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The Impact of Dog Therapy on Anxiety and Happiness in Hospitalized Children

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THE IMPACT OF DOG THERAPY ON ANXIETY AND HAPPINESS IN HOSPITALIZED CHILDREN

by

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Abstract

Research on the psychological impact of hospitalization on children and their families indicates that a hospital stay can lead to stress and fear in pediatric patients. However, positive aspects may be introduced into the lives of hospitalized children through interactions with therapy dogs that can improve their psychological well-being. The focus of this proposed study is to investigate the effect of dog therapy on happiness and anxiety levels in pediatric inpatients. Two hundred children between 6 and 17 years old who are hospitalized at a children's hospital will either interact with a therapy dog or a dog plush animal across multiple sessions and complete established scales measuring anxiety and happiness. Salivary cortisol and oxytocin tests will also be collected from participants as a way of physiologically measuring anxiety and happiness. It is expected that anxiety levels will significantly decrease after the first session in children who interact with a therapy dog but not in those who interact with a plush animal. It is also predicted that happiness levels will significantly increase following the first session in children who interact with a therapy dog but not in those who do not interact with a dog. Assessing the impact of dog therapy on the well-being of hospitalized children may aid society in determining if this form of treatment can be successfully implemented across hospitals around the world and used in people of all ages, not just children.

The Impact of Dog Therapy on Anxiety and Happiness in Hospitalized Children

Each year more than three million children are hospitalized in the United States because of a sudden illness or an injury resulting from an accident or traumatic event (Connecticut Hospital Association, 2002). Whether hospitalization is planned or unplanned, this experience can have a great impact on children. Hospitalized children often experience psychological distress rooted from a combination of negative emotions such as fear, sadness, and anxiety (Connecticut Hospital Association, 2002). In their study, Avila-Alvarez et al. (2020) found that the main concerns for pediatric patients regarding their hospitalization experience include invasive and painful procedures, separation from their families and social environments, and remaining in an unfamiliar environment for a certain period of time. Furthermore, hospitalization in children can significantly impact children and their families as it can cause a sudden disruption in the daily-life routines of home and school (Hinic et al., 2019).

The hospital stay experience for children has been perceived as frightening, distressing, and unsettling given that children often undergo different procedures that can cause fear and pain (Lindström Nilsson et al., 2019). Children usually feel anxious before meeting medical professionals and experiencing a hospitalization (Delvecchio et al., 2019). Furthermore, empirical studies suggested that children express anxiety through aggression, lack of cooperation, and difficulty recovering from procedures (Delvecchio et al., 2019). However, literature shows that children involved in psychological programs were more able to contain anxiety, showing lower levels of anxiety before and after surgery (Delvecchio et al., 2019). Complementary treatment in pediatric hospital care is offered to children with the purpose of reducing their fear and anxiety and to make them feel more comfortable with various medical

procedures (Lindström Nilsson et al., 2019). Complementary treatment can consist of music therapy, structured or non-structured play, and clowns (Lindström Nilsson et al., 2019).

Some other positive aspects that may be introduced into the lives of children who are hospitalized involve animals and pets. Pets can help improve one's well-being by providing companionship, stress relief, and emotional comfort. Additionally, lower depression levels, improved socialization and mental functioning, and an improved quality of life have been associated with positive human-pet interactions (Chandramouleeswaran et al., 2014). Dog ownership, which is widely prevalent in today's society, has been associated with higher life satisfaction and greater well-being (Gee et al., 2021). Thus, the purpose of the proposed study is to examine the utility of animal-assisted therapy in a hospital context for hospitalized children.

In the early 1960's, animal-assisted interventions began to evolve with the work of Boris Levinson, a child psychologist (Gee et al., 2021). Levinson noticed that a child who was nonverbal and withdrawn during therapy was interacting with his dog Jingles after he unintentionally left them alone in the room (Gee et al., 2021). Regarding the theoretical framework behind animal-assisted interventions, Serpell et al. (2017) reported that the field of AAI research currently lacks strong explanatory theories. However, Hart and Yamamoto (2015) discussed the attachment theory as a possible theoretical framework behind the effects of human-animal interactions. In this theory, emotional well-being is affected by personal relationships, and thus pets may be significant attachment figures for promoting general mental health and offering unconditional love (Hanselman, 2002). Furthermore, Hart and Yamamoto (2015) also discussed the stress-coping model as another possible theoretical framework behind the effects of human-animal interactions. This model looks at companion animals as a source of social support in which petting the animal and being accepted by the animal helps one cope with stress (Spence

& Kaiser, 2002). Thus, the attachment theory and the stress-coping model may be used to explain how animal-assisted interventions work theoretically.

Regarding animal-assisted intervention and its objective, the International Association of Human-Animal Interaction Organizations (IAHAIO) defines animal-assisted intervention as a goal-oriented intervention that incorporates animals in health and education services for the purpose of providing therapeutic benefits to people. AAI incorporates human-animal teams in formal human services such as animal-assisted therapy (Jegatheesan et al., 2018). Animal-assisted therapy is a goal oriented and structured therapeutic intervention which focuses on improving physical, cognitive, behavioral, and emotional functioning of the particular person receiving the intervention (Jegatheesan et al., 2018). Some forms of animal-assisted therapy involve caring for animals, such as feeding, grooming, and bathing them on a regular basis. Other forms of AAT involve bringing an animal to a care facility for patient interaction, such as therapy dogs in hospitals. Canines are often used in hospitals and rehabilitation centers where their presence helps reduce feelings of fear, distrust rage, and aggression. Therapy dogs provide a feeling of joy and give patients the opportunity to disconnect from their sickness as patients break from their monotony (Alliance of Therapy Dogs Inc). Therapy dogs do not serve the same function as emotional support dogs as therapy dogs provide comfort to a variety of people across a wide range of settings rather than providing support to an individual they live with. Moreover, therapy dogs live with their owners but often provide support and companionship to other unfamiliar people (Cunningham, 2021). In sum, therapy dogs can have a positive impact on people and improve their well-being.

Being in the presence of a dog and interacting with it can result in a meaningful experience. In their study, Marti et al. (2022) investigated the effects of interacting with a dog by

looking at changes in prefrontal brain activity, which is important as this area is associated with social and emotional processing. The researchers used 21 healthy individuals who participated in six sessions within a period of two weeks. Participants interacted with a dog in the first three sessions and then with a plush animal in the other three. The dogs that were used in the study were trained to work with patients in a hospital setting, and the dog owner was present throughout the sessions. Results indicated that participants had higher prefrontal activity when they interacted with a dog than when they interacted with a plush animal, which suggested that interacting with a dog can generate a stronger emotional arousal than when interacting with a nonliving stimulus (Marti et al., 2022). Based on the results of this study, interacting with a dog can elicit more emotional arousal than interacting with a plush animal.

Furthermore, animal-assisted therapy may have a positive impact on children's hospitalization experience. This type of therapy is offered as complementary treatment to medical treatment in pediatric hospital care to children with the aim of reducing pain, fear, anxiety, and making them feel more comfortable with various procedures (Lindström Nilsson et al., 2019). Research has examined the beneficial influence of animal-assisted interventions on the psychological functioning of patient populations and found several benefits to them (Serpell et al., 2017). However, many of these studies often consist of small sample sizes and one-time interactions between the patient and the therapy dog (Serpell et al., 2017). Additionally, according to Serpell et al. (2017), research in animal-assisted intervention lacks random-assignment to conditions and a weak or no control condition. In their study, Lindström Nilsson et al. (2019) examined children's responses to animal-assisted therapy using a therapy dog as complementary treatment in pediatric hospital care. Fifty hospitalized children were asked to answer some questions about their well-being and hospital stay before and after a therapy dog

visit, as well as their experiences of interacting with a therapy dog. Results indicated that children rated their well-being as "moderately good" before the interaction with the therapy dog, which increased to "very good" after their interaction. Children's ratings regarding their hospital stay increased as well after the therapy dog visit. The researchers also found that children thought it was fun to have a visit from the dog and really enjoyed petting it. The results from this study suggested that hospitalized children can benefit from interacting with therapy dogs.

Similarly, Chubak et al. (2017) conducted a study with 19 inpatients at a children's hospital to examine the feasibility of using animal-assisted activities in inpatient pediatric oncology. The study consisted of a one-time 20-minute visit from a therapy dog team in the patient's own private room. Results indicated that levels of worry and fatigue seemed to decrease almost immediately after the therapy dog intervention, and children were very happy. Moreover, the results suggested that therapy dog visits had a positive effect on oncology pediatric patients. This information is significant as the study's benefits indicate that dog therapy could be implemented as complementary treatment in oncology pediatric inpatients. In a different study regarding dog therapy and pediatric patients, Prothmann et al. (2005) recruited 40 hospitalized children with psychiatric disorders such as anxiety and anorexia to examine whether characteristic interaction patterns exist during animal-assisted therapy with therapy dogs and whether these can be used to diagnose psychiatric disorders. The study consisted of a 25-minute one-time interaction between participants and the therapy dog. Patients with anxiety disorders had the longest duration of stroking the dog than the rest of the patients and showed the least fear of the dog. Additionally, the presence of a dog helped participants interact with the people who were present in the room. Based on the results from all of these studies, the literature indicates that animal-assisted therapy has positive effects on hospitalized children.

Interacting with a dog can be beneficial to pediatric patients as it can bring happiness and reduce anxiety in humans. Beetz et al. (2012) reviewed evidence from 69 original studies on human-animal interactions, focusing on physical and mental health. The studies reviewed in the article indicated positive effects of human-animal interactions in people of different age groups with and without a special medical or mental health condition. In several of the studies, interacting with a dog and petting it reduced stress related parameters such as cortisol and self-reported anxiety. Additionally, several of the studies analyzed also indicated that oxytocin, a hormone that is released via pleasant tactile interactions, was triggered in response to single meetings with dogs. Studying oxytocin is significant as this hormone is associated with positive social behaviors and thus can be assumed its related with happiness (Dfarhud et al., 2014).

Regarding the effect of animal-assisted therapy with therapy dogs on anxiety, Hinic et al. (2019) evaluated a brief therapy dog visit and a comparison intervention on anxiety in hospitalized children. By recruiting 93 hospitalized children the researchers compared state anxiety, that is, subjective and consciously perceived feelings of tension and worry that shift over time (Spielberger, 1973, as cited in elib.tips, 2010) before and after either a one-time therapy dog visit or a visit from a research assistant that involved completing a puzzle. After the interventions, state anxiety levels decreased in both groups, but children in the pet therapy group experienced a significantly greater decrease in anxiety than the puzzle group, the control group. The study findings suggested that a brief therapy dog visit reduces state anxiety more effectively than a comparative activity of completing a puzzle.

Exposure to animal therapy also has neurological and physiological implications. Odendaal & Meintjes (2003) investigated the neurochemical and hormonal correlates between the man-dog bond, focusing on oxytocin and cortisol. Studying cortisol is significant as it is a

hormonal indicator of stress that can lead to anxiety (Beetz et al., 2012). Odendaal & Meintjes (2003) recruited 18 adult participants to analyze how their oxytocin and cortisol levels changed after interacting with a dog in a positive way during a 30-minute session. More specifically, the single group of participants gently stroked the dog, talked softly to it, and scratched its body and ears. Blood samples that were taken before and after the interaction with the dogs indicated that arterial blood pressure decreased between 5 and 24 minutes following the start of the interaction in all humans. Participants also showed a significant increase in oxytocin as well as a significant decrease in cortisol. The results suggested that the decrease in cortisol and increase in oxytocin after petting a dog lead to a decrease in anxiety and an increase in happiness.

Furthermore, a study conducted by Handlin et al. (2011) investigated the impact that interacting with a dog as assessed physiologically has on the well-being of individuals. The researchers looked at heart rate, oxytocin, and cortisol levels in dogs and their owners in response to a short-term interaction. Ten female participants who owned a dog stroke, petted, and talked with their dogs for 3 minutes before completing other tasks. Another 10 female participants who did not own a dog and were part of the control group, performed the same tasks but without a dog present in the room. Results showed that oxytocin levels significantly increased in the dog owners but not in the control group, the females that did not interact with a dog. In addition, cortisol levels decreased in both groups and the heart rate of those who interacted with a dog decreased significantly. The results suggested that there is a release of oxytocin when individuals interact with dogs, but a drop in cortisol in those who interact and do not interact with a dog.

Miller et al. (2009) also examined changes in oxytocin levels in response to interacting with a dog as they investigated how oxytocin levels in men and women changed after interacting

with their own dog after being separated from them while they were at work. Oxytocin levels of the 10 men and 10 women were obtained before and after the interaction with their dogs. The dog condition involved interacting with their dog after coming back home from work for 25 minutes. In the control condition, participants were asked to read for 25 minutes without the presence of their dog. Both of these interactions were compared. Results indicated that oxytocin levels significantly increased more for the participants when they interacted with a dog compared to the reading condition where a dog was not present. These results suggested that interacting with a dog increases oxytocin levels in people. In their study, Vormbrock & Grossberg (1988) investigated the effect of petting a dog, verbally communicating with it, and looking at it on blood pressure in humans. Participants interacted with a dog tactually, verbally, and visually while their blood pressure and heart rate were recorded. The researchers found that participant blood pressure was lowest when they pet the dog regardless of their past experiences with dogs. Based on these results, petting a dog can lead to reduced blood pressure regardless of one's past experience with a dog, which further suggests that interacting with a dog can induce physiological relaxation (Vormbrock & Grossberg, 1988).

Interacting with a dog has shown health benefits supported by empirical research and data yet not all scholars or practitioners agree on this method of support. Despite supporting research, others have raised concerns and objections about the use of therapy dogs in patient rooms (Jalongo et al., 2004). One common sanitation concern is that dogs can be host carriers of zoonoses, diseases and infections that are transmitted from animals to humans (Jalongo et al., 2004). However, this risk is minimal if responsible safety measures are taken such as having adults and children wash their hands before and after a therapy dog visit (Jalongo et al., 2004).

According to Jalongo et al. (2004), therapy dogs are trained to not lick or scratch, which reduces a major potential source of infection. Regarding safety with dogs, a concern is that they can display aggression (Jalongo et al., 2004). However, dogs have to take a basic obedience class in order to be registered as a therapy dog which make displays of aggression highly unlikely (Jalongo et al., 2004). Additionally, registered therapy dogs are capable of appropriately dealing with situations that would be dangerous with untrained family pets (Jalongo et al., 2004). With regard to allergy concerns, therapy dogs are bathed and groomed immediately before a visit, which significantly reduces animal dander, the most common source of an allergic reaction (Jalongo et al., 2004). Despite all of these possible concerns and risks that can come up with a therapy dog visiting children in hospitals, receiving a therapy dog visit can have such a powerful impact on children's physical health and psychological well-being (Jalongo et al., 2004). Furthermore, the proposed study will hopefully fill a gap created by single session studies and small sample sizes in the existing research related to animal-assisted therapy.

The Present Study

Because children may derive supportive benefit from animal-assisted therapy, the purpose of the proposed study is to examine the impact of AAT in happiness and anxiety levels for hospitalized children. A quasi-experimental study with 200 participants will be conducted at a children's hospital to examine how the implementation of dog therapy impacts general anxiety and happiness levels in pediatric patients. Patients will be randomly assigned to either a control group or an experimental group, and will receive multiple visits from a therapy dog. Participants will complete self-report measures and physiological measures simultaneously. The proposed study will test the hypotheses that pediatric patients who receive dog therapy will experience a decrease in general anxiety and an increase in happiness compared to those who do not receive a

therapy dog visit and interact with a stuffed animal instead. This study will also test the hypothesis that pediatric patients who receive dog therapy will experience a decrease in general anxiety after the first therapy dog visit and will continue to decrease over time compared to those who do not receive dog therapy, whose anxiety levels will increase over time. Finally, the proposed study will test whether pediatric patients who receive dog therapy will experience an increase in happiness levels after the first therapy dog visit and will continue to increase over time compared to those who do not receive dog therapy, whose happiness levels will remain the same over time.

Proposed Method

Participants

The participants in this study will be children between 6 and 17 years old who are hospitalized at Children's Hospital Los Angeles for any given diagnosis, injury, or condition and who are not allergic to dogs and do not have a fear around them. According to G*Power, approximately 179 participants will be needed in order to attain desired power of .80 with $\alpha = 0.05$ and an estimated effect size of 0.25 based on the statistical analysis of a Multivariate Analysis of Variance (MANOVA). However, researchers will aim for 200 participants assuming that some participants will drop out of the study. Hinic et al (2019) found a moderate effect size (d= 0.5) in their study, which compared state anxiety before and after structured research interventions in hospitalized children.

About 65% of patients at Children's Hospital Los Angeles identify as Latino, 24% identify as Other, 12% as Caucasian, 4% as Asian, and 4% as African American (Children's Hospital Los Angeles, 2021). According to the United States Census Bureau (2021), 50.5% of the population at the city of Los Angeles identifies as female, and 49.5% identifies as male.

Gender and demographics of participants are expected to reflect the local characteristics of communities serviced by CHLA. Participants will be recruited at Children's Hospital Los Angeles through flyers that will be posted throughout the hospital so that children and families know about the study. Participants in this study will be compensated with a plush animal of a dog to motivate them to participate.

Materials

Happiness

Self-Reported Measures.

Happiness levels will be measured by using the Children's Happiness Scale, which was developed by Dr. Roger Morgan (2014) to measure how happy a child is feeling on the day the questionnaire is completed. The scale consists of 20 statements in randomized order, and when answering the questionnaire, a child is asked to tick all of the statements that they feel are right about them. The statements consist of things children or young people might say about themselves, for example, that they get lonely or that they are proud of themselves. There is a number next to every statement which will then be used to calculate the happiness score. To calculate a child's "happiness score" the numbers next to all statements that were ticked need to be added and then divided by the number of items that were ticked. The highest possible score is 4.25, the middle score is 2.88, and the lowest possible score is 1.68. The higher the score, the happier a child is feeling and vice versa.

Regarding the validity of the Children's Happiness Scale, it appears to be adequate as the scale is based on children's views and judgments. Moreover, a list of 100 statements proposed by children about feeling happy or unhappy were selected, and over 100 children were then asked to use a rating scale to judge how happy or unhappy they believed a child saying each of the

statements would be. The 20 statements that judges agreed most on the ratings were used in the final version of the scale. Even though reliability information for this scale is unavailable, its internal reliability will be assessed by calculating Cronbach's α with the data that will be collected in the study.

Physiological Measures.

Happiness will also be assessed physiologically through a salivary oxytocin test that will be taken from participants using a swab. This measure has been used effectively in other studies to measure oxytocin levels. For example, Feldman et al. (2011) used saliva tests to investigate the role of oxytocin in human bonding throughout life.

Anxiety

Self-Reported Measures.

Anxiety levels will be measured by using the State-Anxiety sub-scale from the State-Trait Anxiety Inventory for Children (STAIC) developed by Charles D. Spielberger (1973). Individual STAIC items in this scale are similar in content to those from the original State-Trait Anxiety Inventory for adults, but the format for responding has been simplified for children to use it (Spielberger, 1973, as cited in elib.tips, 2010). The State-Anxiety scale consists of 20 statements that ask children how they feel in a particular moment in time. When responding to the questionnaire, a child is asked to read the statements which all begin with "I feel" and indicate which word or phrase best describes how they are feeling at that very moment. For example, a child would have to indicate if they are feeling "very calm", "calm" or "not calm." To calculate the child's anxiety score, the response values based on a 3-point rating scale printed on the scoring key for each item should be added. Scores on state anxiety can range from a minimum of 20 to a maximum of 60 (Spielberger, 1973, as cited in elib.tips, 2010). Regarding the validity of

the State-Anxiety section of the STAIC, its preliminary items were tested on children in an elementary school in Florida along with the Children's Manifest Anxiety Scale and the General Anxiety Scale for Children; the items that had the strongest correlation with these scales were the ones that were included in the final version of the scale (Spielberger, 1973, as cited in elib.tips, 2010). The internal consistency of the State-Anxiety scale appears to be adequate as its α reliability was .82 for males and .87 for females in an elementary school when they were retested after an eight-week time interval (Spielberger, 1973, as cited in elib.tips, 2010).

Physiological Measures.

Anxiety will also be assessed physiologically through a salivary cortisol test that will be taken from participants using a swab. This physiological measure has been used effectively in other studies to measure cortisol levels. For example, Barker et al. (2005) used a saliva swab to measure cortisol levels in healthcare professionals before and after interacting with a therapy dog and found that salivary cortisol levels decreased significantly after interacting with the dogs.

Procedure

After participants' parents or caregivers provide informed consent, children will then be asked no more than twice if they wish to participate in the study to get their direct opinion and assent. Participants will then be randomly assigned to either a control group, consisting of snuggling a stuffed animal, or an experimental group, in which patients will receive a weekly 20-minute therapy dog visit throughout four weeks total. Additionally, participants will complete state anxiety and happiness measures in randomized order prior to the first session. Parents and caregivers will have the option to remain in the room during the study so that participants feel safe and comfortable. Moreover, if participants are not able to fill out the scales on their own,

their parents or caregivers will be allowed to help them do so by reading them the question and noting their answers.

One oxytocin salivary swab and a cortisol salivary swab will also be administered at that time. As soon after the initial measurements are taken, experimental exposure will then take place. Based on the method of other animal-assisted therapy studies such as Marti et al. (2022), participants who are assigned to the control group will interact and snuggle with a large-sized plush animal in their hospital rooms for about 20 minutes. Participants who are in the experimental group will receive a visit from a therapy dog and its handler at their hospital rooms and they will interact with the dog and pet it for about 20 minutes. Following the interaction, participants will be given both scales once again in a different order to complete and the saliva swabs will be administered as well.

The previous steps, not including informed consent from parents and measurement completion prior to the session, will be followed for each subsequent session. The sessions will take place once a week for a total duration of four weeks. At the end of the study, participants will be debriefed and then be given a dog plush toy as compensation.

Ethical considerations

The proposed study primarily involves studying hospitalized children, a vulnerable population, because they often experience fear and psychological distress from their hospital stay, and this study will investigate how dog therapy can improve their well-being. However, some steps that will be taken to protect participants will include asking their parents or caregivers for their consent, as well as directly asking children if they wish to participate in the study to get their opinion. Moreover, parents will have the option to remain in the room during the study, so that participants feel safe and comfortable. Another step that will be taken to protect

participants will be to check in with the doctors and nurses before each visit and make sure that the interaction takes place at an appropriate time for the patient and that they are aware that the patient will be receiving a therapy dog visit or will interact with a plush animal.

Regarding potential concerns of bringing therapy dogs to patient rooms, best practices will be followed to address these worries. For example, adults and children will be instructed to wash their hands before and after the interaction with the therapy dog to prevent the transmission of an infection from animals to humans. Furthermore, therapy dogs will be required to know not to lick or scratch which will reduce a major potential source of infection. Even though participants will be informed about the possibility of interacting with a dog when advertising the study in case of any allergies, therapy dogs will be required to get bathed and groomed to reduce dander, the most common source of allergic reaction.

There are potential benefits of this study to the participants. One way in which this study may benefit participants is by giving them the opportunity to interact with either therapy dogs or plush animals, which may reduce their fear and stress from their hospital stay. In terms of scholarly knowledge, this study may add to past research on the impact of dog therapy on children by specifically focusing on general anxiety and happiness. The study will also focus on the construct of time, that is, how multiple sessions impact anxiety and happiness levels in participants and how long the benefits of dog therapy may last. The proposed study will expand on the positive effect of dog therapy on hospitalized children and specifically analyze how general anxiety and happiness are impacted, which could lead to the implementation of dog therapy across hospitals and patients from different ages to positively impact their well-being.

Regarding level of risk to participants, this study's level of risk is minimal as participants will interact with dogs who have been trained to provide support and remain calm throughout the

entire interaction. Additionally, the dog's handler will be with them throughout the whole visit to make sure the interaction between the patient and the dog runs smoothly. When advertising the study, it will be made clear that participation in this study could involve interacting with a dog, which would allow children who are afraid of dogs or who are allergic to them make an informed decision about their participation. The participants who interact with a plush animal will not be put in any more risk than daily life as owning a plush animal is very common and will cause no harm to children.

The only sensitive information that participants will be asked to provide is their diagnosis or the reason why they are hospitalized. This will be necessary in order to have an idea of how dog therapy impacts patients with different diagnoses and how beneficial it can be across hospital patients in general, no matter their condition or injury. However, even though knowing the diagnosis, injury, or condition of participants would be valuable to the study in assessing how they respond to dog therapy, children and parents who do not wish to indicate the reason why they are hospitalized will not be forced to do so. If the patient and their parents feel comfortable sharing their diagnosis or reason for hospitalization, the researchers will know this as well as the participants' age. Nevertheless, any identifiable data will not be divulged when publishing the study's results. Furthermore, the data will be stored in a private flash drive that only the researchers who take part in the study will be able to access.

Participation in this study will be truly voluntary. Even though participants will be offered a plush animal as a compensation for participating, they will not be persuaded to take part in the study. The study objectives will be made clear when advertising the study and participants will have the opportunity to end their participation in the study whenever they wish to if that is the case or to not participate in the study if they so choose. Participants will not be

deceived, and their collected data will be completely confidential. Even though the level of risk of this proposed study will not be greater than minimal risk, the benefits of this study are expected to outweigh any potential risks as participants will be benefitted from this study.

Predicted Results

This proposed quasi-experimental study aims to examine the impact of dog therapy on anxiety and happiness levels in hospitalized children.

Anxiety

A Mixed Model ANOVA will be used to assess the effect of dog therapy on anxiety levels of hospitalized children. The number of sessions will be the same within the participants and the treatment condition will vary between participants.

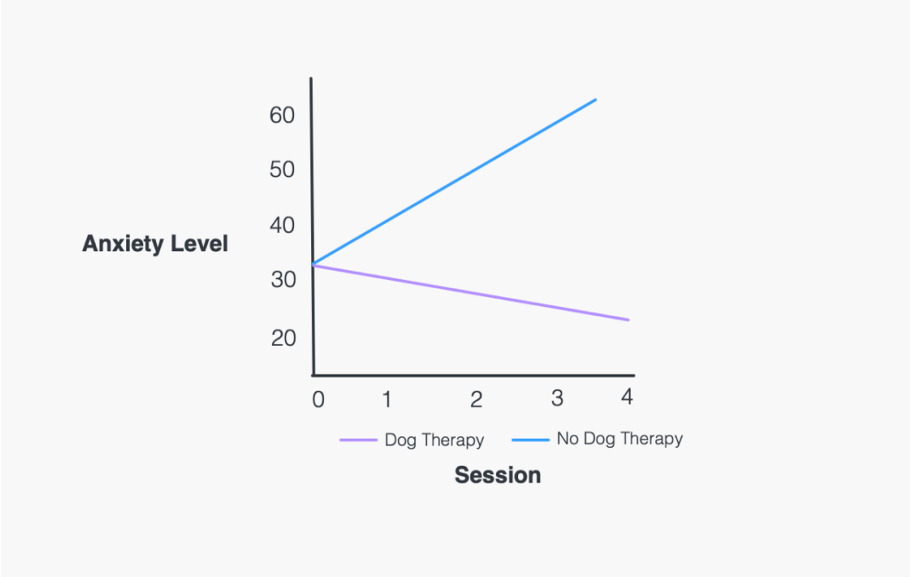
It is expected that anxiety will significantly decrease in children who receive a visit from a therapy dog but not in children who interact with a plush toy. It is also expected that anxiety levels will significantly decrease after the first session in the therapy dog condition as opposed to the no therapy dog condition, for whom anxiety levels will increase over time (see Figure 1). These anticipated results are consistent with the findings of Hinic et al. (2019) that anxiety significantly decreased in hospitalized children after interacting with a therapy dog on one occasion, but not in the children in the control group who completed a puzzle. Another study that supports the prediction that anxiety levels will decrease is Chubak et al. (2015), in which the researchers found that levels of worry seemed to decrease almost immediately after interacting with a therapy dog.

It is also expected that the cortisol test will provide the same results. Furthermore, anxiety levels measured by a salivary cortisol test will significantly decrease in the children who interact with a therapy dog but not in those who do not. The anxiety levels will also significantly

decrease after the first interaction with the therapy dog in the experimental condition but not in the control group whose anxiety levels will increase over time (see Figure 1). These anticipated results relate to the findings of Handlin et al. (2011) that showed that cortisol levels significantly decreased in participants who interacted with a dog after 15 minutes, as opposed to those who did not interact with a dog whose cortisol levels took 30 minutes to decrease. The anxiety measures and the salivary cortisol test are expected to correlate and converge to the same pattern, that is, to decrease in the dog therapy condition but not in the control group.

Figure 1.

Predicted Anxiety Levels in Hospitalized Children



Happiness

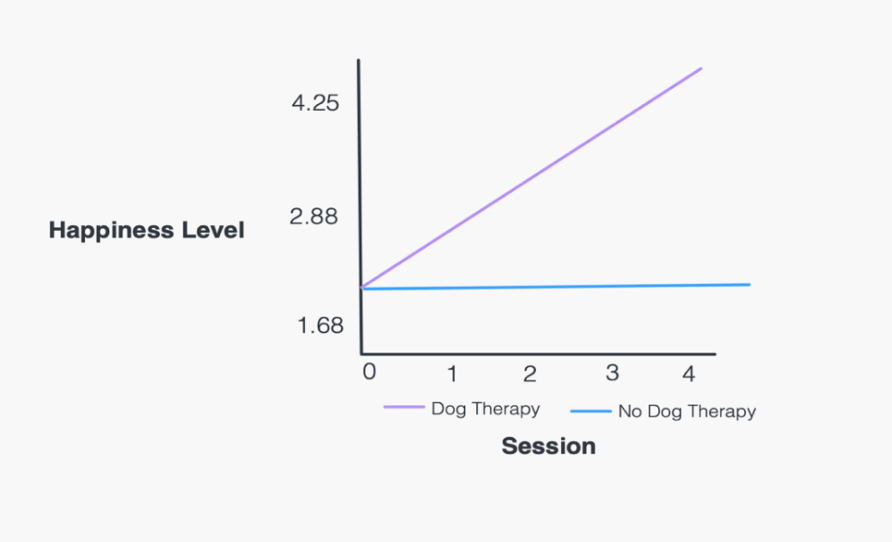
A Mixed Model ANOVA will be used to assess the effect of dog therapy on happiness levels of hospitalized children. The number of sessions will be the same within the participants and the treatment condition will vary between participants.

It is anticipated that happiness, as measured by self-report or by oxytocin levels, will significantly increase in children who interact with a therapy dog but not in those who interact

with a plush toy. It is also anticipated that happiness levels will significantly increase after the first session in children who receive a visit from a therapy dog and will keep increasing over time but not in those who interact with a plush toy (see Figure 2 for patterning for oxytocin) whose happiness levels will remain constant over time. These predicted results are consistent with the findings of Handlin et al. (2011) that oxytocin levels significantly increased in participants in the experimental group who petted and interacted with dogs but not in those who were in the control group and did not interact with a dog. These predicted results also support the findings of Miller et al. (2009) that oxytocin significantly increased in participants after they interacted with a dog but not in those who did not interact with a dog. Responses from the happiness self-report and physiological measures are expected to correlate and converge to the same pattern, that is, to an increase in the dog therapy condition but not in the control group.

Figure 2.

Predicted Happiness Levels in Hospitalized Children



Note: The predicted happiness level values are based on the range of scores of the *Children's Happiness Scale*. The highest possible score is 4.25, the middle score is 2.88, and the lowest possible score is 1.68 (Morgan, 2014).

Scholarly Merit and Broader Impact

This proposed study may add to the existing research on the benefits of dog therapy on children's well-being, especially for those who are hospitalized. Specifically, the study will explore how interacting with a therapy dog can impact children's anxiety and happiness levels. The study may fill a gap created by single session studies in the existing research as multiple therapeutic sessions will be conducted. By implementing the use of more than one session, the study will be able to assess whether the benefits of dog therapy change over time. This could then be further used to assess if dog therapy can be used in children who are not hospitalized but visit the hospital once in a while, that is, outpatients.

Furthermore, the question of how dog therapy impacts hospitalized children's anxiety and happiness levels is very important as children's well-being is an important and relevant matter. The hospitalization experience can be very difficult and stressful for children. Learning more about the positive impact of dog therapy as a complementary form of treatment to the medical treatment given by the hospital can be very beneficial not only to scientists and researchers, but to the society as a whole. Animal-assisted therapy can be implemented as an alternate form of treatment that can be used for patients of all ages and conditions, not just children.

Moreover, there are many potential benefits that this proposed study could bring to society. The positive impact of dog therapy on well-being may not be specific to a certain type of population, this form of treatment could increase the well-being of people in society. Furthermore, the use dog therapy is not unique to hospital settings. This type of animal-assisted therapy can be used in different contexts and with people of different ages to help increase their happiness and decrease their anxiety, not just hospitalized children. There are potential benefits of dog therapy to the global community as it can be further implemented in hospitals around the

world, and not just the United States. Implementing dog therapy as a complementary treatment would be something relatively simple to do and could potentially be established in different hospitals worldwide. Society could benefit from the positive outcomes to one's well-being from interacting with a therapy dog and how a simple and brief interaction with a dog can increase happiness and decrease general anxiety in people.

Altogether, this proposed study aims to investigate how the implementation of dog therapy impacts general anxiety and happiness levels in hospitalized children. The data that will be collected in the quasi-experimental study may add on the research on the benefits of dog therapy in people's well-being.

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