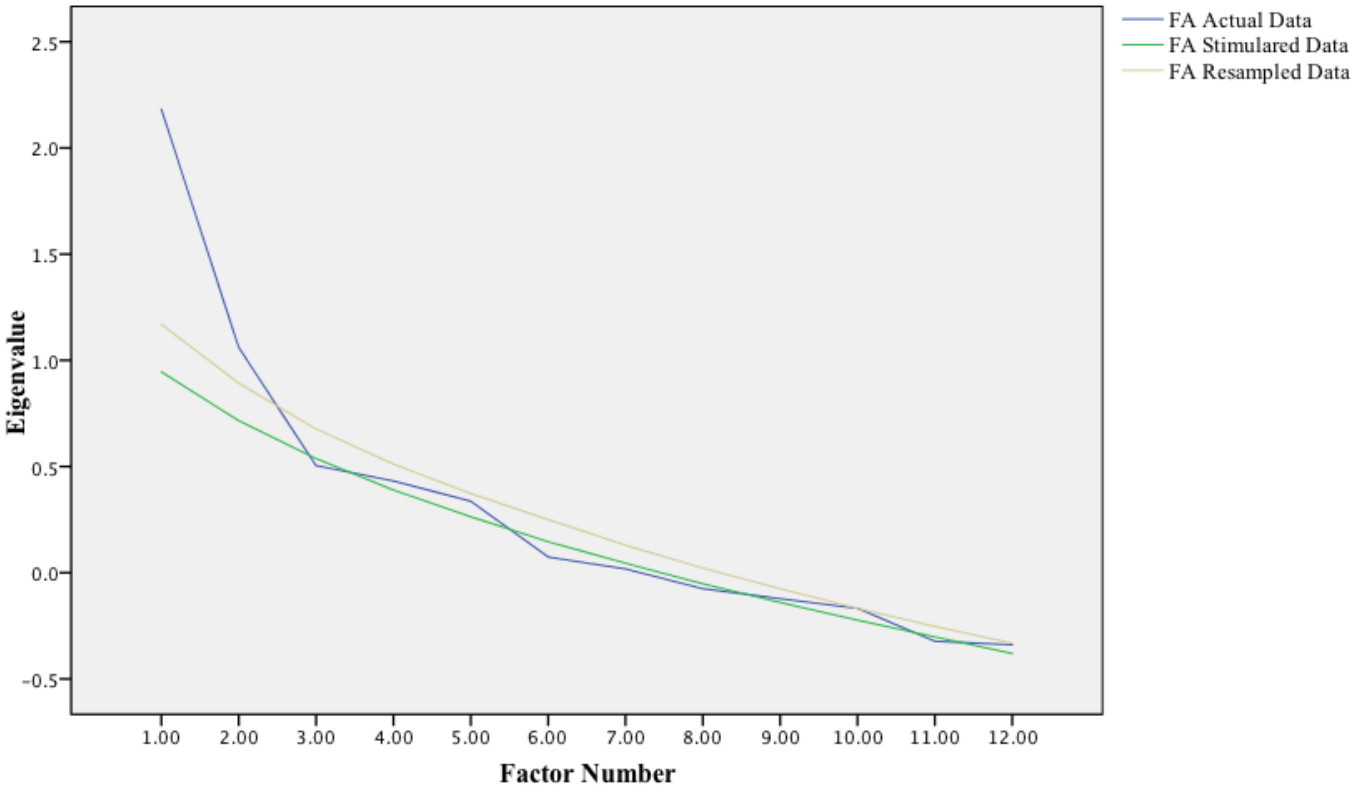


Figure H.2. *Scree plot illustrating the parallel analysis to identify the number of potential factors to reduce mother's person characteristics*

APPENDIX I: Russian study: Consent form, Demographic booklet, Booklet for mother and Booklet for child

Код участника:____________

Информированное согласие
на участие в исследовании

Исследовательская группа факультета психологии Санкт-Петербургского государственного университета и Canterbury Christ Church University (Кентерберийский университет Крайст Чёрч) приглашает Вас принять участие в психологическом исследовании, целью которого является изучение природы взаимодействия матери и ребенка в процессе развивающих игр, руководитель –Мария Владимировна Осорина.

В этом исследовании примут участие пары состоящие из мам и их детей из двух стран России и Великобритании. Прежде чем Вы примите решение об участии в этом исследовании, мы бы хотели предоставить Вам информацию об этом исследовании, о том, что ожидает Вас и о возможных рисках.

Условия участия в исследовании.
Вы можете принять участие в исследовании, если Вашему ребенку от 4 до 5 лет.

Добровольность участия.
1. Ваше участие в исследовании исключительно добровольно.
2. Вы можете принять решение **не** участвовать в исследовании сейчас или отказаться продолжать участвовать на любом этапе без каких-либо негативных последствий.

Конфиденциальность.
Ваше имя, фамилия и должность не будут упомянуты где-либо в связи с теми сведениями, которые вы сообщите. Все результаты будут представляться только в общем массиве, а не индивидуально. Все данные, собранные в ходе исследования, будут доступны только исследовательской группе и будут храниться в течении 5 лет, после чего они будут уничтожены.

Процедура исследования.
Вам будет предложено ответить на несколько опросников и решить ряд задач, некоторые из заданий необходимо будет решать вместе с ребенком, а некоторые по отдельности. Например, Вам вместе с ребенком предложат сыграть в ряд простых развивающих игр, после этого пока ребенок выполняет ряд заданий с исследователем, у Вас будет время ответить на несколько опросников об аспектах поведения Вашего ребенка и Ваших способах реагирования на это. Для наиболее точного анализа данных все коммуникации во время совместного выполнения заданий будут записаны на камеру, в конце проекта Вам будет передана копия DVD диска с Вашим участием.

По результатам исследования планируется изучить и понять причины эффективного семейного взаимодействия в процессе развивающих занятий. Также данный проект имеет международный характер, что даст возможность изучить культурные различия\сходства между детьми и родителями в разных странах. В конце исследования, у Вас будет возможность ознакомиться с результатами исследования.

Возможные неудобства.
Некоторые вопросы интервью, возможно, затрагивают личные и/или эмоционально значимые темы, а так же проблемы с которыми вы сталкиваетесь ежедневно, как родитель. Помните, что Вы можете отказаться от участия в исследовании на любом этапе. Данное исследование не предполагает чрезвычайных ситуаций, однако в случае возникновения таковых Вам будет оказана профессиональная психологическая помощь.

Выгоды.
Участие в исследовании не предполагает получение респондентом денежной или материальной компенсации, или какой-либо другой прямой выгоды. Однако, информация,

полученная в ходе этого исследования, может в будущем принести пользу и Вам, и другим людям. По результатам Вашего участия в исследовании Вы можете получить индивидуальную консультацию у квалифицированного психолога.

Внимание! По окончании исследования участникам может быть предоставлена информация об общих результатах исследования. Если у вас возникло желание ознакомиться со своими индивидуальными результатами, то вы можете обратиться к координатору исследования Шпиковой Наталье Петровне по электронному адрес shpikova@mail.ru, в теме письма просьба указать «Индивидуальные результаты», в тексте письма необходимо указать код участника, который обозначен в верхней части листа.

Данное исследование рассмотрено и одобрено Этическим комитетом Санкт-Петербургского государственного университета, куда Вы можете обратиться, если у Вас возникнут вопросы как у участника исследования [телефон 8(812) 328-94-16, irb@spbu.ru].

Если у Вас возникнут вопросы, касающиеся исследования, Вы можете позвонить координатору исследования Шпиковой Наталье Петровне, по телефону 8(950) 017-11-69

ПОДТВЕРЖДЕНИЕ ИНФОРМИРОВАННОГО СОГЛАСИЯ НА УЧАСТИЕ В ИССЛЕДОВАНИИ

Подписывая данную форму информированного согласия, я подтверждаю, что прочитал(а) и понял(а) цели, процедуру, методы и возможные неудобства участия в исследовании. У меня была возможность задать все интересующие меня вопросы. Я получил(а) удовлетворительные ответы и уточнения по всем вопросам, интересовавшим меня в связи с данным исследованием. Я даю свое согласие на участие в исследовании.

Подпись участника исследования Дата: «_____»___________________ 2015

Я объяснил(а) респонденту предложенную выше форму информированного согласия, а также ответил(а) на все вопросы респондента относительно участия в исследовании. Его(ее) решение принять участие в исследовании не навязано кем-то, а является осознанным и добровольным, о чем получено согласие.

Ф.И.О. и подпись интервьюера Дата: «____»____________________ 2015

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Буклет исследователя

Дата _ _/_ _/_ _ _ _

ID участника _ _ _

Дата рождения матери (ДД/ММ/ГГГГ): __/__/____

Дата рождения ребенка __/__/____

Семейное положение:

- ☐ Замужем
- ☐ Гражданский брак
- ☐ Разведена
- ☐ Вдова
- ☐ Не замужем и не была
- ☐ Другое (уточните)

____

К какой этической группе вы себя относите:

____

Является ли русский язык для Вас родным?

- ☐ Да
- ☐ Нет, ________________

Уровень образования

Вы

- ☐ Нет формальной квалификации
- ☐ Начальное образование (1-8 классы общеобразовательной школы)
- ☐ Среднее образование (9-11 классов общеобразовательной школы)
- ☐ Начальное профессиональное (лицей, ПУ)
- ☐ Среднее профессиональное (колледж, техникум)
- ☐ Незаконченное высшее
- ☐ Высшее ______________________________
- ☐ Магистратура\ аспирантура ______________________________
- ☐ Иное (уточните): ______________________________

Ваш партнер

- ☐ Нет формальной квалификации
- ☐ Начальное образование (1-8 классы общеобразовательной школы)
- ☐ Среднее образование (9-11 классов общеобразовательной школы)
- ☐ Начальное профессиональное (лицей, ПУ)
- ☐ Среднее профессиональное (колледж, техникум)
- ☐ Незаконченное высшее
- ☐ Высшее ______________________________
- ☐ Магистратура\ аспирантура ______________________________
- ☐ Иное (уточните): ______________________________

В настоящее время вы работаете или находитесь дома с детьми?

Вы

- ☐ Да, работаю
  Сколько часов в неделю? ______________________________
- ☐ Нет
- ☐ Нахожусь дома и забочусь о детях

Ваш партнер

- ☐ Да, работаю
  Сколько часов в неделю? ______________________________
- ☐ Нет
- ☐ Нахожусь дома и забочусь о детях

Какую должность вы занимали\ занимаете на последней работе? (*Должность полностью*)

Вы	**Ваш партнер**
______________________________	______________________________

Сколько человек живут в Вашем доме? (*включая Вас)*

_______ взрослых (старше 18 лет)
_______ подростков (16- 18 лет)
_______ детей (до 16 лет)

Сколько комнат в Вашей квартире/ доме? ____________________________

Дата рождения и пол каждого из детей: (*Начиная со старшего*)				
	Ребенок 1.	Возраст:	___________	М / Д
	Ребенок 2.	Возраст:	___________	М / Д
	Ребенок 3.	Возраст:	___________	М / Д
	Ребенок 4.	Возраст:	___________	М / Д

Задание на взаимодействие. Инструкции

Задание «Картинки» (мама и ребенок)

Условия:

Мама и ребенок должны сидеть рядом друг с другом.

Инструкция:

- Мамам выдать 12 картинок и проинструктировать: *«Пожалуйста, рассмотрите и обсудите эти картинки вместе с ... (имя ребенка), как будто это сказка на ночь или интересный журнал».*

Скаффолдинг

Игра «Танграм»

Условия: Мама и ребенок должны сидеть рядом друг с другом. Сначала продемонстрируйте, как работает танграм и дайте маме шанс попрактиковаться (как минимум убедитесь, что мама поняла смысл игры).

Инструкция:

- Для ребенка «*Используя эти фигуры, постарайся сделать такую же фигуру как на картинке. Мама будет тебе в этом помогать*».

- Для матери: «*Пожалуйста, помогайте, когда и насколько это необходимо. Существуют три уровня сложности, вы можете выбрать наиболее подходящий. Первый уровень - голубое очертание фигуры будет на доске, а перед Вами будет лежать сам образ фигуры. Второй уровень - перед Вами образ фигуры, но чистая доска. Третий уровень - только голубое очертание фигуры будет на доске, без каких-либо дополнительных подсказок*».

Соберем Динозавров в 10-ку

Инструкции:

- Для ребенка: *Посмотри, кто это?* (показываем карточки с динозаврами и вместе считаем 1-10). *Сколько разных способов сосчитать динозавриков ты можешь придумать, чтобы их получилось 10. Например, первый способ может быть такой…* (продемонстрируйте пример 5+5).
- Для матери: *Пожалуйста, помогайте, когда и насколько это необходимо.*

Карточная игра

Инструкции:

- Для ребенка: *Здесь 12 карточек и я хочу, чтобы ты разобрал их на 4 разные группы.*
- Для матери: *Пожалуйста, помогайте, когда и насколько это необходимо.*

Learning Together @ Home

Буклет для родителей

Дата _ _/_ _/_ _ _ _ Участник ____________________

Часть I: Ваш Дом

Ниже приведены некоторые ситуации, которые происходят в большинстве домов. Пожалуйста тщательно прочитайте каждое утверждение и отметьте 'X' в поле рядом с ответом, который лучше всего описывает ваш дом.

		Соверше нно не верно	**Скорее не верно**	**Не знаю**	**Скорее верно**	**Соверше нно верно**
1.	У детей существует ритуал укладывания спать (одна и та же постель каждую ночь, принятие ванной перед сном, чтение сказки)					
2.	В своем доме вы не можете услышать собственных мыслей					
3.	Наш дом напоминает настоящий зоопарк					
4.	Обычно мы все успеваем					
5.	Обычно в нашем доме включен телевизор					
6.	Атмосфера в нашем доме спокойная					

Этот раздел о том, что родители и дети иногда делают вместе. Пожалуйста, укажите, насколько регулярно Вы и Ваш ребенок делаете следующие вещи.

Как часто Вы и Ваш ребенок		**Ни разу за после дний месяц**	**Ни разу за последн ий месяц но хотя бы 1 раз за последн ий месяц**	**1 или 2 раза за после днюю недел ю**	**3 or 4 раза за после днюю недел ю**	**5 or 6 раза за посл еднюю неде лю**	**Кажд ый день**	**Чаще чем раз в день**
1	Проводите время вместе							
2	Обнимаете, целуете, похлопываете по спине друг друга или демонстрируете другие физические признаки любви							

3	Играете в игры, занимаетесь спортом и т.д. вместе							
4	Ездите в гости к друзьям или родственникам							
5	Покупаете или делаете подарки другим членам Вашей семьи							
6	Смеетесь вместе над чем-нибудь							
7	Делаете домашнее задание вместе							
8	Ходите на прогулки, на пикники или на пляж, катаетесь на велосипедах, плаваете, занимаетесь спортом и т.д.							
9	Ходите на вечеринки (праздники) или устраиваете их вместе							
10	Строите или делаете что-нибудь вместе (например, моделирование, приготовление еды или починка чего-либо)							
11	Играете на музыкальных инструментах, поете вместе или слушаете музыку							
12	Хвалите или делаете комплименты друг другу							
13	Вместе ходите по магазинам или в кафе, в кино, в музеи или перекусить							
14	Даете дополнительные привилегии (например, разрешаете не ставать до поздна)							
15	Даете дополнительные деньги или что-то особенное в качестве подарка-сюрприза							
16	Приходите посмотреть на его/ее представления или на выставку его/ее работ или на участие в спортивном мероприятии, концерте, пьесе, творческом шоу и т.д.							
17	Разговариваете о том, что волнует или тревожит его/ее.							
18	Имеете совместное хобби (собираете марки, занимаетесь моделированием, работой по дереву, вышиванием)							

Приведенные ниже утверждения описывают события, которые обычно происходят в семьях с маленькими детьми. Эти события иногда могут осложнять жизнь. Пожалуйста, прочитайте каждое утверждение и обведите, как часто это происходит с вами, а затем обведите насколько «хлопотно» вы чувствовали себя в течение последних шести месяцев. Если у вас более одного ребенка, то эти события могут относиться к любым из них или ко всем из них.

События		Как часто это происходит				Хлопоты (мин-> макс)
1	Беспрерывно убираю разбросанные игрушки или еду.	Редко	Иногда	Часто	Постоянно	1 2 3 4 5
2	Дети постоянно ворчат, ноют, жалуются.	Редко	Иногда	Часто	Постоянно	1 2 3 4 5
3	Испытываю сложности во время еды с разборчивыми едоками, жалобами и т.д.	Редко	Иногда	Часто	Постоянно	1 2 3 4 5
4	Дети не будут слушаться или делать то, что их попросили, без того, чтобы на них не сердились.	Редко	Иногда	Часто	Постоянно	1 2 3 4 5
5	Сложно найти няню (или человека, который останется с детьми).	Редко	Иногда	Часто	Постоянно	1 2 3 4 5
6	Расписание детей (например, дошкольные или другие мероприятия) мешает удовлетворению Ваших собственных бытовых нужд.	Редко	Иногда	Часто	Постоянно	1 2 3 4 5
7	Детские споры или драки требуют участия «судьи».	Редко	Иногда	Часто	Постоянно	1 2 3 4 5
8	Дети требуют, чтобы их развлекали или просят поиграть с ним.	Редко	Иногда	Часто	Постоянно	1 2 3 4 5
9	Дети сопротивляются или борются с Вами из-за укладывания спать.	Редко	Иногда	Часто	Постоянно	1 2 3 4 5
10	Дети постоянно вертятся под ногами, мешая выполнению других дел.	Редко	Иногда	Часто	Постоянно	1 2 3 4 5
11	Существует потребность постоянно следить, где дети и что они делают.	Редко	Иногда	Часто	Постоянно	1 2 3 4 5
12	Дети прерывают разговоры или взаимодействия взрослых.	Редко	Иногда	Часто	Постоянно	1 2 3 4 5
13	Есть необходимость менять свои планы из-за капризов детей.	Редко	Иногда	Часто	Постоянно	1 2 3 4 5

	События	Как часто это происходит				Хлопоты (мин-> макс)
14	Дети пачкаются по несколько раз на день и это требует переодевания	Редко	Иногда	Часто	Постоянно	1 2 3 4 5
15	Сложно уединиться (например, в ванной комнате)	Редко	Иногда	Часто	Постоянно	1 2 3 4 5
16	Детьми сложно управлять в общественных местах (продуктовых магазинах, торговых центрах, ресторанах)	Редко	Иногда	Часто	Постоянно	1 2 3 4 5
17	Есть сложности в том, чтобы собрать детей для выхода из дома и делать это во время	Редко	Иногда	Часто	Постоянно	1 2 3 4 5
18	Есть сложности оставить детей, когда Вы уходите из дома вечером, в школе или садике	Редко	Иногда	Часто	Постоянно	1 2 3 4 5
19	У детей возникают трудности с друзьями (драки, не получается ладить с друзьями или друзей нет)	Редко	Иногда	Часто	Постоянно	1 2 3 4 5
20	Приходится выполнять дополнительные действия чтобы удовлетворить капризы детей	Редко	Иногда	Часто	Постоянно	1 2 3 4 5

Часть два: О Вашем ребенке

Прочитайте каждое утверждение и, пожалуйста, поставьте «Х» в поле, которое соответствует наиболее подходящему варианту для вашего ребенка. Постарайтесь ответить на все вопросы, как можно точнее, даже если вы не совсем уверены, или если заявление звучит глупо! Основывайте свои ответы на поведении Вашего ребенка в течение последних 6 месяцев.

		Не верно	Иногда верно	Совершенно верно
1	Внимательный к чувствам других людей			
2	Неугомонный, гиперактивный, не может оставаться спокойным долго			
3	Часто жалуется на головные боли, боль в животе или нездоровье			
4	Охотно делится с другими детьми (угощениями, игрушкам, карандашами и т.д.)			
5	Часто бывают истерики или взрвывной характер			

		Не верно	Иногда верно	Совершенно верно
6	Чаще держится сам по себе, старается играть в одиночестве			
7	В общем послушный, обычно делает, что просят взрослые			
8	Много беспокоится, часто кажется тревожным			
9	Услужливый, если кто-то ранен, расстроен или болеет			
10	Постоянно суетится или ерзает			
11	Обладает хотя бы одним близким другом			
12	Часто дерется с другими детьми или задирает их			
13	Часто несчастный, подавленный или плаксивый			
14	В целом нравится другим детям			
15	Легко отвлекается, имеет трудности с концентрацией			
16	Нервный или прилипчивый в новых ситуациях, легко теряет уверенность в себе			
17	Добр к детям, которые младше			
18	Часто обманывает или жульничает			
19	Другие дети задирают или дразнят его\ ее			
20	Часто предлагает свою помощь другим людям (родителям, учителям, другим детям)			
21	Думает перед тем, как действовать			
22	Ворует из дома, школы или откуда-либо еще			
23	Ладит лучше со взрослыми, чем с другими детьми			
24	У него\ нее есть много страхов, легко напугать			
25	Доводит решение задач до конца, хорошая продолжительность внимания			

Оцените, как часто Ваш ребенок обладает следующими типами поведения или эмоциональные состояния, поставив «Х» в соответствующей клетке рядом с каждым утверждением

		Никогда	Иногда	Часто	Всегда
1	Мой ребенок веселый				
2	Выражает широкие колебания настроения (например, его / ее эмоциональное состояние трудно предвидеть, потому что он / она быстро переходит от очень положительных до очень негативных эмоциональных состояний)				

		Никогда	Иногда	Часто	Всегда
3	Положительно реагирует на нейтральное или дружелюбное общение со стороны взрослых				
4	Хорошо переходит от одного вида деятельности к другому (например, не становится тревожным, сердитым, расстроенным, или чрезмерно возбужденным при переходе от одного вида деятельности к другому)				
5	Может быстро оправится от эпизодов огорчения или несчастья (например, не дуться и не оставаться угрюмым, тревожным или грустным после эмоционально волнительных событий)				
6	Мой ребенок легко раздражается				
7	Положительно реагирует на нейтральное или дружелюбное общение со стороны других детей				
8	Легко взрывается				
9	Мой ребенок способен дождаться удовлетворения своих желаний				
10	Получает удовольствие от огорчения других (например, смеется, если другой человек ударился или радуется слезам других людей)				
11	Может регулировать волнение в эмоционально возбуждающих ситуациях (например, может «не увлекаться» в игровых ситуациях требующих большой энергии или чрезмерно не возбуждаться в неподходящих ситуациях)				
12	Он/а плаксив или слишком привязан к воспитателям				
13	Мой ребенок склонен к разрушительным вспышкам энергии и избытку чувств				
14	Гневно реагирует на ограничения, установленные взрослыми				
15	Легко сказать когда он/а грустит, злится, боится				
16	Кажется грустным или вялым				
17	Слишком буйный, когда пытается привлечь других людей в игру				
18	Демонстрирует эмоциональное уплощение (например, его\ ее выражения пустые и невыразительные, ребенок кажется эмоционально опустошенным)				

		Никогда	Иногда	Часто	Всегда
19	Реагирует негативно на нейтральные или дружелюбные общение с ровесниками (например, разговаривает злым тоном или отвечает грубо или агрессивно)				
20	Мой ребенок импульсивен				
21	Он/а эмпатичен по отношению к другим людям, демонстрирует обеспокоенность, когда другие расстроены или огорчены				
22	Демонстрирует избыток чувств, которые другие считают навязчивыми или отвлекающими				
23	Демонстрирует уместные негативные реакции (например, злость, страх, раздражение, огорчение) в ответ на враждебные, агрессивные или навязчивые действия со стороны сверстников				
24	Демонстрирует негативные реакции при попытке привлечь других людей в игру				

Learning Together @ Home

Буклет для детей

Дата_ _/_ _/_ _ _ _ ID участника _ _ _

Повторение цифр

Прямой счет:

"Сейчас я скажу тебе несколько цифр, а ты, как только я закончу говорить, точно в таком же порядке их повтори. Хорошо? Ну, давай попробуем, Внимание...".

Для практики: (2-7; 1-5-2)

Первая серия	Вторая серия	Баллы
3-8-6	6-1-2	3
3-4-1-7	6-1-5-8	4
8-4-2-3-9	5-2-1-8-6	5
3-8-9-1-7-4	7-9-6-4-8-3	6
5-1-7-4-2-3-8	9-8-5-2-1-6-3	7
1-6-4-5-9-7-6-3	2-9-7-6-3-1-5-4	8
5-3-8-7-1-2-4-6-9	4-2-6-9-1-7-8-3-5	9

Обратный счет: «Сейчас я тебе скажу еще несколько цифр, ты их тоже будешь повторять. Только ты будешь начинать с конца, говорить в обратном порядке. Вот смотри, я, например, говорю "Один-два" (показать рукой на разные места стола), и ты скажешь "два-один" (опять показать рукой на эти места стола, но в обратном порядке). Понял? Ну, давай попробуем. Внимание!..»

Для практики: (7-1; 2-6-1)

First round	Second round	Score
2-5	6-3	2
5-7-4	2-5-9	3
7-2-9-6	8-4-9-3	4
4-1-3-5-7	9-7-8-5-2	5
1-6-5-2-9-8	3-6-7-1-9-4	6
8-5-9-2-3-7	4-5-7-9-2-8-1	7
6-9-1-6-3-2-5-8	3-1-7-9-5-4-8-2	8

Словесная беглость (60 секунд на каждую категорию)

Сейчас мы будем играть в «слова» и я смогу узнать, как много слов ты знаешь. Я назову тебе что-то и хочу, чтобы ты назвал мне как можно больше вещей из этой группы.

Например, кошка - это животное. Назови мне как можно больше разных ***животных***.

Яблоко - это еда. Назови мне как можно больше разных ***видов еды***.

Красный - это цвет. Назови мне как можно больше разных ***цветов***.

Задача о неожиданном перемещении (Салли- Анна)

1. Поместите куклы (Салли и Анну) в отдельные мешки с каждой стороны стола.
2. Поместите две мисочки на одинаковом расстоянии от участника.
3. «*Загляни в обе мисочки, пусты ли они? Пожалуйста, положи крышки на каждую из мисочек*»
4. Представьте Салли и ее мячик. - *Это Салли. Салли обожает играть в мяч.*
5. Продемонстрируйте, как Салли играет в мяч. – *Она играла с мячом целый день и теперь очень устала, Салли кладет мяч в **ГОЛУБУЮ** миску и идет спать.*
6. Положите мячик в голубую миску и накройте крышкой, затем уберите Салли в ее мешок. – *Салли, так сильно устала, что сейчас она крепко спит и не может нас слышать или видеть.*
7. – *Это Анна.* Вытащите Анну из мешка. – *Ей бы тоже очень хотелось с чем-нибудь поиграть. Она заглянула в **ГОЛУБУЮ** миску, нашла мячик и начала с ним играть.*
8. Продемонстрируйте, как Анна находит мяч и играет с ним. – *Анне надоело играть с мячом и она положила его в **КРАСНУЮ** миску и ушла.*
9. Положите мячик в красную миску и накройте крышкой, затем положите Анну в ее мешок.
10. – *Салли проснулась и снова хочет играть со своим мячом.* Вытащите Салли из ее мешка.

Раздел 1: Вопросы на Понимание/ Обоснование

Понимание: *Где Салли будет искать мячик в первую очередь?* (1 балл) ___________________

Верно (В голубой миске) ☐ Не верно ☐

Обоснование: *Почему Салли станет искать мячик там?* (1 балл) ______________________

Верно (Она его там оставила) ☐ Не верно ☐

Раздел 2: Контрольный вопрос

Контрольный вопрос 1: *Где изначально Салли оставила свой мячик?*__________

Верно ☐ Не верно ☐

Контрольный вопрос 2: *А где мячик сейчас?* ______________________________

Верно ☐ Не верно ☐

Общий балл (считать по Разделу 1; max = 2 балла): ___________

Задача о Неожиданном содержимом (конфеты Smarties)

1. *«Знакомься, это Джек. Я положу его в мешочек, где он сможет отдохнуть и не сможет нас видеть или слышать».*
2. Вытащите коробку **Smarties** и покажите ее ребенку. – *Как ты думаешь, что в ней?* Если ответ «я не знаю» или неверный ответ, спросите «*Что это?*» и укажите на рисунок на коробке. (Если ответ все равно «не знаю» или неверный ответ, тогда остановите задание).
3. – *Давай вместе посмотрим.* Откройте коробку и вытащите ее содержимое. – *Посмотри, это карандаши. Там нет никаких конфет. Давай вместе положим их на место.*
4. Укажите на коробку. – *Ну что, ты запомнил, что там лежит?* Если ответ «я не знаю» или неверный ответ, еще раз откройте коробку и снова покажите содержимое, затем еще раз спросите «*Так что там лежит?*» (Если ответ все равно «не знаю» или неверный ответ, тогда остановите задание).

Вопрос: Когда я показала тебе эту коробочку в первый раз, закрытую, как сейчас, что ты подумал в ней лежит? (1 балл)

Верно (Конфеты) ☐ Не верно ☐

5. "*Сейчас давай позовем Джека*". Достаньте игрушку из мешка.

Вопрос 2: *Помнишь Джек не видел и не слышал нас пока был в мешочке. Когда мы первый раз покажем ему эту коробочку, до того, как он заглянет внутрь, как ты думаешь, что он скажет там лежит?* (1 балл)

Навязанный выбор: Думаешь Джек скажет, что там лежат конфеты или карандаши?

Верно (Конфеты) ☐ Не верно ☐

Контрольный вопрос: Почему Джек скажет, что там лежат …….? (1 балл)

Общий балл (max= 3 балла): __________

Выражения Лиц

Сейчас я покажу тебе несколько картинок, на которых изображены дети, а ты посмотрев на них, скажи, что чувствует каждый ребенок.

	Счастливый	Грустный	Злой	Напуганный
1. Она чувствует себя счастливой, грустной, злой или напуганной?				
2. Он чувствует себя счастливой, грустной, злой или напуганной?				
3. Она чувствует себя счастливой, грустной, злой или напуганной?				
4. Она чувствует себя счастливой, грустной, злой или напуганной?				
5. Он чувствует себя счастливой, грустной, злой или напуганной?				
6. Она чувствует себя счастливой, грустной, злой или напуганной?				
7. Она чувствует себя счастливой, грустной, злой или напуганной?				
8. Он чувствует себя счастливой, грустной, злой или напуганной?				
9. Он чувствует себя счастливой, грустной, злой или напуганной?				
10. Она чувствует себя счастливой, грустной, злой или напуганной?				
11. Он чувствует себя счастливой, грустной, злой или напуганной?				
12. Она чувствует себя счастливой, грустной, злой или напуганной?				
13. Он чувствует себя счастливой, грустной, злой или напуганной?				
14. Он чувствует себя счастливой, грустной, злой или напуганной?				
15. Она чувствует себя счастливой, грустной, злой или напуганной?				

16. Она чувствует себя счастливой, грустной, злой или напуганной?				
17. Она чувствует себя счастливой, грустной, злой или напуганной?				
18. Она чувствует себя счастливой, грустной, злой или напуганной?				
19. Она чувствует себя счастливой, грустной, злой или напуганной?				
20. Он чувствует себя счастливой, грустной, злой или напуганной?				
21. Он чувствует себя счастливой, грустной, злой или напуганной?				
22. Он чувствует себя счастливой, грустной, злой или напуганной?				
23. Она чувствует себя счастливой, грустной, злой или напуганной?				
24. Он чувствует себя счастливой, грустной, злой или напуганной?				
25. Он чувствует себя счастливой, грустной, злой или напуганной?				
26. Она чувствует себя счастливой, грустной, злой или напуганной?				

APPENDIX K: Russian study: Tables.

Table K.1

Assessment of the normal distribution across all the behavioural dimensions in Russian Sample

Variables	Kolmogorov-Smirnov		Shapiro-Wilk		Skewness	Kurtosis
	Statistic	p	Statistic	p		
Mother's Scaffolding Behaviour						
Quality of information	.17	.20	.91	.12	-.90	.64
Contingency	.17	.20	.93	.28	-.30	-1.15
Positive Affect	.22	.03	.92	.14	.54	-.55
Negative Affect	.31	.00	.67	.00	2.38	6.38
Over-control	.22	.04	.83	.01	1.59	2.44
Child's Scaffolding Behaviour						
Level of difficulty (time)	.18	.18	.96	.61	.77	1.21
Amount of help required	.20	.09	.94	.36	-.70	-.11
On Task	.25	.01	.72	.00	-2.25	5.91
Autonomy	.23	.03	.95	.53	-.32	.20
Positive Affect	.14	.20	.97	.83	.28	-.25
Negative Affect	.35	.00	.46	.00	3.45	12.75
Non-compliance	.21	.05	.80	.00	1.80	4.17
Dyad's Scaffolding Behaviour						
Intersubjectivity	.23	.02	.90	.08	.18	-1.44

Degree of freedom (df)= 16

* Dyad's Conflict was constant and the analysis was omitted.

Table K.2

Assessment of the normal distribution of person and contextual characteristics in Russian Sample

Variables	Kolmogorov-Smirnov		Shapiro-Wilk		Skewness	Kurtosis
	Statistic	*p*	Statistic	*p*		
Child's Person Characteristics						
Working memory	.23	.02	.86	.02	-.85	-.21
Verbal fluency	.15	.20	.94	.39	.82	.53
Hyperactivity/ inattention	.18	.19	.93	.27	.59	.39
Emotional symptoms	.18	.20	.88	.04	.64	.01
Conduct problems	.20	.09	.90	.09	.52	.44
Peer problems	.20	.09	.92	.15	.48	.32
Pro-social behaviour	.16	.20	.92	.19	-.20	-.46
Emotion recognition	.21	.05	.89	.05	-.80	2.06
Lability/Negativity	.14	.20	.96	.61	-.06	-.76
Emotion Regulation	.19	.15	.93	.25	.15	-.27
Theory of mind	.23	.02	.86	.02	-.30	-1.18
Cognitive MS	.22	.05	.80	.00	1.70	3.34
Emotion MS	.12	.20	.94	.41	.64	-.25
Desire MS	.29	.00	.75	.00	.80	-1.18
Modulation of assertion MS	.18	.16	.88	.05	1.32	2.10
Other MS	.33	.00	.75	.00	1.40	1.85
Mother's Person Characteristics						
Education	.36	.00	.75	.00	-.03	.77
Expression of affection	.15	.20	.84	.01	1.89	5.06
Parenting stress intensity	.16	.20	.96	.62	-.19	-.46
Parenting stress frequency	.20	.08	.92	.14	.30	-.06
Emotion Intelligence	.12	.20	.97	.77	-.59	.83
Reappraisal	.13	.20	.95	.42	-.45	-.89
Suppression	.14	.20	.94	.31	.57	-.50
Cognitive MS	.16	.20	.93	.22	.67	.25
Emotion MS	.32	.00	.82	.00	1.43	1.33
Desire MS	.16	.20	.90	.07	.91	.13
Modulation of assertion MS	.13	.20	.94	.32	.85	1.01
Other MS	.27	.00	.72	.00	2.60	8.60
Contextual factors						
Household chaos	.18	.16	.86	.02	1.67	3.86
Crowding index	.15	.20	.88	.04	1.46	3.15
Younger siblings	.52	.00	.40	.00	2.51	4.90
Older siblings	.34	.00	.73	.00	.85	-.84
Total number of siblings	.31	.00	.76	.00	.55	-1.43

Degree of freedom (df)=16