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Exposure in Transit: In Vivo Exposure Therapy Treatment for Agoraphobia Symptoms in Teenage Girls

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ABSTRACT

Agoraphobia is an anxiety disorder that is typically characterized by avoiding public spaces, including crowds and public transportation to the extent that it impacts one's quality of life. There are a few methods of cognitive behavioral therapy (CBT) that have been proven as effective against agoraphobia, but recently people have been using in vivo exposure therapy more because of its higher efficacy. Because of this, this research focuses on a method of in vivo exposure therapy for the agoraphobic symptom of having a fear of public transportation, this method being that the participants would go on an underground subway system in order to see if their agoraphobic symptoms, measured on a scale from 0-100, would decrease within the span of 3 weeks. After the study concluded the numbers did decrease for all participants, making the use of the subway a viable way of reducing agoraphobic symptoms for the study group of teenage girls. Future studies are advised to test out this method on other study groups.

Keywords: Agoraphobia, Adolescent Mental Health, Public Transportation AnxietyIn Vivo Exposure Therapy.

INTRODUCTION

Agoraphobia is an anxiety disorder that is typically characterized by avoiding public spaces, including crowds and public transportation to the extent that it impacts one's quality of life (Okasha, 2024). Agoraphobia has been shown to impact female adolescents over the past few decades with up to 3.4% of adolescents living in the United States experiencing agoraphobia at least once (National Institute of Medical Health, n.d.). With agoraphobia being one of the more prominent anxiety disorders, research has been done to find effective therapy methods for its treatment. Cognitive behavioral therapy (CBT) is widely known to be one of the most, if not the most, effective methods of treatment by many of those who specialize in anxiety disorders such as agoraphobia (Mayo Clinic Staff, 2023). With that being said, there are many types of CBT exposure therapy that one could choose for treatment methods for agoraphobia, three notable ones that are prominent in research being imaginal flooding/ imaginal exposure therapy, virtual-reality exposure therapy (VRET), and in vivo exposure therapy. Imaginal exposure therapy is when the person thinks of the situation that they have fear towards, VRET is when the person uses virtual reality in order to face their fears while being in a controlled environment, and finally in vivo exposure therapy is when the person faces their fear head on (for example if someone was scared of a dog, they would be exposed to dogs in order to lessen their fear of them as a whole).

This study will focus on using in vivo exposure therapy, a type of exposure therapy that focuses on facing fears head on, in the form of public transportation as a way of reducing agoraphobic

symptoms, specifically, the symptom stated in the Diagnostic and Statistical Manual of Mental Disorders fifth edition (now to be known as the DSM-5) where there is "marked fear or anxiety in….using public transportation (e.g., automobiles, buses, trains, ships, planes)" (American Psychiatric Association, 2013). While focussing on only one symptom of agoraphobia may not show the best way of treating agoraphobia as a whole, the purpose of this research is to see if the symptom of having a fear of public transportation will reduce prominence if in vivo exposure therapy was used.

LITERATURE REVIEW

Imaginal Exposure Therapy vs In Vivo Exposure Therapy

Imaginal exposure therapy is a form of exposure therapy that involves thinking about the anxiety inducing situation to desensitize the mind. Imaginal exposure therapy has occasionally been shown to be a valid treatment for agoraphobia but it is not as considered when treating agoraphobia compared to the other methods of treatment. Regardless, some studies prove that it can be just as effective as in vivo exposure therapy (James, 1983), but research about imaginal exposure therapy being better at reducing agoraphobic symptoms is scarce. Another study also proved that there have been results that in vivo exposure therapy shows greater amounts of reduction in agoraphobic symptoms overall (Emmelkamp, 1975). With the vast variation of the results of efficacy of imaginal exposure therapy, it would be better to focus on in vivo exposure therapy instead.

Virtual Reality Exposure Therapy (VRET) vs In Vivo Exposure Therapy

VRET is a form of exposure therapy that uses virtual reality headsets for a more controlled exposed environment for desensitization. VRET has been becoming more common with the widened accessibility of VR equipment and thus has been used for a lot of exposure therapy. Some studies show that VRET can be seen as very effective, similar to in vivo, but allows the patient to have an added sense of relief since the treatment can be in a controlled environment (Pan, 2024). In addition, studies mention that VRET has the potential to help with agoraphobic symptoms, but because of the cost of VRET it would be difficult to recommend it to patients (Meyerbroeker, 2013). With the cost of the required materials for VRET, it would also be difficult to properly conduct a study for it, thus in vivo would have more value being researched.

In Vivo Exposure Therapy's Efficacy

In vivo exposure therapy is a form of exposure therapy which consists of putting the patient in an anxiety inducing environment in person to desensitize them. In vivo exposure therapy has been shown to be extremely effective with 60 to 70% of those who received in vivo treatment had reductions in agoraphobic symptoms. Not only this, but the reductions of symptoms held out through a 6 month follow up (Porter, 2006). Although the efficacy of in vivo exposure therapy was sometimes questioned, for example, a study states that the end results of both in vivo exposure therapy and imaginal exposure therapy are relatively similar end results (Mattews, 1976), but a different study found that even though the end results are very similar, in vivo exposure therapy gave faster results, thus making it more effective (Zitrin, 1980). Most studies agreed that since the results were faster and generally lasted for longer, in vivo exposure therapy could be considered as having more efficacy in comparison to the other forms of cognitive behavioral therapy mentioned previously. With the efficacy of in vivo exposure therapy being overwhelmingly positive, it is worth looking at a form of it at a closer level.

Literature Review Conclusion

With most of the research that was looked at regarding in vivo exposure therapy as one of the best methods of exposure therapy for agoraphobia, methods of treatment need to be brought up. Research can be conducted to determine the effectiveness of many treatment types of in vivo exposure therapy. Though previously shown studies looked at agoraphobia as a whole and did not focus on one or two specific symptoms. With public transportation giving a relatively low pressure environment in comparison to public speaking or another form of putting the attention to someone, research on public transportation could be conducted to help measure the effectiveness of it as an in vivo exposure therapy treatment method. There is a lack of research on using public transportation as a means of exposure therapy and as a result that will be what this research paper will be on. Public transportation could give a relatively accessible and less time consuming method of treatment if results are proven effective. Since the other methods of CBT have given specific methods they used to reduce symptoms of agoraphobia, it would be useful to go in depth into one potential form of in vivo exposure therapy to see if it is also feasible.

METHOD

This research uses a survey with quantitative analysis over a short-term longitudinal study. This study is considered short-term longitudinal because although it did not go on for as long as most longitudinal studies do, it was still a study over a period of time, thus this research can be labeled as being a short-term longitudinal study. This research method was partially inspired by a study done by Porter et al. in which the Subjective Units of Distress Scale (now to be referred to as SUDS) was what made the study count as quantitative The SUDS scale is a scale that is typically used with patients who may suffer from an anxiety disorder, the scale allows participants to self report on a scale from 0-100 (typically this is a scale from 0-10, but in order to get more specific, this study makes the scale 0-100) that explains how much distress they typically feel in a situation. For example, if a patient was suffering from a fear of dogs, they would self-report how distressed they normally feel in that situation in order for the therapist to understand how intense the fear/distress that they feel in the situation is. Different sources have different numbers in which they would consider it slightly psychologically dangerous for a patient to do a certain thing, but I have noticed that those numbers typically do not exceed 37; thus, a score of 30 was my maximum for the participants of the study to ensure extra precaution. The SUDS scale was used in order to get an initial understanding of how much distress a potential participant would feel when on Singapore's railway system, Mass Rapid Transit (now to be known as the MRT), since as mentioned earlier, one of the symptoms for agoraphobia was a fear of public transportation. This study was framed around the research question: by using short-term longitudinal surveys with protective exclusion criteria, does the use of the MRT as a form of in vivo exposure therapy have a negative correlation on a female high school student's agoraphobic symptoms?

An Institutional Review Board (IRB) looked at the details of the research that was filled out on an online document and approved of the methods of the study before this study started to make sure that the study would be ethical and cause no psychological harm to participants. There were three participants in this study (referred to as participant A, participant B, and participant C in order to maintain anonymity) all of which were female high school students between the ages of 15-18. Participants were selected based on whether they responded to the survey and gave consent to participate in the study. The initial survey was conducted on Google Forms and

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was sent out via a mass email where the participants already met one of the standards of this study of being a female. If the participant was under 18 they were given a parental consent form for their parents to sign in order for them to be eligible to participate. The first question was asking for consent from the participants, if the participants gave consent, they were then sent to the next question in which the participant was asked to self identify their distress on a scale from 0-100 when on the MRT because of the amount of people. This study also utilized protective exclusion criteria, which was that in order to minimize any potential of psychological harm, if any participant self-reported to be above a 30 in the SUDS scale, they would not be eligible to participate for their own wellbeing, as mentioned earlier.

This study focussed on female participants for a certain reason, according to the National Institute of Mental Health (NIMH), the lifetime presence of agoraphobia among female adolescents was 3.4 percent, while the lifetime presence of agoraphobia among male adolescents was only 1.4 percent (National Institute of Mental Health, n.d.). With the amount of agoraphobia being a decent amount higher for females, it would make sense for the study to focus on them in order to try and combat this number. Teenage participants were selected because a general trend of anxiety disorders (such as agoraphobia) and other mental health disorders in general is that symptoms begin to show within teenage years and for the most part continue on into their adult lives. In vivo exposure therapy was chosen as the form of CBT to use because of its proven efficacy (mentioned in the literature review) compared to other methods of CBT (Emmelkamp & Wessels, 1975). With all of this information given, I decided to focus on female teenage participants with agoraphobic symptoms in hopes of finding a way of reducing the symptoms as agoraphobia is relatively more common for them. The use of only using underground lines was to limit most confounding variables as the underground railways are most similar to each other in comparison to the overground ones. So in simpler terms the underground lines were what the participants went on because the environment was the most predictable, not only did this decrease confounding variables, but also it protected the safety of the participants within this study. Once the participants were selected, they were asked to go on the MRT two times a week (on separate days) for 15 minute intervals each time for a total of 3 weeks, this is what was considered short-term longitudinal. Since the participants are still in high school and thus still have things to study for, I thought it would be reasonable to ask for this time dedicated to the MRT as the intervals could be completed on a weekend. Unfortunately, due to time constraints, the study would not be able to last for much longer than three weeks as there are multiple school breaks where it is common for the participants to travel (more about this will be mentioned in the limitations section). After the three weeks went by, participants were asked to fill out yet another survey with a similar question. They were asked to put in their anonymous letter that was assigned to them from the first survey and self-report how much distress they felt on the MRT now that the 3 weeks were over, once again using the SUDS scale. After all the results are in, I looked at the initial number of a participant in the SUDS scale, and compared it to their most recent score, noting if the numbers went up, down, or stayed the same. This was then used to determine if using the MRT could have a negative correlation with agoraphobic symptoms.

LIMITATIONS AND ASSUMPTIONS

Before mentioning the results of this study, it is important to go over limitations. As I conducted this study I was a high school student, and as I did not want to risk dealing with any psychological harm done to the participants, I only selected participants with an SUDS score of

below a 30 (as mentioned earlier). Other studies did not have such limitations, but as I was not a trained professional in this field, I wanted there to be no harm done to the patients. I conducted a pilot study before conducting this study with a participant that was over the age of 18 to ensure that the study would go well with a younger group of participants and made necessary changes to prevent any psychological harm to the participants. Although no psychological harm happened in the pilot study, I realized that since my focus group is those under the age of 18, more precautions should be put into place to ensure their safety. This study's methods were approved by an IRB committee after they were sent the method to ensure the study was ethical and safe for all participants. As of this paper being written I am not licensed with the ability of diagnosing anyone with agoraphobia or any other psychological condition, so all of the scores from the participants were self-reported. This could have led to participants self reporting on the SUDS score as more or less than what they actually were. Because of this, measures were taken to try to get as reliable results as possible, such as explaining the terms thoroughly on the survey as participants may or may not have been familiar with the terms within the survey.

Another limitation of this study is that the results may not be able to be generalized to other parts of the world. As this study was only conducted in Singapore that has strict regulations put in place to ensure safety on public transportation, putting participants on the MRT did not pose much of any threat. Other countries may have subways that are more dangerous and unpredictable. As the Singapore subway systems typically are predictable with little threat to the safety of the participants, this study was able to be conducted safely. Since the Singapore MRT is a decently controlled environment, these results may not be able to be generalized to the same populations in different countries.

A few assumptions were made in order to make sure this study could be done. The first assumption that was made was that the SUDS score the participant put into the form was completely accurate to how much fear they actually had in the situation. Without making this assumption it would not be possible to analyze the results to get a conclusion for this study, though, as mentioned previously, there were measures put in place to try and get the most accurate SUDS scores from the participants. Another assumption was that the participants all had relatively similar MRT experiences to simulate that they were going through the exact same events. Although this is not possible to happen since the MRT does not always have the same people riding it at the same times doing the same things, the assumption has to be made that the participants were in a similar or the same environment. The final assumption was that there were not any other variables that impacted the results of the study. In order to make this assumption, as many major variables as possible were suppressed, most of the other variables within the study would have been minor and would have had little to no impact on the study.

RESULTS

At the beginning of the study I hypothesized that the use of public transportation as a form of in vivo exposure therapy would be effective on the agoraphobic symptom I was focusing on because previous studies that I was basing my research on ended up with those results. have shown in vivo exposure therapy's efficacy. As mentioned earlier, there were three participants to this study as that amount of participants was the norm for most other studies that this research was based on. Participant A started off with a SUDS score of a 2 and ended off the study with a score of a 0 after the three weeks, participant B started off with a SUDS score of 11 and

ended off with a score of a 3 by the end of the three weeks, and finally, participant C started off with a SUDS score of a 5 and ended off the three weeks with a final score of 2 (see Figure 1).

As a result of the study, all of the participants' SUDS scores decreased (see Figure 1). Thus, it can be assumed that there could be a correlation with lessened agoraphobic symptoms and the usage of public transportation for this specific sample group.

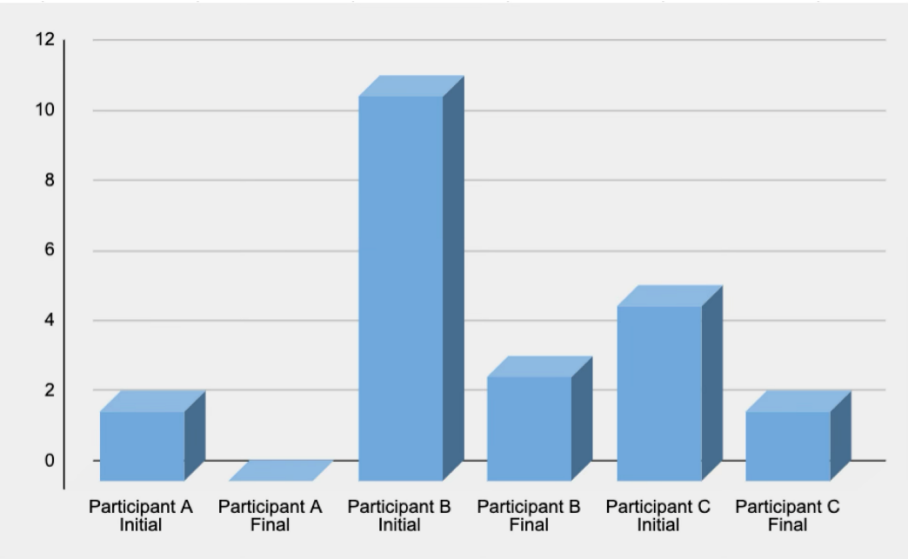

Figure 1: Participants' initial and final SUDS scores

DISCUSSION

Some of the key findings of this study was that the use of public transportation (the MRT for this case) did help reduce agoraphobic symptoms that the participants had. There was a decrease in all the SUDS scores within the group that I focussed on. When tying this study back to the similar sources and to my hypothesis, I noticed that there were relatively similar or expected results. Similar to the experiments done by Porter et.al and Zitrin and colleagues, in vivo exposure therapy was shown as decently effective for agoraphobic symptoms. Since both Porter et.al and Zitrin got similar results, agreeing that in vivo exposure therapy was one of the fastest methods to reduce symptoms of agoraphobia and keeping the agoraphobic symptoms away. They stated in-vivo exposure therapy's efficacy, and because of their agreement it seems reasonable to say that in vivo exposure therapy could potentially reduce agoraphobic symptoms within patients because that was the results of both of their studies.

There were differences between this study and the study done by Porter and Zitrin. Both of those studies did not specify on what they were using for in vivo exposure therapy, and both the studies mainly stated that that method was being used while this study looked at a very specific form of in vivo exposure therapy and did a deep dive on it. Zitrin and colleagues also focussed on using drugs specialized for agoraphobia with the in vivo exposure therapy, which could have led them to better results than this study as actual prescribed drugs were used. Porter et.al did not use any drugs with their study, and had similar results to what I found within this study. This can lead to the conclusion that even though the drugs may have helped enhance the study done by Zitrin, in vivo exposure therapy on its own was effective enough with treating agoraphobia.

Overall, since I based my hypothesis that the use of public transportation as a form of in vivo exposure therapy would be effective on the agoraphobic symptom of a fear of public transportation based on the results of previous studies that have shown in vivo exposure therapy's efficacy in the literature review. When comparing this study's results to the previous two research studies mentioned (Zitrin and Porter et. al), I feel like this research was decently tied together with the two studies, potentially leading to similar results. The hypothesis was proven correct in the end, likely because of the similarities of methodology with my study and the study conducted by some of the sources in the literature review.

IMPLICATIONS AND FUTURE RECOMMENDATIONS

There are a few implications of the study, but to understand them it is important to focus on the significance of this research. Since, as mentioned in the introduction, agoraphobia is almost the most common in teenage years (National Institute of Mental Health, n.d.) and during teenage years most people have lesser time to do largely time consuming tasks or less long blocks of time for certain exposure treatments, finding a relatively less time consuming way to lessen their agoraphobic symptoms might be useful. Not to mention teenage years are typically when symptoms of different mental health struggles, including agoraphobia, begin to form or worsen. This form of in vivo exposure therapy treatment would also likely have less time commitment tied to it, making it more plausible for some to do this form of in vivo exposure therapy. Alongside it being easier to fit into a teenager's schedule, another place of significance can come from the fact that this research addresses a gap in the literature. Previously other studies on agoraphobia with in vivo exposure therapy did not focus on the specific symptom of agoraphobia that this study as most studies focussed on agoraphobia in a broader context (for example, not looking at a very specific symptom). Thus, this method gives more options for people to reduce this specific symptom of agoraphobia (which other studies did not look at specifically).

When thinking about the implication of these results, there are a few that may come to mind, though the largest implication is likely how if this method is proven effective for other groups, this can be used in the future if someone is exhibiting the agoraphobic symptom that I was looking at. One recommendation that I would have for future studies on this topic is to have a larger sample size. Although a few of the studies I looked at had around three to six participants, some studies included more participants (for example Emmelkamp's study with 30 participants) so people could generalize results, which is what I would recommend for the studies done in the future. Another recommendation I would have is to look at other age samples, for example, looking at how this form of in vivo exposure therapy would be effective to an older age group such as the middle aged or elderly people. This is because agoraphobia is still relatively common for those in the 49 to 59 age range (National Institute of Mental Health, n.d.) One last recommendation would be to see whether or not these results uphold for boys since this study only focussed on girls. Even though agoraphobic is more common in girls, it does not mean that boys do not experience it, which would make similar research with boys worthwhile.

CONCLUSION

In conclusion, this study focussed on using a form of in vivo exposure therapy, as in vivo exposure therapy is seen as the most effective form of exposure therapy treatment when dealing with agoraphobia, in order to reduce the agoraphobic symptom of a fear of public

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transportation. This symptom studied was one of the things labeled on the DSM 5 that is present for some people with agoraphobia. There were three female participants in the study of teenage age and their initial values were gathered with the participants self-reflecting on the SUDS scale via a form and a similar form was sent again to find the final value. All participants showed a decrease in agoraphobic symptoms, which can lead to the idea that the use of public transportation as a form of in vivo exposure therapy for the specific symptom I was looking at was effective for this study group of teenage girls. Future studies are encouraged to look at other focus groups, for example, males and older participants to see if the results still stand well.

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