

## The Influence of Siblings on Young Children's Understanding of Fluid Intake

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### Abstract

**Background:** Children need to drink enough water (1.1-1.3 litres) throughout the day to stay hydrated and for health benefits<sup>1</sup>. Wellbeing and cognitive function benefits have been identified for children who are hydrated<sup>2</sup>. Yet there is a dearth of research focusing specifically on children's perceptions of their own fluid intake levels and who helps support them in ensuring they are drinking enough water, this is a novel area to investigate. Previous research<sup>3</sup> identified that 44.2% of young children's fluid intake were influenced the strongest by a family member. This paper will explore in further detail the influence of siblings on children's fluid intake, in particular older versus younger siblings.

**Methods:** 130 children (67 girls and 63 boys, of which 45 had a younger sibling (s) and 85 having an elder sibling (s), from 4 primary schools in the South East of England, were questioned between January and April 2019 using an adapted version of Coppinger and Howells' (2019)<sup>4</sup> questionnaire, on their understanding of fluid intake, how much they perceived they drank and who supported them in prompting them to drink. Physical visual representations were used to aid question comprehension and to ensure the questions were appropriate for young children. The data was analysed using SPSS 24.0 using MANOVAs ( $P < 0.05$ ) to consider statistical variance in gender and older sibling status.

**Results:** The most significant results were linked to elder siblings influence younger siblings in drinking too little fluids within a school day ( $F=0.530$ ,  $p<0.05$ ), whilst those without an elder sibling, thought they drank beyond the daily recommended guidelines and reported they drank over 2 litres. This illustrates that children misunderstand fluid intake recommendations regardless of whether they have an elder sibling or not. Children named adults, both parents and teachers as well as elder siblings as the key influencers of them drinking ( $F=3.67$ ,  $p<0.05$ ) and the data indicated that girls were more influenced by siblings than boys, whilst twins were not influenced by each other.

**Conclusion:** It is concluded that siblings do have an influence on the consumption of water, as siblings act as role models and other siblings follow their habits, therefore the whole family unit is important to ensure that the right fluid intake is consumed. It is recommended that further education, curriculum and community development is needed to continue to support young children's knowledge and understanding of fluid intake.

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## Introduction

It has been identified<sup>3</sup> that for 44.2% of young children the strongest influence was a family member, such as siblings, grandparents and parents. Due to the amount of data obtained from that report, this paper aims to explore in further detail the influence specifically of siblings on children's fluid intake, this is an under researched area, yet siblings can have large role modelling influence. The Department for Education (DfE) in the United Kingdom, plan to introduce a new curriculum, with an 'early adopter' version (2020) being implemented by some educational settings<sup>5</sup>. Within this new curriculum, there is a renewed focus to ensure children have a greater level of understanding in relation to their own dietary needs, however fluid is often the forgotten element of diet and the education of healthy diets. This research aims to add to examine children's understanding and knowledge of fluid intake and offer further supporting evidence that the topic of fluid intake should not be overlooked by policy makers and educators.

It has been posited<sup>6</sup> that older brothers and sisters are much more probable to act as role models for their younger siblings. As a result, this external influence can in turn suggest the point that because of this modelling of behaviors that older siblings may exhibit, they can demonstrate both positive and negative actions in relation to home life customs. As stated<sup>4</sup>, children spend a significant proportion of their waking hours in the home environment, this suggests that the effect of children's external influences in the form of family role modelling is an important facet to a child's development in relation to this topic matter. Consequently, if an older sibling were not to consume adequate water at home, the younger sibling could, in theory, imitate this behaviour as they might think it is the normal thing to do in their household. Alternatively, if the older sibling role modeled the behavior of drinking effectively then the younger sibling would copy. Also, it is proposed that if one sibling asked for a drink within the family home, that the parents / carers or grandparents in charge of all siblings may also ask the other siblings, if they too wished for a drink. It is

hypothesized that the older sibling will have the most influence on the behavior of the younger sibling.

However, earlier researchers<sup>7</sup> found that for very young children, those aged 18-month-old, there was a 6% increase in water consumption from children with no elder siblings when compared to children whom have two or more. It could then be implied that due to this percentage rise at a younger age, that children with no elder sibling are drinking more water in the foundations of their lives. As a result, these children without an elder sibling could be more inclined to drink more in the mornings when they are slightly older, due to the somewhat enhanced consumption earlier in their lives and habits being formed. However, it was later<sup>6</sup> suggested that older siblings act as role modelling in their practices of water consumption in the home setting, the aforementioned could be argued.

As a result, due to the scarcity of the research in this field, this paper addresses a gap in the field, by exploring the influence of the siblings on young children's understanding and knowledge of fluid intake. This study investigates if primary (elementary) aged school children (aged 4 and 5 years old) are influenced by their siblings, if they are told to drink, and if variations exist between the children from different ages, gender, schools and sibling make up.

## Methods

### *Participants*

A total of 130 (63 boys, 67 girls of which 83 were aged 4 and 47 were aged 5) from 4 elementary schools in the South East of England participated in the study between January and April 2019. Participants had a variety of different types of sibling status, they were the youngest sibling; the eldest sibling; the middle sibling, an only child or a twin (see table 1 for full demographics). Prior to the study commencing, the lead researcher visited each principal and/or lead teacher at participating schools. The full outline of the study was explained, along with the distribution of information sheets and consent forms were completed by the gatekeepers. Children were read written instructions to ensure they understood what they were participating in, where assent was gained from the children. All were given the option to drop out at any time, without giving

Table 1. Illustrates the demographic data for each child according to sibling status

Sibling Status	Number of Children	Number of Boys	Number of Girls
Participant is the youngest sibling – only has older siblings	77	36	41
Participant is eldest sibling – only has younger siblings	28	12	16
Participant is middle sibling – has both older and younger siblings	7	4	3
Participant has no siblings – is the only child	13	7	6
Participant is a twin – has a sibling of the same age	5	4	1

reason.

#### *Procedure*

Schools were recruited via a geographical cluster sampling method to ensure a representative sample from similar low socioeconomic based schools were encapsulated to allow comparison with similar school settings. The geographical area is one of the most socioeconomically deprived populous in England<sup>8</sup>. Only children within the age range of 4 – 5 years were included within the sampling. These children within England follow the Early Years Foundation Stage Curriculum<sup>9</sup>, within which they learn about the importance for good health, physical exercise and healthy diet. The lead researcher spent a day within each school prior to starting the research to ensure familiarity with the children and rapport was developed. Building a rapport with research participants can assist with the undertaking of research<sup>10</sup>, particularly important with young age children to allow them to feel more comfortable with the researcher. An opportunistic selection was used as all children who were present at school on the days of the research and wished to participate, completed the research. The lead researcher positioned themselves at child height either on the floor or at a table, to be less threatening within the classroom setting.

#### *Data Analysis*

All children were read the questionnaire by the lead researcher to ensure the young children understood the questions. All children were anonymised via an identification number and their subsequent

results inputted into SPSS statistical package 24.0 for analysis. As the same questionnaire as used by Coppinger and Howells (2019)<sup>4</sup> was adapted in terms of language only, the type of questions were the same. Rating scale questions were used to understand children's frequency of thirst and visual methodologies using physical water bottles to ask children about the total amount they perceived they drank. Five questions within the questionnaire were multiple choice in order for direct comparisons to be made between age and gender. Six open-ended questions were also included within the questionnaire to ascertain children's understanding of why drinking is important, identify who tells them when to drink, what opportunities they had to drink within the school day and what barriers they faced to not being allowed to drink at school. This open-ended style was chosen in order to obtain more in depth answers from participants. The final question asked participants to identify their favourite drink. MANOVA statistical analysis was undertaken on all quantitative data and coding analysis completed on all qualitative responses to also allow for comparison across gender and whether the children have older or not or more specifically whether they the children were an only child, had only younger siblings, had only older siblings, had both younger and older siblings or if they were twins. This paper therefore has undertaken further analysis from the same questionnaire responses that were not previously reported. Ethical approval was received from the ethics committees at Canterbury Christ Church University in December 2018.

## Results

The results presented within this paper are quantitative data and reported with a focus on sibling and gender, their fluid intake habits and their knowledge and understanding of fluid intake.

### *What is the Influence of the Elder sibling?*

The data concluded that there significant difference (figure 1) and a potential influence of having an elder sibling ( $F= .530, P < 0.05$ ) thinking that they should be drink between 250ml (15.3%) or 500ml (35.3%) a day, whilst those without an elder sibling believed they should be consuming 2 litres a day. Those also without an elder sibling also were the only ones who indicated that they didn't know what they should be drinking.

### *What is the Influence of Elder Sibling and Gender?*

The data indicated there was a significant interaction ( $F = 1.812, P < 0.05$ ) between gender and older sibling in particular for girls. The most popular response for girls with elder siblings was 500ml of fluids a day (47.7%) whilst for girls without an elder sibling reported only 34.8% for 500ml. The most popular

response for girls without an elder sibling was 2litres (43.5%), whilst 18.2% of girls with an elder sibling only believed they should have 2litres a day. Indicating that by having an elder sibling had the greatest influence on girls.

### *Who Influences you / Supports you in Remembering to Drink?*

The data indicated that there was a significant main effect ( $F=3.67, p<0.05$ ) and significant interaction ( $F=1.367, p<0.05$ ) for children who influenced / supported them in remembering to drink. Adults were the strongest influencer for all children. For those children who had no older sibling, (77.8%) reported that the teacher or their parent was the biggest influencer, they did not report the young sibling at all as an influencer. Yet those who had an elder sibling reported them to encourage them to drink (17.6%). 23.1% of children who were the only child, 11.8% of children with an elder sibling and 17.8% of those with no elder sibling reported that 'no one' or 'myself' told me when to drink. This response for those children who have siblings, is much lower than the 24% reported previously (1) for this same age range. Girls (22.7%)

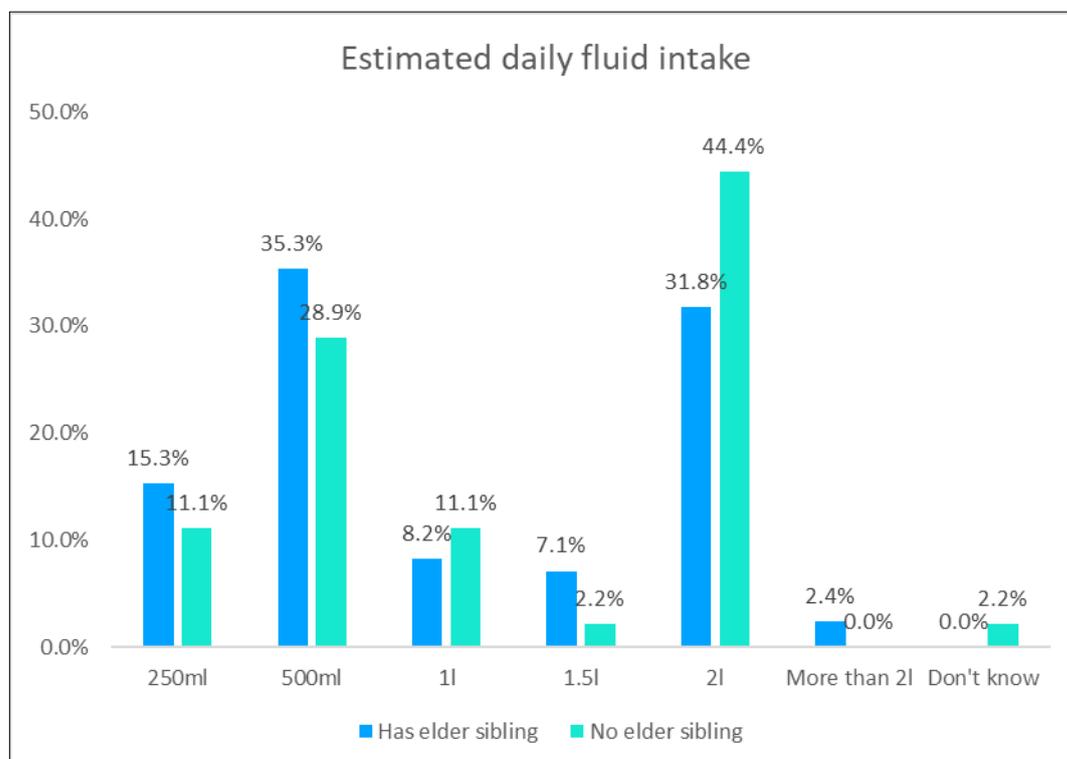


Figure 1. The percentage values for the young children's perceived drinking habits on a daily basis according to if they had an elder sibling / not.

continue to influenced more strongly ( $F=1.494$ ,  $p<0.05$ ) than boys (12.2%). For the twins (100%) they reported that the adults were the key influencers, their other sibling had no influence on helping them remember to drink.

#### *To Drink and then Play or Just play without Drinking?*

Children were asked if they would drink before playing or just head straight to playing without drinking. The focus of this questions was to look at how children prepare themselves and if they understood the importance of hydrating and to interspersed their playing with drinking, or if they would potentially still need support from their teachers to understand the need to pause and drink.

All the data except girls who were the eldest sibling indicated that they would play straight away (34.1% - 40.9%) and concur with similar previous results<sup>11</sup>. However girls who were the eldest reported a significantly ( $F=1.252$ ,  $p<0.05$ ) lower level of play without drinking (17.4%). Interestingly this result indicates that potentially gender and sibling status has an influence and by being the eldest girl they may have developed habits of when to drink linked to playing, perhaps the lure for boys in particular regardless of their sibling status and the excitement of playing acts as an inhibitor to recognising the signs of thirst and the need to drink. It is recommended that boys especially need further guidance and support linking playing and drinking to help them stay hydrated.

#### *When do you get Most Thirsty?*

Children were asked when they get most thirsty within the day, with the focus on the different parts of the school day. There was a significant main effect ( $F=0.711$ ,  $p<0.05$ ), for sibling, with 15.6% of children with no elder siblings reported that straight after lunch was a key place they felt most thirst, whilst 0% of children with an elder sibling reported this as a place that they felt thirsty. This indicates that children with elder siblings were potentially drinking during lunch time and have learnt to drink at lunch time. Therefore preventing the feeling of thirst that has been reported to occur as a delayed response in children<sup>12</sup>. Another result that was indicated is differences in the feeling of thirst before school, 8.9% of children with no elder sibling reported this as a place they felt thirsty, whilst

those with an elder sibling only reported this part of the day 2.4% of the time. This may be due to the dynamics of the family unit and the whole family having breakfast or fluid intake together prior to school starting, whether this be at home or during breakfast club. It is acknowledged that the 4 schools were based within low-socioeconomic status and a high proportion of the children who participated within this research ate breakfast at breakfast club (based at school) prior to the formal start of school. Further clarification is future research in terms of the definition 'before school' and children's interpretation of if before school meant before physically coming to the school premises or before the school started lessons, as it is unknown fully the impact that breakfast club provision had on the children's perception of when they got most thirsty.

### **Discussion**

The study aimed to investigate the potential influence of sibling status and perceived intake of primary (elementary) school children aged 4 and 5 within the South East of England, in particular their understanding of how much fluids they should drink daily, who supported / prompted them in drinking, if they considered drinking before playing and when they were most thirsty during the school day. Gender differences were also explored.

#### *Knowing and Understanding the Daily Fluid Intake Recommendations*

The results indicated that children did not know the recommended fluid intake they need on a daily basis. Young children need 1.1 – 1.3 litres of fluids a day to maintain an effective hydration status<sup>1</sup> the data indicated that children either believed they needed between 250 – 500ml or over 2litres a day. Those with elder siblings reported the lower levels of fluid intake, whilst those without elder siblings reported the higher levels, indicating that the influence of having an elder sibling in particular was to drink less fluids. These results are in contrast to previous data<sup>7</sup> in which children with no elder siblings had a 6% increase in water consumption compared to children whom have two or more. It has also been highlighted<sup>13</sup> that siblings and friends were barriers to consuming beverages and choosing types of drinks. The researcher explained that there are peer pressure related imperatives and wanting to fit into social conventions of consuming whatever

beverage is popular in their family and friendship groups. This may link to the results of this study and the influence of siblings, but also identifies the need to consider the influence of friendship groups on meeting daily recommendations.

#### *Key Influencer for Supporting and Encouraging Drinking*

The biggest influencer was reported to be adults, whether this be either teachers or parents, in particular for those who had no sibling or those who are twins. When the influence of siblings are considered previous research<sup>6</sup>, who posited that older brothers and sisters are much more probable to act as role models for their younger siblings. This is reflected in the results which found that girls with older siblings, had the greatest influence. However as illustrated in the results this external influence of modelling of behaviours that older siblings may exhibit, they can demonstrate both positive and negative actions in relation to home life customs. Consequently, if an older sibling were not to consume adequate water at home, the younger sibling could, in theory, imitate this behaviour as they might think it is the normal thing to do in their household; which may explain why they think they only need under 500ml a day of fluids. Therefore younger children of multi-child households may be receiving conflicting and possibly, counterproductive influences.

#### *The Influence of Play and Drinking*

When the question was posed as to the young children's autonomous choice of playing, or drinking and then playing if they were thirsty, 36.5% of children with an elder sibling would choose to play without hydration; 7.6% higher than their peers without an elder brother or sister. Conversely, 82.6% of girls without elder sibling would choose to drink and then play. As such teaching practitioners and parents should ensure that children are not given this independent choice by further integrating a consistent hydration message into their pedagogy and parenting respectively. This recommendation of further professional development has already been raised previously<sup>14</sup> in their report on teacher's perceptions of children's consumption, and perhaps this is why children are given the choice of when they drink due to teacher's own deficiencies in this area. Hence, with the evidence assessed and the cited recommendation in the All-Party Parliamentary 'Fit and Healthy Childhood report'<sup>15</sup> is to ensure there is a plan in place for children in the UK, to

be taught about the acute benefits of maintaining adequate hydration. Thus, this study concurs and emphasises the need to continually support and educate children in when to drink throughout the school day, including during play.

#### **Limitations**

##### *Response Rates*

A total of 217 children could have been questioned within the four elementary schools (the entire size of the four settings), but due to the time constraints of the schools allowing the researchers into the settings, only 130 children were accessed via an opportunistic sampling technique. This was 59.9% of the overall total potential sample within the settings. However, the total sample size was regarded as a medium sample size, as previous research on fluid intake has varied from a small sample size of 58<sup>2</sup> to a large sample size of 529<sup>16</sup>. It is recognised that if more time was allowed within each of the settings a larger sample size could be obtained for future research.

##### *Self-Reporting*

Coppinger and Howells (2019)<sup>4</sup> previously have aired caution in the accuracy of children's, particularly young children, such as the sample age in this research as to cognitive ability to recall when they consume fluids within the school day. This may explain some of the discrepancies in the results that were obtained. It is recommended that in future research to include both observations within the classroom setting and the children's perceptions to allow for comparison between the actual and perceived fluid intake of young children in school.

##### *New Statutory Curriculum Framework*

The Department for Education in the UK have announced the introduction of the new statutory Early Years Foundation Stage curriculum framework for England to be implemented from 2021 or early adopters from 2020<sup>5</sup>. Within the curriculum practitioners and teachers are advised that "drinking water must be accessible at all times" (p.23). Furthermore the Development Matters guidance<sup>17</sup> that helps practitioners and teachers implement the curriculum indicates that real life choices should be offered to children within early years settings, and children in particular for those up to the age of 3, should have a choice of what they

would like to drink “water or milk” (p.38)<sup>17</sup>. Future research could focus on children’s choices and preference of drink linked to their allowed choices of milk or water and their desire to drink.

### Conclusion

This study has extended both previous international comparison<sup>4</sup>, as well the specific age ranged focused research on children’s understanding and knowledge of fluid intake<sup>3</sup>. The results supports the indication that children seem confused and do not understand the daily fluid recommendations. This paper has highlighted that the aforementioned issues are heightened for children with an elder sibling, particularly for girls. Further interventions in turn is needed to help children understand about their hydration more comprehensively, as well as further education for parents and teachers to help support this young age group recognise their thirst responses is recommended through the previously discussed development of community resources packs<sup>15</sup> and continuous professional development for teachers. It appears that the message is becoming to be heard by the UK Government, about the importance of hydration and understanding fluid intake for young children, however it is recommended future research is needed to analyse the shift in the new policy and the implementation of the new curriculum from 2021<sup>5</sup>.

This study has identified there is a scarcity of research focusing on the influence of siblings and family drinking habits. It has proposed that elder siblings are potentially exhibiting role modelling behavior towards drinking habits and patterns in particular for girls. This study is the start of future research to establish the full influence of the ‘whole family’s approach to fluid intake, and it is recommended there is a need to establish a wider understanding of this influence of siblings as well as the family unit.

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