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Journal article

**The effects of a therapy dog vs mindfulness vs a Student Advisor
on student anxiety and well-being**

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“This is an Accepted Manuscript of an article published by Taylor & Francis in Journal of Further and Higher Education on 20th August 2020, available online:
<https://doi.org/10.1080/0309877X.2020.1804535>”



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Journal:	<i>Journal of Further and Higher Education</i>
Manuscript ID	CJFH-2020-0012.R2
Manuscript Type:	Original Paper
Keywords:	therapy dog, mindfulness, university student, stress, anxiety

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**The Effects of a Therapy dog vs Mindfulness vs a Student Advisor on Student Anxiety
and Well-being**

For Peer Review Only

ABSTRACT

There are growing concerns about the psychological well-being of university students; both in the UK and globally. In light of emerging research on the benefits of therapy dogs for student well-being, this study aimed to compare the use of therapy dogs to more conventional methods for improving students' well-being. A between-participants randomized control study was conducted on 94 university students who were randomly assigned to one of three 30-minute treatment sessions: dog therapy, mindfulness, or the control group who were given the university's standard treatment – a session with a student well-being advisor. All participants completed an anxiety scale and a mood scale, both immediately before and immediately after their allocated session. The results showed that whilst all three groups showed a significant decrease in anxiety after their allocated treatment, only the dog therapy and mindfulness groups' anxiety levels dropped to at or below normal levels. Both the dog therapy and mindfulness groups reported post-treatment anxiety levels which were significantly lower than those of the controls. The dog therapy and mindfulness groups' mood also showed a significant improvement after treatment whereas the control group's did not. The findings of this study therefore suggest that the use of therapy dogs is as effective as mindfulness in reducing students' anxiety and improving their well-being. However, more research investigating the use of multiple treatment sessions and comparing the more long-term effects of the two treatments are recommended.

Key words: therapy dog, mindfulness, university student, stress, anxiety

INTRODUCTION

There has been a growing interest in the psychological well-being of higher education students in recent years (Grant, 2002). This is unsurprising given the increasing financial and academic pressure students face in today's economy (Hesketh, 1999). Many students also now go away for university, leaving much of their support system behind, which can lead to heightened loneliness and stress (Adamle et al., 2009). The global rise in people entering into higher education can place further stress on students to achieve a good degree, as degrees are becoming more common (Davy et al., 2000). These new dilemmas that students face, coupled with the traditional pressures of exams and continuous deadlines, can often result in further mental health issues, as students who experience high levels of stress are more likely to develop other symptoms (Gilbert et al., 1996). For instance, in Canada 50% of students report feeling overwhelmed with stress and anxiety with 34% reporting feelings of depression (Craggs, 2012). Likewise, a national survey completed by 5,689 college students in the United States indicated that 50.7% reported symptoms of major depression, panic disorder and/or generalized anxiety (Keyes et al., 2012).

Similar concerns about the rise in student mental health has also been reported in a number of countries, including Australia (Stallman, 2008), Turkey (Guney et al., 2010), and Malaysia (Othman & Rashid, 2018). These types of results can also be seen in the UK; for example, a longitudinal study involving 16,460 students from the UK found that symptoms of depression and anxiety rose steadily over time, peaking in students' final year (Bewick et al., 2010).

Recent changes to the distribution of funding within the UK's higher education sector has led to further concerns for students; in particular, the drastic increase in tuition fees, rise of living costs, and changes to disability and maintenance grants (Mian & Richards, 2016). In fact, the UK Royal College of Psychiatrists (2011) predicted that the level of mental health problems

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3 in students will continue to rise as a result of the reductions in government funding and the
4 increased financial pressures placed on students. Accordingly, although higher education is
5 expanding, both in the UK and abroad, so too are the issues students face, resulting in a
6 growing concern that the structures currently in place to support students are not developing
7 at an equivalent pace (Davy et al., 2000). With that, although research in the area of student
8 stress and mental health is also expanding, there is still a need for more research into the
9 support that universities provide these students (Storri et al., 2010).

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20 One popular method that has recently been explored in a number of universities is the use of
21 mindfulness, which is a means of training the regulation of attention in a particular, non-
22 judgemental way (Barnes et al., 2017). Research, both in clinical and nonclinical samples, has
23 shown that the practice of mindfulness can result in lower levels of anxiety and stress
24 (Vøllestad et al., 2012). In addition, a number of studies have also found that mindfulness-
25 based interventions can be effective in reducing stress and anxiety in university students
26 (Regehr et al., 2013). For example, Crane et al. (2013) embedded a mindfulness-based
27 intervention in a core university module. The findings showed that students reported lower
28 levels of anxiety and depression if they practised mindfulness once a week or more,
29 compared to students who did not partake in mindfulness. Similarly, Shapiro et al. (2011)
30 found that undergraduate students who participated in a mindfulness-based intervention had
31 significantly higher rates of well-being and lower levels of stress compared to a control group
32 and that these significant gains were still present 12 months later. More recently, Galante et
33 al. (2018) had participants randomly assigned to either an eight-week mindfulness course
34 alongside their usual mental health support, or to a control group that received just mental
35 health support. They found that 57% of the control group reported stress scores higher than
36 the clinical threshold compared to 37% of the mindfulness group.

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3 However, not all research has provided full support for mindfulness as an intervention. In
4 their review of the literature on meditation, Lustyk et al. (2009) warned that individuals with
5 Posttraumatic Stress Disorder (PTSD) may be at risk of flashbacks or of triggering unwanted
6 memories and invasive thoughts. Dobkin et al. (2012) explain that being mindful makes it
7 difficult to ignore negative emotions and problems the individual would prefer not to think
8 about. They also note that some of their patients and student participants report an increase
9 in their levels of stress and/or in their depression scores at the end of their block of
10 mindfulness sessions. Thus, mindfulness may be inadvisable for some and it is important to
11 investigate alternative ways of enhancing well-being.
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25 Additionally, despite the growing research exploring the use of mindfulness-based
26 interventions in reducing university stress, to date there has been limited research comparing
27 mindfulness interventions in university settings to an active control group; something which
28 has often been criticized as a major limitation by researchers (Toneatto & Nguyen, 2007).
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34 The research that has been carried out has indicated that other active controls may be as
35 effective as mindfulness in reducing student stress. For instance, Shearer et al. (2015) carried
36 out the only study that compared the effects of a mindfulness-based intervention with a
37 therapy dog programme. A sample of students from the University of Pennsylvania were
38 assigned to either a no-treatment control condition, a therapy dog condition, or a mindfulness
39 condition. The students in the latter two conditions attended one-hour group sessions once a
40 week for four weeks. Self-reported measurements of well-being revealed that participants
41 assigned to either the therapy dog group or the mindfulness group yielded lower anxiety
42 scores than the control condition. Further, there was no significant difference between the
43 therapy dog group and the mindfulness group, suggesting that other forms of interventions,
44 such as therapy dogs, could be as beneficial as mindfulness.
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3 In fact, therapy dogs have become increasingly popular in many universities as a novel and
4 highly plausible method of reducing stress and promoting student well-being (Daltry & Mehr,
5 2015; Stewart et al., 2014). A number of universities across North America have started to
6 implement therapy dog programmes to help reduce anxiety and stress for students (Falcone,
7 2014; Schultheis, 2010). Anecdotal evidence has indicated that such programmes have been
8 extremely popular and beneficial (Barker et al., 2016) in reducing anxiety, stress and other
9 negative moods (Crossman et al., 2015). Formal research in the area is growing and although
10 limited, has demonstrated that therapy dogs can have a number of benefits for students. For
11 instance, Binfet (2017) examined the effects of a group-administered, single-session canine
12 therapy intervention on university students. Findings revealed a significant main effect for the
13 group, and when compared with the control group, participants in the canine therapy group
14 showed significant decreases in perceived stress. Some researchers however have contended
15 that the group format can dilute the immediate benefits of such interactions. As such, research
16 exploring single drop-in therapy dog sessions has recently started to emerge (Ward-Griffin et
17 al., 2018). For instance, Grajfoner et al. (2017) investigated the effects of short 20-minute
18 drop-in sessions with a therapy dog and found that interacting with the dog led to
19 improvements in students' mood and well-being and decreased levels of anxiety.
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43 Although the research assessing the effects of therapy dog interventions on students has
44 highlighted a number of benefits, there are various limitations within current research. In
45 particular, the vast majority of research has been carried out in American universities, very
46 few have been conducted within UK universities (see Grajfoner et al., 2017). This gap is a
47 common criticism when trying to generalise the findings of therapy dog studies and further
48 research needs to be carried out in other countries (Shearer et al., 2015). Barker et al. (2016)
49 further noted that there is a severe lack of rigorous research on therapy dog interventions in
50 higher education institutes and more needs to be done in terms of comparing such
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3 interventions with more traditional and well-established methods, such as mindfulness (see
4 Shearer et al., 2015). Previous research has also failed to compare such interventions to the
5
6 standardised treatment options that are available for higher education students. For instance,
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8 many universities have developed formal support schemes whereby students can meet
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10 individually with a student well-being officer to discuss any issues they may be experiencing.
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15 Due to the limitations in current literature and the lack of research on therapy dog
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17 interventions within UK universities, the current study was designed to assess the effect of a
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19 single therapy dog session as compared to mindfulness and the standard treatment offered to
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21 students (one-to-one with a student well-being advisor). These sessions took place during
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23 students' final exam period, a time when students are particularly stressed and often require
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25 the most support (Ansari et al., 2011). The overall aim of the study was thus to investigate the
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27 use of therapy dogs for reducing students' anxiety compared to more conventional methods.
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29 The current research therefore not only provides the first global evaluation into the impact
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31 that therapy dogs can have on student well-being compared to more established and standard
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33 methods, but it also provides one of the first explorations of such practices within a UK
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35 higher education institute.
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42 **METHODS**

43 *Design*

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46 A between-participants randomized control trial was conducted, utilising a mixed measures
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48 design with Time (Time 1 vs Time 2) as the repeated measures variable and Therapy group
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50 (Dog therapy vs Mindfulness therapy vs No therapy Control) as the independent measures
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52 variable. The control group received the 'usual treatment' available to students when initially
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54 seeking help for anxiety and issues relating to stress. The mindfulness group received a
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56 standardized mindfulness intervention and the therapy dog group engaged with a certified
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Pets As Therapy (PAT) dog. The focus of the study was on whether participants showed any changes in their well-being from directly before to directly after their therapy session. Self-reported mood and anxiety levels were used to measure the participants' well-being.

Participants

In total, 94 participants (37 males and 57 females) were recruited from a local university and randomly assigned to one of three experimental groups: dog therapy ($n = 32$), mindfulness ($n = 31$), or a standard treatment control condition ($n = 31$). All students studying psychology were invited to participate. However, students were deemed ineligible if they reported being too allergic or afraid to interact with a trained therapy dog. Across all three groups, participants' ages ranged from 18 to 46 years ($M = 22.76$, $SD = 4.87$), with the majority of the sample identified as White British ($n = 86$; 91.5%), and the remaining identifying as Black British ($n = 5$; 5.3%), and Asian British ($n = 3$; 3.2%).

Materials

All participants were asked to complete the following materials both before and after they completed their session:

State-Trait Anxiety Inventory short form (STAI-Y-6; Marteau & Bekker, 1992). The STAI-Y-6 consists of six items related to anxiety (calm, tense, upset, relaxed, content, and worried), all of which are rated on a four-point scale, with higher scores indicating more anxiety. The STAI-Y-6 is reported to have good reliability and validity and has been found useful in assessing subjective anxiety levels. The STAI-Y-6 was found to have a high internal reliability within the sample, with a Cronbach's Alpha score of .86.

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3 *Mood Tracking Scale (MTS)*. The MTS was created for the purpose of this study and asked
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5 participants to rate their overall mood on a 10-point scale (1 - very unpleasant, 10 - very
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7 pleasant).
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10 11 *Procedure*

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14 Upon approval from the University Research Ethics Committee, all students studying
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16 psychology were made aware of the research through on-campus flyers, email, and electronic
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18 campus bulletin boards. Potential participants were provided with a full briefing regarding the
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20 purpose of the research and that they would be required to rate their level of anxiety both
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22 before and after participating in a randomly allocated group. They were also advised that one
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24 of the conditions would require interaction with a therapy dog and if they had known
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26 allergies or a fear of dogs they were not allowed to take part in the study.
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31 If participants agreed to take part in the study, they were asked to read and sign a consent
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33 form, made available online. Upon consent, all participants were allocated a participant
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35 number to ensure confidentiality. Using a random number generator, participant numbers
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37 were subsequently used to randomly allocate participants to one of the three conditions:
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39 mindfulness, therapy dog, or control. All conditions took place in identical rooms and lasted
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41 30 minutes. Participants were asked to complete the *STAI-Y-6* and *MTS* both before and after
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43 attending their allocated condition. Afterwards, participants were thoroughly debriefed and
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45 thanked for participation.
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51 *Mindfulness condition*. Participants were invited to make themselves comfortable. They were
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53 then told that they would be listening to a pre-recorded 30-minute guided mindfulness
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55 exercise, consisting of a mindful meditation of the breath (Williams & Penman, 2011). These
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57 specific procedures were used as research has shown these exercises can be adopted for short
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59 experimental studies (e.g., Carlbring et al., 2007). Once the participant was seated
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3 comfortably, the researcher left the room and observed the participant through a one-way
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5 vision window.
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9 *Therapy dog condition.* Participants were introduced to a certified therapy dog and the dog's
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11 handler. Once both the participant and dog were comfortable, the participant was left in the
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13 room to interact with the dog. The researcher observed all interactions through a one-way
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15 window. Participants were not provided with specific instructions regarding what to do
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17 during the session and were therefore free to engage with the therapy dog however they
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19 wanted.
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23 *Control condition.* Participants in this condition met with the student advisor working within
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25 the psychology department. The student advisor held a degree in psychology and had five
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27 years of experience working with vulnerable people in a similar role. The advisor also
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29 underwent in-house training at the university prior to commencing the role. This condition
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31 was created to mimic the standard treatment for student stress and anxiety at the target
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33 university, a one-to-one session with a student advisor to talk over their worries and
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35 difficulties. In these sessions, students are encouraged to talk about any issues or problems
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37 that may be of concern to the student. The purpose of these sessions are to provide
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39 psychological support to help students make their own choices and decisions.
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45 *Ethics*

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48 An important consideration in studies utilising therapy dogs is that they too are sentient
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50 beings with their own mind and feelings. They cannot give their explicit permission to take
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52 part in the study and it is therefore important to monitor them for signs of stress or distress
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54 throughout. Recent research has found that dogs' stress levels increase as their owners' stress
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56 (Sundman et al., 2019) and anxiety (Sümegei et al., 2014) increase, suggesting that they are
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58 not only able to detect when humans are stressed but that this may then serve to cause stress
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3 to the dogs themselves. This is important to bear in mind because the effect of animal
4 assisted interventions (AAIs) on the animals themselves is not yet clear (Melco et al., 2020)
5 and research has produced mixed results. For instance, King et al. (2011) found that their
6 sample of 21 therapy dogs exhibited higher stress (as measured by salivary cortisol) when
7 they were at work than on days they were not. However, Melco et al.'s (2020) sample of 9
8 dogs did not show increases in either heart rate or salivary cortisol during their sessions with
9 children with Attention Deficit Hyperactivity Disorder (ADHD). Interestingly, however,
10 they did observe some behavioural signs of stress in the dogs and they suggest that the reason
11 the dogs' physiology measures did not reflect this may have been due to: how attentive the
12 handlers were to the dogs' needs throughout, the dogs' temperaments, and the AAI training
13 and experience the staff. They therefore recommended that therapy dogs and owners be
14 vetted beforehand and that the safety and well-being of the dogs are closely monitored and
15 maintained with clear training and guidelines for all involved.

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34 With this in mind, the dog used in the study was a trained, experienced, therapy dog, certified
35 by Pets as Therapy (see <https://petsastherapy.org>). She was already familiar with the campus
36 and the rooms the study took part in and the handler was trained in spotting signs of
37 stress/distress in dogs, observed the interactions between the dog and the participants
38 throughout, and was able to stop the session if the dog showed signs of stress, distress, or of
39 needing a break.

40 41 42 43 44 45 46 47 48 49 **RESULTS**

50 51 52 *Anxiety*

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55 Overall, participants' average STAI-Y-6 scores before their therapy session were $M = 43.1$
56 ($SD = 10.7$). Scores of around 34 to 36 are generally considered to be in the 'normal' range
57 (Bekker et al., 2003), so these results suggest that prior to the session the participants were
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3 experiencing a high level of anxiety, above what would be considered to be the norm. As can
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5 be seen from Table 1, this was true of all the groups at the start of their session. In contrast,
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7 immediately after their therapy session participants' anxiety levels had dropped to $M = 34.8$
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9 ($SD = 9.7$) which is considered to be within the 'normal' range (Bekker et al., 2003).
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11 Interestingly, when the mean anxiety scores for each of the three groups are looked at
12
13 separately (see Table 1) the average scores after therapy for both the mindfulness ($M = 31.7$,
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15 $SD = 7.2$) and dog therapy ($M = 31.5$, $SD = 9.5$) conditions is below the normal range
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17 whereas the control group ($M = 42.3$, $SD = 8.2$) are still reporting anxiety scores of above the
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19 norm. A comparison of each of the group's anxiety scores directly before (Time 1) and
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21 directly after (Time 2) their sessions is illustrated in Figure 1.
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27 ----- Table 1 Here -----
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30 In order to see if there were any significant differences between the groups in their anxiety
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32 levels, a 3 (Therapy: Control vs Dog vs Mindfulness) x 2 (Time: Time 1 vs Time 2) mixed
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34 ANOVA was performed with Therapy as the independent measures variable and Time as the
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36 repeated measures variable. This showed a significant main effect of Therapy, $F(2, 91) = 7.5$,
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38 $p = .001$, $\eta p^2 = .141$, and post hoc pairwise comparisons, using a Bonferroni correction to
39
40 adjust for Type 1 errors, showed that the Control group's STAI-Y-6 scores ($M = 43.9$, $SD =$
41
42 1.6) were significantly higher than both the Dog group's ($M = 38.2$, $SD = 1.5$), $p = .031$, and
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44 the Mindfulness group's ($M = 35.3$, $SD = 1.6$), $p = .001$.
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50 ----- Figure 1 Here -----
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53 The analyses also revealed a significant main effect of Time, $F(1, 91) = 99.0$, $p < .001$, $\eta p^2 =$
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55 521 . This was due to the participants having higher STAI-Y-6 scores at Time 1 ($M = 43.1$,
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57 $SD = 10.7$) than at Time 2 ($M = 34.8$, $SD = 9.7$). A significant Time by Therapy interaction
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59 effect was also found, $F(2, 91) = 13.5$, $p < .001$, $\eta p^2 = .229$. Post hoc pairwise comparisons
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3 showed that this was due to differences in STAI-Y-6 scores between the groups at both Time
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5 1 and at Time 2 as well as differences from Time 1 to Time 2 within some of the groups.
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7 Specifically, at Time 1 the Mindfulness group reported a significantly lower score on the
8
9 STAI-Y-6 ($M = 38.9$, $SD = 8.5$) than the Control group ($M = 45.6$, $SD = 9.5$), $p = .048$. At
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11 Time 2, there was a significant difference between the Control group's STAI-Y-6 scores (M
12
13 $= 42.3$, $SD = 8.2$) and the Dog group's STAI-Y-6 scores ($M = 31.5$, $SD = 9.5$), $p < .001$, and
14
15 between the Control group's STAI-Y-6 scores and the Mindfulness group's STAI-Y-6 scores
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17 ($M = 31.7$, $SD = 7.2$), $p < .001$. In addition, all three groups showed a significant difference
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19 in their anxiety levels at Time 1 compared to Time 2. The Control group showed a small but
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21 significant decrease in their STAI-Y-6 scores from Time 1 ($M = 45.6$, $SD = 9.5$) to Time 2 (M
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23 $= 42.3$, $SD = 8.2$), $p = .025$. The Mindfulness group also showed a significant decrease in
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25 their STAI-Y-6 scores from Time 1 ($M = 38.9$, $SD = 8.5$) compared to Time 2 ($M = 31.7$, SD
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27 $= 7.2$), $p < .001$. And the Dog Therapy group also showed a significant decrease in their
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29 STAI-Y-6 scores from Time 1 ($M = 44.9$, $SD = 12.5$) to Time 2 ($M = 31.5$, $SD = 9.5$), $p <$
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31 $.001$.

32 33 34 35 36 37 38 39 *Mood*

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42 Participants' mean mood ratings were 6.5 ($SD = 1.5$) at Time 1 and 7.5 ($SD = 1.5$) at Time 2.
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44 The mean mood scores for each group at Time 1 and Time 2 are listed in Table 2 and can be
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46 seen illustrated in Figure 2, below.
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50 ----- Table 2 Here -----
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53 In order to see whether there was a significant difference between the groups in their mood
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55 ratings from Time 1 to Time 2, a 3 (Therapy: Control vs Dog vs Mindfulness) x 2 (Time:
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57 Time 1 vs Time 2) mixed ANOVA was used. This did not show a significant main effect of
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59 Therapy on mood, $F(2, 91) = 1.6$, $p = .204$, $\eta p^2 = .034$. However, there was a significant
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3 main effect of Time, $F(1, 91) = 73.8, p < .001, \eta p^2 = .448$. This was due to participants
4 reporting a better mood at Time 2 ($M = 7.4, SD = 1.5$) than at Time 1 ($M = 6.5, SD = 1.5$).
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8 The analyses also revealed a significant Time by Therapy interaction effect, $F(2, 91) = 25.0,$
9 $p < .001, \eta p^2 = .355$. Post hoc pairwise comparisons showed that this was due to differences
10 between the groups at both Time 1 and at Time 2 and differences from Time 1 to Time 2
11 within some of the groups. Specifically, at Time 1 the Mindfulness group reported a
12 significantly better mood ($M = 7.0, SD = 1.2$) than the Dog group ($M = 6.0, SD = 1.6$), $p =$
13 $.015$. At Time 2, the Dog group ($M = 7.8, SD = 1.5$) reported a significantly better mood than
14 the Control group ($M = 6.8, SD = 1.2$), $p = .015$. In addition, the post hoc comparisons also
15 revealed that there was a significant difference in mood ratings from Time 1 to Time 2 for
16 both the Dog therapy group ($p < .001$) and the Mindfulness therapy group ($p < .001$). This
17 was due to the Dog group having a higher mood rating at Time 2 ($M = 7.8, SD = 1.5$)
18 compared to Time 1 ($M = 6.0, SD = 1.6$) and the Mindfulness therapy group also reporting a
19 higher mood rating at Time 2 ($M = 7.6, SD = 1.5$) compared to Time 1 ($M = 7.0, SD = 1.2$).
20 None of the other pairwise comparisons were found to be significant.
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39 ----- Figure 2 Here -----
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41 42 43 **DISCUSSION** 44

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46 The purpose of this study was to investigate the use of therapy dogs for reducing students'
47 anxiety compared to more conventional methods. Students were given the opportunity to
48 sign up to a randomised control study which compared the use of therapy dogs to
49 mindfulness therapy, one of the more established methods used to reduce anxiety (e.g., Crane
50 et al., 2013). The study also included a control group who were given the standard treatment
51 for student stress and anxiety at the target university (i.e., a session with a student advisor to
52 talk over their worries and difficulties). All three of the treatment methods produced a
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3 significant decrease in student anxiety but the largest improvements were seen by the dog
4 therapy group and the mindfulness group. Further, whilst the students all initially reported
5 anxiety levels above what would be considered to be in the 'normal' range (Bekker et al.,
6 2003), the control group's anxiety scores remained above the 'normal' range even after their
7 treatment session whereas the anxiety levels of the students who had received dog therapy
8 and those who had received mindfulness therapy decreased to below the 'normal' range. In
9 addition, whilst both the dog therapy and mindfulness therapy groups showed a significant
10 improvement in mood after their therapy session, the control group did not. The findings of
11 the study therefore support the hypothesis that therapy dogs are at least as effective at
12 reducing students' anxiety levels as mindfulness therapy and also demonstrated that dog
13 therapy was as useful as mindfulness therapy in improving students' mood.
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30 The results of the current study add to recent research by both Wood et al. (2018) and
31 Grajfoner et al. (2017) who found evidence to support the use of therapy dogs for improving
32 student anxiety and well-being. Because Wood et al. (2018) used assistance, rather than
33 therapy, dogs in their study it was important to use therapy dogs specifically in the present
34 study because assistance dogs are very different to therapy dogs both in regards to the extent
35 and type of training they receive and also in terms of their behaviour and demeanour whilst at
36 work (Spruin & Mozova, 2018). Similarly, whilst Grajfoner et al.'s study (2017) showed a
37 significant improvement in students' mood and a significant decrease in students' anxiety
38 after a 20 minute dog-therapy session, the students in their study were given the opportunity
39 to interact with multiple dogs rather than just a single therapy dog. The single-dog-only set-
40 up of the current study enabled a more like-for-like comparison with the standard treatment
41 currently available to students at the target university (i.e. a one-to-one session with a student
42 advisor).
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1
2
3 With that, although the idea of improving the services available for students to combat stress
4 and anxiety is nothing new and there has been some research comparing mindfulness and dog
5 therapy in mental health patients suffering from anxiety and depression (see Henry &
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7
8 Crowley, 2015), there has been no research that directly compares both methods with the
9
10 traditional services offered in university students struggling with similar symptoms, and also
11
12 limited research of such programmes within the UK student population. This study is thus the
13
14 first to compare the effects of more innovative services, such as therapy dog programmes and
15
16 mindfulness, with the traditional practices for student well-being often offered at university.
17
18 Based on the findings of the current study, the authors contend that therapy dogs can help to
19
20 alleviate student stress and increase well-being at a similar rate to mindfulness. These results
21
22 support previous research comparing the effectiveness of mindfulness and therapy dogs in
23
24 similar settings. Henry and Crowley (2015) found that for patients suffering from anxiety or
25
26 depression, both mindfulness and therapy dog interactions were shown to decrease
27
28 participants' symptoms of anxiety and depression. The researchers also found no significant
29
30 difference between the two groups. Similarly, Shearer et al. (2015) compared the benefits of
31
32 mindfulness with interacting with a therapy dog versus a non-treatment control group and
33
34 found that the students in both the dog therapy group and the mindfulness group reported
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36 lower anxiety scores than in the control condition.
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45 Accordingly, while mindfulness is becoming a well-established, popular method for
46
47 improving individual well-being, the use of therapy dogs is still a growing practice. Similar to
48
49 mindfulness, however, the theory supporting the benefit of therapy dogs is becoming well
50
51 established. In particular, it has been argued that the benefits of this innovative practice arise
52
53 from the various pathways in which the human-canine interaction can benefit individuals
54
55 (Friedmann & Tsai, 2006). More specifically, research has shown that dogs are a source of
56
57 attachment security for people, providing them with a non-judgmental entity for emotional
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1
2
3 support (Beck & Madresh, 2008) and unconditional companionship (Saunders, 2003), both of
4
5 which have been shown to help improve overall well-being (Eger & Maridal, 2015). In
6
7 contrast to mindfulness, therapy dog interventions also provide loving social interactions that
8
9 go beyond basic physical care (van der Horst et al., 2008), and this has been shown to aid in
10
11 the avoidance of loneliness and fulfil, to some extent, humans' social-emotional needs
12
13 (Triebenbacher, 1998). It could therefore be argued that therapy dog programmes can offer
14
15 various avenues to reducing anxiety and stress in university students. They also provide an
16
17 alternative approach to other interventions, something which is particularly important for
18
19 people with certain pre-existing traumas or mental health issues that may make interventions
20
21 such as mindfulness inadvisable (e.g., see Lustyk et al., 2009 for further discussion of this
22
23 point).
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29 Although the findings of the current study are positive, there are nonetheless limitations.
30
31 Crucially, participants in the study only received a single session of therapy. Mindfulness-
32
33 based interventions are usually performed over a series of weeks (see Crane et al., 2013) so it
34
35 would be useful to compare the effectiveness a full course of mindfulness therapy to the
36
37 equivalent number of dog therapy sessions. Additionally, although the students' mood levels
38
39 and anxiety both showed improvement immediately after both mindfulness and dog therapy,
40
41 it is not known how long these improvements lasted. Recent research by Sundquist et al.
42
43 (2018) found that a year after receiving a series of mindfulness therapy sessions, patients
44
45 from a healthcare centre in Sweden were still showing significant long-term improvements in
46
47 their anxiety levels which were on a comparable level to patients given the more routine
48
49 therapies (e.g., Cognitive Behavioural Therapy). Although these were clinical patients and
50
51 not students, the results are suggestive of the long-term benefits of mindfulness therapy for
52
53 anxiety and it would be useful to see if students in future studies show evidence of long-term
54
55 improvement in anxiety and well-being as a result of dog therapy.
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1
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3 It is also worth noting that although participants in the current study were asked whether or
4 not they were pet owners, they were not asked specifically if they were dog owners. Similar
5
6 to the findings of Grajfoner et al. (2017), pet ownership was not found to have an influence
7
8 on the results of the present study and pet ownership was removed from the analyses in order
9
10 to avoid unnecessarily increasing the length of the results reported. That said, although
11
12 Grajfoner et al.'s (2017) study did not find that being a dog owner specifically made a
13
14 difference to their participants' improvements in anxiety and mood, their participants self-
15
16 selected to sign up for dog-therapy specifically so it would nonetheless be useful for future
17
18 studies to get a more detailed history of participants' previous history and experience with
19
20 dogs in case this has an influence on how they respond to dog therapy. The participants in
21
22 the current study did not get to choose which of the three types of treatment they received and
23
24 although there are many advantages to randomly allocating participants to treatment
25
26 conditions, it could be argued that students who sign up to take part in a study rather than to a
27
28 particular therapy per se may not have the same motivations as a student who signs up for a
29
30 specific intervention (i.e. dog therapy, talking to a student advisor, mindfulness). It would
31
32 therefore be useful to look at whether there are any additional benefits with regard to anxiety
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34 and well-being for students who sign up specifically for dog therapy.
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43 Although the focus of the current study is on the effect of therapy dogs on student anxiety
44
45 and well-being, it is important to also consider the well-being of the dogs in studies like this
46
47 (and, indeed, in the practice of dog therapy in general). Despite the increasing amount of
48
49 research into the use of animals to improve well-being in people, there is very little research
50
51 which looks at the effect that this has on the animals themselves (Palestrini et al., 2017),
52
53 despite the concerns which have been raised about the animals' welfare (Ng et al., 2014), and
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55 the limited research which has been done in this area is mixed. A recent study by
56
57 McCullough et al. (2018) did not find any evidence of stress in a group of 26 therapy dogs
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1
2
3 whilst they were working in a children's ward in hospital whereas Haubehofer and
4
5 Kirchengast (2007) discovered that the cortisol levels - a common method for assessing stress
6
7 in dogs (Cobb et al., 2016) – of the 18 dogs in their study increased when they were at work
8
9 compared to when they were at home. This is a finding also echoed by King et al. (2011),
10
11 although Haubehofer and Kirchengast (2007) stress the importance of further study to find
12
13 out what aspects of the work, specifically, produce this effect in the dogs. Interestingly, King
14
15 et al. (2011) noted that in their study both the younger dogs and the more inexperienced
16
17 therapy dogs showed the most behavioural signs of stress and it may be that some therapy
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19 dogs react differently to certain settings than others.
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25 Further, whilst Glenk et al. (2013) did not find evidence to suggest that the therapy dogs in
26
27 their study experienced stress whilst at work, they did discover that the dogs' cortisol levels
28
29 depended on whether they were working on or off the lead. Similarly, Melco et al. (2020)
30
31 noted that the therapy dogs used in their study were more likely to show behavioural signs of
32
33 stress when the children they were paired with tugged at their lead. This is an important point
34
35 because therapy dogs are expected to remain on their leads (Spruin & Mozova, 2018).
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40 Another point worth noting is that, like mindfulness, therapy dogs are not suitable for
41
42 everyone. Some individuals may have personal histories or cultural backgrounds that make
43
44 the use of dogs inappropriate and others may have a fear of dogs or suffer allergies that
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46 prevent them from even being in the same room as a dog. It is therefore important to screen
47
48 for these factors before considering a session of dog therapy with someone.
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52
53 Despite these limitations, the current findings have provided the first step towards developing
54
55 a new avenue of support for students, one that has the potential to radically progress and
56
57 modernise the services of support currently available to university students. Our study
58
59 suggests that therapy dog programmes can be a powerful and innovative way to help
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1
2
3 university students cope with anxiety and improve overall well-being. The extensive body of
4 research highlighting the positive effects of the canine-human relationship (e.g., Beck, 2003;
5
6 Barker & Barker, 1988; Gavriale-Gold, 2011), coupled with previous research highlighting
7
8 the benefits of therapy dog programmes (e.g., Grajfoner et al., 2017; Hart, 1995; Havener et
9
10 al., 2001; Wood et al., 2018) and the positive results found within the current study, offer a
11
12 natural pathway to incorporating therapy dogs as a low-risk, cost-effective way to support
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14 university students without the social stigma that is often attached to seeking help when
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16 overwhelmed with the stress of university.
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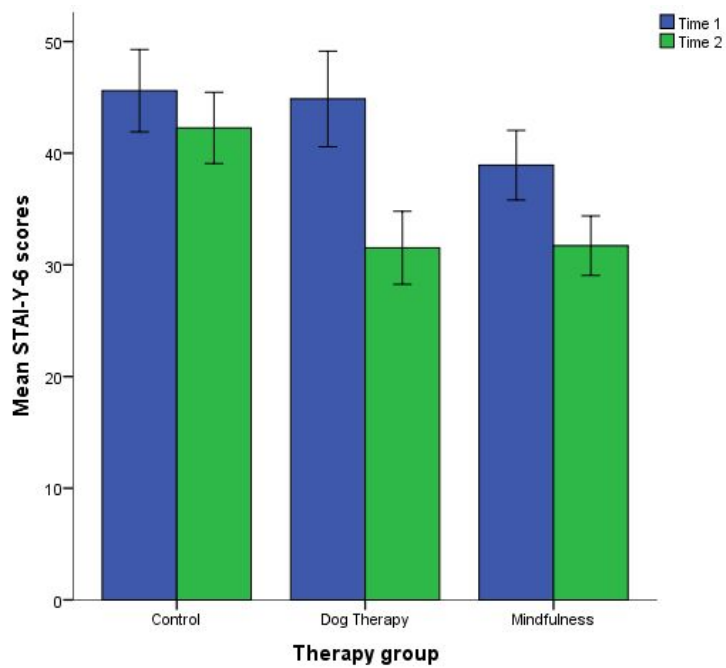
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Table 1.

Mean (and standard deviation) STAI-Y-6 scores for each of the therapy groups at Time 1 and at Time 2.

	Time 1	Time 2
Control	$M = 45.6 (SD = 9.5)$	$M = 42.3 (SD = 8.2)$
Dog therapy	$M = 44.9 (SD = 12.5)$	$M = 31.5 (SD = 9.5)$
Mindfulness	$M = 38.9 (SD = 8.5)$	$M = 31.7 (SD = 7.2)$

Figure 1. The mean STAI-Y-6 scores at Time 1 and at Time 2 for each of the therapy groups (error bars represent 95% confidence intervals).



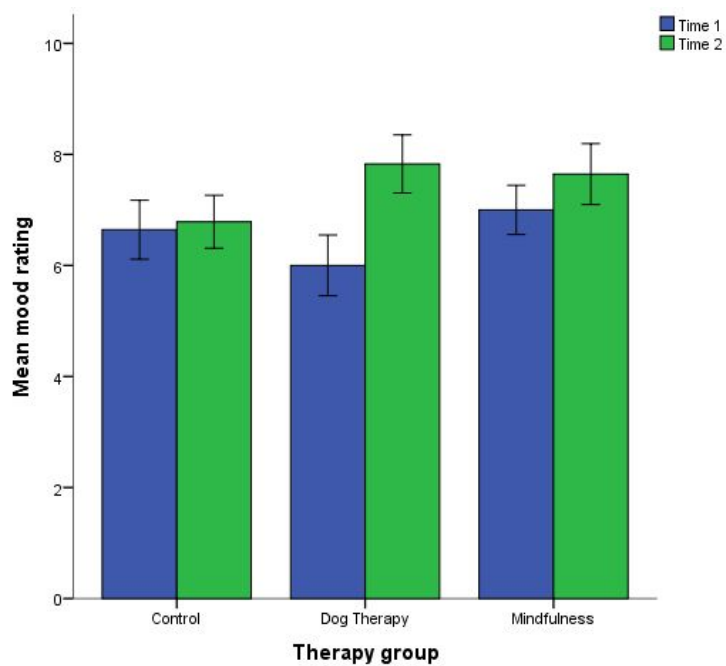
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Table 2.

Mean (and standard deviation) mood rating for each of the therapy groups at Time 1 and at Time 2

	Time 1	Time 2
Control	$M = 6.6 (SD = 1.4)$	$M = 6.8 (SD = 1.2)$
Dog therapy	$M = 6.0 (SD = 1.6)$	$M = 7.8 (SD = 1.5)$
Mindfulness	$M = 7.0 (SD = 1.2)$	$M = 7.6 (SD = 1.5)$

Figure 2. The mean mood scores at Time 1 compared and at Time 2 for each of the therapy groups (error bars represent 95% confidence intervals).



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