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Reduction of anxiety in college students with Asperger's disorder using behavioral relaxation training

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REDUCTION OF ANXIETY IN COLLEGE STUDENTS WITH ASPERGER'S DISORDER USING BEHAVIORAL RELAXATION TRAINING

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Abstract

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REDUCTION OF ANXIETY IN COLLEGE STUDENTS WITH ASPERGER'S DISORDER USING BEHAVIORAL RELAXATION TRAINING

2010/11

Michelle Ennis Soreth, Ph.D.

Master of Arts in Clinical Mental Health Counseling

The purpose of this study was to reduce levels of anxiety in college students with Asperger's Disorder. Two students from Rowan University were taught Behavioral Relaxation Training over a period of four weeks. Measurements of anxiety and relaxation were gathered during biweekly sessions and those results were graphed. Results showed that a) behavioral relaxation training was quickly learned by participants and b) anxiety levels decreased on some measures with the use of behavioral relaxation. Issues facing those with Asperger's Disorder were discussed as well as the wide variety of populations that have demonstrated positive change with behavioral relaxation training.

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Chapter 1

Introduction

Asperger's Syndrome (AS) is one of five pervasive developmental disorders (PDD) and is characterized primarily by severe social impairment (American Psychological Association, 2000). It is considered to be on the mild end of the Autism Spectrum Disorders (Toth & King, 2008) but can be debilitating for those with the diagnosis. The Center for Disease Control and Prevention (2006) estimated the prevalence of Autism Spectrum Disorders at 1% of the population in children ages 3 to 17. There is a lack of research on AS specifically, with most PDD research directed towards Autism (Lasser & Corley, 2008).

Those diagnosed with AS display repetitive and restrictive patterns of behavior, often become preoccupied with one specific interest, and tend to use overly formal language (Toth et al., 2008). There are three domains deficits for AS: social relatedness, communication, and unusual behaviors and patterns (Allen, 2008). Individuals with AS also have difficulty understanding the perspectives of others as well as developing effective coping strategies (Shtayermman, 2007). Without treatment many children with AS will become socially isolated and eventually develop depression (Volkmar, Klin, Schultz, Rubin, & Bronen, 2000). It is important to recognize that individuals diagnosed with AS are interested in social interaction but do not understand how to behave in social situations. One of the reasons is that they have a difficult time with nonverbal social cues such as eye contact (Rinehart, Bradahaw, Brereton, & Tonge, 2002). Those diagnosed with AS have difficulty developing friendships and using empathy (Shtayermman, 2007).

For a child or adult to be diagnosed with AS there cannot be any significant delays in cognition or speech and they must meet developmental milestones on time. The diagnosis of AS is also relatively stable over a lifetime with 84% meeting criteria more than 5 years after first being diagnosed (Cederlund, Hagberg, Billstedt, Gillberg, & Gillberg, 2008).

Additionally, anxiety and managing stress are common problems for individuals diagnosed with AS, with 42% of these individuals having a comorbid anxiety disorder (White, Oswald, Ollendick, & Scahill, 2009) including social phobia (Toth et al., 2008), generalized anxiety disorder (Sofronoff, Attwood, & Hinton, 2005), social anxiety (Melfsen, Walitza, & Warnke, 2006) and obsessive compulsive disorder (Toth et al., 2008). Individuals with AS tend to have comorbid anxiety stemming from their social impairments. Those with AS may develop anxiety in certain situations, such as when their routine changes or during extreme sensory experiences. They may also try to avoid this anxiety by refusing school or other situations where they are afraid their anxiety will occur (Attwood, 2007).

Comorbid anxiety tends to increase during adolescence as the differences from their peers become more apparent (White et al., 2009). Further, anxiety experienced in childhood by individuals with AS can carry over into adulthood. Hofvander et al. (2009) found that 15% of their sample of adults with AS met criteria for Generalized Anxiety Disorder, 11% met criteria for Panic Disorder, and 6% met criteria for Specific Phobia. Since this population has a high occurrence of comorbid anxiety it is important to make treatment options available that are time limited and cost effective.

Anxiety and AS seem to have a bidirectional relationship with an adolescent's social deficits increasing anxiety and then anxiety further increasing social deficits (White et al., 2009). Thus, treating comorbid anxiety is necessary in order to improve social skills. Since anxiety is a common and difficult issue with AS, researchers have tried to identify effective treatments for reducing and managing anxiety in this population.

Individuals with AS and comorbid anxiety present with a similar profile of anxiety symptoms as individuals without AS who are diagnosed with an anxiety disorder (Sofronoff et al., 2005) suggesting that existing emprically-supported anxiety treatments should be effective in individuals with AS. One treatment that has been used for decreasing anxiety in adolescents and adults is Behavioral Relaxation Training (BRT).

BRT was developed in 1983 by Schilling and Poppen (Eason, Brandon, Smith, & Serpas, 1986) as a treatment for anxiety by substituting the new behavior of relaxation for the unhealthy behavior of anxiety (Poppen, 1988). BRT has been shown to be effective in reducing anxiety for individuals diagnosed with Generalized Anxiety Disorder and those with physical diseases or injuries (Manzoni et al., 2008). BRT has also been used in populations with cognitive impairments. Lindsay and Morrison (1996) found that the use of BRT in adults with intellectual disabilities decreased anxiety levels as well as increased their task performance. Relaxation training was also used for young adults with the diagnosis of specific phobia and they found that such relaxation techniques lowered arousal during exposure to an anxiety provoking situation (McGlynn, Moore, Lawyer, & Karg, 1999).

BRT has also been effective in relieving symptoms of other populations and behavior problems including acquired brain injury (Guercio et al., 2001), moderate to severe essential tremor (Lundervold, Belwood, Craney, & Poppen, 1999), hyperactivity in children (Easton et al., 1986), the severely handicapped (Lindsay & Morrison, 1996), and aggressive behavior in Autism (Mullins & Christian, 2001).

According to Poppin (1988), the theory behind BRT is considered the four modality theory: a behavioral taxonomy. This theory suggests that there are four domains in which relaxation occur and when there is relaxation in one domain it increases the likelihood of relaxation in the other domains. The four domains include motoric behavior (manipulating physical environment), verbal behavior (manipulating social environment), visceral behavior (maintains one's internal environment such as heart rate), and observational behavior (seeks differentiates between stimuli). Each of these four domains is also divided between covert and overt behaviors. Overt behavior is anything that can be observed by someone else and covert is only observable by the person in which the behavior is happening. So in theory, by decreasing behavior in one of these domains behavior in the other three domains will decrease as well, and therefore result in increased levels of relaxation.

BRT consists of bring the participant to a relaxed state by having them complete 10 relaxing behaviors (See Table 1). These behaviors include even breathing, an absence of vocalization, and positioning the body, head, eyes, mouth, throat, shoulders, hands, and feet into relaxing positions (Guercio, Ferguson, & McMorrow, 2001). These relaxed positions are held between 15 and 20 minutes while the instructor either praises them or provides feedback in one word prompts to indicate parts of the body that are tense

(Poppen, 1988). The participant is scored on body stillness and evenness of breath and at the end they are asked to rate their level of relaxation on a scale of 1 (completely relaxed throughout my entire body) to 7 (extremely tense throughout my entire body). Individuals are asked to practice these same relaxation techniques at home for 10 to 20 minutes daily because the more comfortable they become with the process the easier it will be to use when in an anxiety provoking situation (Poppen, 1988).

Due to the shown effectiveness of BRT within the general population, this study used BRT to reduce the anxiety of two adults with AS. It was hypothesized that BRT would be effective in reducing anxiety for adults with AS over a 4 week intervention period when compared to their pretest anxiety scores. Specifically, BRS scores are expected to increase, anxiety ratings decrease, Beck Anxiety Inventory scores decrease, and heart rate decrease after exposure to BRT.

Chapter 2

Method

2.1 Sample

The sample included two adults attending Rowan University who have a current diagnosis of Asperger's Disorder as well as a comorbid anxiety disorder. They were both female, Caucasian, and the ages of 19 and 29. The participants were recruited from the Academic Success Center at Rowan through an email containing the informed consent for the study as well as a brief explanation of the procedure.

2.2 Measures

Participants were given the Beck Anxiety Inventory (BAI) which consists of 21 self report questions in which the participant responds on a 0 to 3 scale (0= not at all, 3= severely- it bothered me a lot). The results were calculated by summing the numbers. Interpretation was as follows: 0-21= low anxiety, 22-35= moderate anxiety, and exceeds 36 is severe anxiety. The BAI has shown to have high internal consistency, test-retest reliability, and is valid in assessing levels of anxiety (Beck, Epstein, Brown, & Steer, 1988).

Level of relaxation was measured using the Behavioral Relaxation Scale (BRS) that was developed by Poppen and colleagues (Poppen, 1988). The BRS has been shown to be valid in assessing a participants' level of relaxation (Norton, Holm, & McSherry, 1997; Guercio et al., 2001). The BRS centers around 10 behaviors that are commonly present in a person when they are relaxed. The instructor measures these 10 behaviors in 1 minute intervals for 5 to 10 minutes. Breathing is observed for the first 30 seconds, the other behaviors are measured for the next 15 seconds, and the final 15 seconds are used

to record the data. The behaviors are scored as "relaxed" or "unrelaxed" and used to calculate a percentage of the participant's level of relaxation (Guercio et al., 2001). The BRS has been found to have high construct validity with significant correlations between changes in BRS scoring and changes in physiological measures such as heart rate and respiration (Murry & Ray, 2001).

Heart rate was also measured using the Octivetech USA finger pulse oximeter, version: FDA 1.0C2. Measurement accuracy is as follows: PR: 30-235 BPM, ± 2 bpm during the pulse rate range of 30-99 bpm and 2% during the pulse rate range of 100-235 bpm. A lower pulse rate was considered a sign of relaxation.

2.3 Procedures

The following procedures were approved by the Rowan University Institutional Review Board prior to data collection. Participants read the informed consent forms and gave consent before the start of the study. Next, participants completed baseline measures on anxiety. Baseline measurements were assessed before the start of treatment by the BAI, pulse, and self rating of current anxiety on a 7 point Likert scale (1= no anxiety, 7= most severe anxiety ever experienced).

Behavioral Relaxation Training (BRT) was taught to participants over a period of 4 weeks with 30 minute sessions twice a week in a quiet and private room at Rowan University in the Psychology Department. The first phase of BRT was the acquisition training which took place during the first session and was reviewed during the beginning of the second session. The instructor demonstrated 10 specific relaxed positions and the participant imitated these behaviors. Each behavior was maintained for 30 to 60 seconds.

Verbal and physical prompting and feedback by the instructor were used to help the participant correctly obtain the positions (Lindsay et al., 1996). The second phase was Proficiency Training (Sessions 2-8). During this phase, the instructor asked the participant to relax all 10 areas and think about the feeling of relaxation in each area for 10 minutes (Poppen, 1988). About every two minutes the instructor either informed the participant of any tense areas by using one-word labels for the unrelaxed area or provided positive feedback. The participants pulse was taken at the beginning of each session after completing the BAI and then again at the end of the BRT session.

At the end of the sessions the participant was asked to relax on their own for ten minutes. During this time the BRS was used to measure the level of relaxation obtained by the participant. Following the ten minutes, the instructor counted backwards from five and asked the participant to open their eyes. The participant was also asked to rate their level of relaxation on a scale of 1 (completely relaxed throughout my entire body) to 7 (extremely tense throughout my entire body) following the BRT session (Poppen, 1988). Participants were asked to complete a home practice form where they use BRT for 5 to 10 minutes a day at home and record their level of relaxation and any items that were difficult for them.

Interobserver agreement (IOA) data were collected for the BRS by an undergraduate psychology major through a one-way mirror on sessions six and nine. The participant was informed of the observation prior to data collection. IOA was calculated by summing the number of relaxed responses for both observers and then dividing the smaller number by the larger and multiplying by 100. Results showed an IOA of 97.67%

for session six and 95.29% for session nine.   At the end of the study, participants were fully debriefed. No compensation was given for their participation in the study.

2.4 Statistical Analyses

Graphs were created using the data collected to determine whether the BRT was effective in reducing anxiety for the participants. This current study used a sample size of 2 adults with comorbid AS and anxiety. A power analysis was not conducted because behavior analysis often uses single-subject designs and graphed data in studies (Fisch, 2001; McGlynn et al., 1999; Guercio et al., 2001). Behavioral observations also provided validity for self-report measures (Gerdtz, 2000).

<center>**Chapter 3**

Results</center>

3.1 Behavioral Relaxation Scale

Scores on the BRS increased greatly for both participants. Participant one started with a BRS score of 59% and ended with a score of 85% (See Figure 1). Her BRS scores show a rapid increase between sessions three and four with scores stabilizing and remaining relatively similar between sessions five and nine.

Participant two was given the BRS during baseline and started with a score of 26% and an end score of 84% (See Figure 2). Her BRS scores quickly rose between session two baseline and session three, with session three being the first treatment session. BRS scores remained stable between sessions three and nine, varying between 69% and 86%.

3.2 Anxiety rating on a Likert scale before and after BRT

Participant one had a relatively stable rating of anxiety throughout the sessions alternating between 2 and 3 (See Figure 3). On two occasions anxiety level was reduced from a 3 before BRT to a 2 after BRT. Participant two demonstrated a decrease in anxiety rating after BRT in all sessions except for session nine (See Figure 4).

3.3 Beck Anxiety Inventory

Participant one's BAI scores did not display much fluctuation (See Figure 5). There was a slight downward trend from session one to session two with stabilization

from sessions three through nine. BAI scores for participant one ranged from 1 to 10. Participant two exhibited a downward trend for BAI scores with a range of 0 to 22. Session seven showed an increase in BAI scores with a rating of 15 but then continued to decrease in the final two sessions (See Figure 6).

3.4 Pulse Rate (bpm)

For pulse rate before and after BRT, participant one displayed an elevated pulse rate after BRT in every session except session 6 (See Figure 7). Participant one showed an overall higher pulse rate during baseline sessions (*M*= 95) and after BRT (*M*= 95) than before BRT (*M*= 87.57).

Participant two demonstrated a lower pulse rate after BRT for the majority of sessions (See Figure 8). On average, participant two's pulse rate was lower after BRT (*M*= 77) than before BRT (*M= 80.86)*. However, pulse rate was lower at baseline (*M=* 76.5) than during treatment sessions.

Chapter 4

Discussion

BRT was taught to two college students with AS and comorbid anxiety. A single subject design was implemented which is often the case in behavioral research. Nine sets of data were collected from each participant and this controlled for normal variation in behavior. The hypothesis was that anxiety ratings would decrease from baseline levels with the implementation of BRT. The results showed a mixed outcome.

The rapid increase in BRS scores was similar to results of previous studies. The increase in BRS scores for both participants can most likely be attributed to the implementation of BRT because it follows the traditional learning curve observed when learning a new task. The BRS was specifically created to measure the level of relaxation during the use of BRT. In the study participants' BRS scores increased as they learned and practiced BRT. This current study differs from other studies on BRT because of sample used. No other published studies have been found that use BRT specifically with the adult AS population. BRT has been used with Autism and many other disorders but not AS specifically.

Participant one's anxiety ratings did not show a decrease after BRT and did not vary from baseline levels. Anxiety ratings remained stable throughout the study with scores ranging between 2 and 3. Participant one often said "relaxation won't work for me" and "I don't feel any different." However, participant one was observed as tense both in behavior and conversation but more relaxed after BRT. For example, when coming into the room the participant was very restless, changing positions frequently and her voice would quiver. After BRT, participant one was much calmer with an even tone

of voice and relaxed posture. It may have been that self-report was not at accurate estimate of anxiety for participant one and that a different anxiety scale would have yielded better results.

Participant two's anxiety ratings stayed the same during baseline session number two when a BRS score was calculated. It is possible that there was no change in anxiety rating because there was no treatment implemented at that time. When sessions three through nine were examined, the anxiety rating was almost always higher before the BRT intervention than afterwards. It is likely that the implementation of BRT was the reason for the decrease in anxiety but this is not definite because there was no separate control group due to the nature of the single subject experimental design. Another possible explanation for these results could be the Hawthorne effect in which the participant performs better, or in this case rates themselves better, because they are being studied.

Participant one's BAI scores decreased from baseline levels, however in the BAI interpretation it suggests that extremely low ratings of anxiety could be a sign that the participant was not correctly assessing her anxiety or was potentially masking it. While completing the BAI, participant one often tried to rationalize her signs of anxiety. She would say things like "I felt numbness but that couldn't have been anxiety" and then would indicate a rating of zero.

Those diagnosed with AS tend to think in literal terms and therefore the BAI may not have been the best measurement of anxiety for this population. A more common test for anxiety in people AS is the Hamilton Anxiety Scale which is a clinician rated scale.

However, this study did not allow for lengthy discussion with participants so the Hamilton Anxiety Scale was not an option.

Participant two's BAI scores decreased from a moderate level of anxiety at baseline to a low level of anxiety after learning BRT. This may have resulted from the use of BRT but evidence is limited. A few issues emerged with the BAI scores for participant two. A BAI score was not obtained for session four and in session nine a BAI score of zero was given by participant two. As stated earlier, low scores on the BAI can be representative of denial or masking of anxiety or an unrealistic assessment of anxiety. The final rating of zero may also have been an attempt to please or impress the researcher.

Another issue with the BAI was that both participants scored high on the first baseline measurement and then their scores decreased on the second session without any treatment. This may have been due to the fact that they were nervous at their first meeting as well as it being their first time taking the BAI and not knowing what to expect. This initial decrease in baseline from sessions one to two makes it hard to tell what the average level of anxiety was for these participants before being taught BRT.

According to the American Heart Association (2011), resting heart rate should be on average between 60 and 80 bpm and is best taken in the morning after first waking up. Participant one's pulse rate was higher after BRT which is the opposite of what was expected. This may have been caused by phenomena called relaxation induced anxiety in which the participant has an increase in physiological, behavioral, or cognitive aspects of anxiety during relaxation procedures (Heide & Borkovec, 1983). Another issue with the

heart rate measurement was the possibility of a contrast effect with the readings after BRT because the participants were asked to open their eyes and no longer concentrate on relaxation as their pulse was being taken. A more effective means of measurement would be to take pulse readings in intervals throughout the session with a heart monitor. This equipment was not available for this study.

Participant two showed a decrease in pulse rate after BRT for the majority of sessions. During the second baseline session pulse was taken at the beginning and also after the BRS was calculated but no BRT was taught until session three. Sessions six through nine demonstrated a steady decrease in pulse rate after BRT which may have been caused by mastering and becoming comfortable with the BRT procedure. This may also have been caused by the participant's heart rate being slightly elevated before BRT due to walking to the building. This was attempted to be resolved by having the participants' pulse taken after they had a few minutes to sit down while taking the BAI and talking about their week.

Both participants were asked to complete homework on a daily basis in which they used BRT for five to ten minutes a day and recorded their level of anxiety. Participant one completed only one homework assignment (See Table 2) and had little change in anxiety while participant two completed 24 homework assignments (See Table 3) and demonstrated a greater decrease in anxiety. While amount of practice is widely different between participants, there was an inability to determine whether practice of BRT influenced a decrease in anxiety scores.

Limitations to this study include a small sample size and a sample of convenience and, therefore, an inability to generalize findings to the population. Also the baseline observations acted as a control group but these data are limited with only two sets of data for each participant. The study was also designed as an AB design with no return to baseline condition. A return to baseline would help to verify treatment effects; however, after BRT was learned by participants there was no way to minimize carryover effects of the treatment so an ABA design was not ideal. Furthermore, the use of a different anxiety measure may have been more appropriate and may have demonstrated a greater decrease in anxiety. Replication of this study is needed.

Overall this study demonstrated that BRT could be used to decrease anxiety in people diagnosed with AS. Future research should continue to build upon the use of BRT to reduce anxiety in those with AS and other disorders. Another aspect that should be researched is the use of homework and whether completing BRT homework increases the effectiveness of treatment for this population. When working with the AS population, multiple measures should be used to assess progress such as direct observation along with questionnaires and rating scales. BRT is easily learned and can be used with many different populations; however more research is needed in using BRT with individuals with pervasive developmental disorders.

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Table 1

Ten relaxing behaviors in BRT

1. Hands	Rested in lap and fingers are either flat or curled.	
2. Feet	Resting on foot rest with toes pointed away from each other.	
3. Body	Chest and hips are straight with no movement.	
4. Shoulders	Rounded and relaxed against the chair with tops in straight line.	
5. Head	Resting back and facing straight forward.	
6. Mouth	Teeth parted and lips slightly parted in the center.	
7. Throat	Smooth and quiet.	
8. Quiet	No noise	
9. Breathing	Slow and even.	
10. Eyes	Eyelids closed and smooth.	

Adapted from Poppen, 1988

Table 2

Homework Completion for Participant 1

Date	Start Time	End Time	Self-rating	Difficult Items
5/7/11	2:10	2:15	4	None

Table 3

Homework Completion for Participant 2

| Date	Start Time	End Time	Self-rating	Difficult Items
3.9.11	11:12 am	11:17 am	5	Mouth, feet, legs
3.10.11	10:34 pm	10:43 pm	2	Mouth, hands
3.11.11	5:15 pm	5:26 pm	4	Mouth
3.11.11	8:12 pm	8:16 pm	5	Face, hands, feet, mouth
3.12.11	6:26 am	6:28 am	5	Hands, feet, mouth
3.14.11	2:30 pm	2:37 pm	5	Feet, hands
3.15.11	2:30 am	2:40 am	3	Shoulder, mouth
4.7.11	3:00 pm	3:11 pm	4	Mouth, throat
4.8.11	8:32 pm	8:43 pm	5	Mouth, shoulders
4.9.11	2:13 pm	2:17 pm	6	Mouth, shoulders
4.9.11	3:22 pm	3:27 pm	5	Mouth, throat
4.10.11	12:22 pm	12:34 pm	2	Mouth
4.10.11	10:36 pm	10:42 pm	2	Legs, mouth
4.11.11	7:38 am	7:44 am	2	Legs, mouth, feet
4.13.11	8:00 am	8:10 am	5	Mouth, feet
4.13.11	9:00 pm	9:07 pm	5	None
4.15.11	9:07 pm	9:12 pm	6	Mouth, hands
4.16.11	7:07 am	7:19 am	4	Mouth, feet
4.19.11	8:11 pm	8:15 pm	6	Mouth, hands, feet
4.22.11	9:02pm	9:12 pm	5	Mouth, feet
4.23.11	11:00 am	11:07 am	4	Mouth, hands
4.23.11	9:37 pm	9:45 pm	5	Neck, mouth, feet
4.24.11	1:32 am	1:37 am	5	Neck, feet
4.25.11	7:10 am	7:13 am	4	Neck, feet, mouth
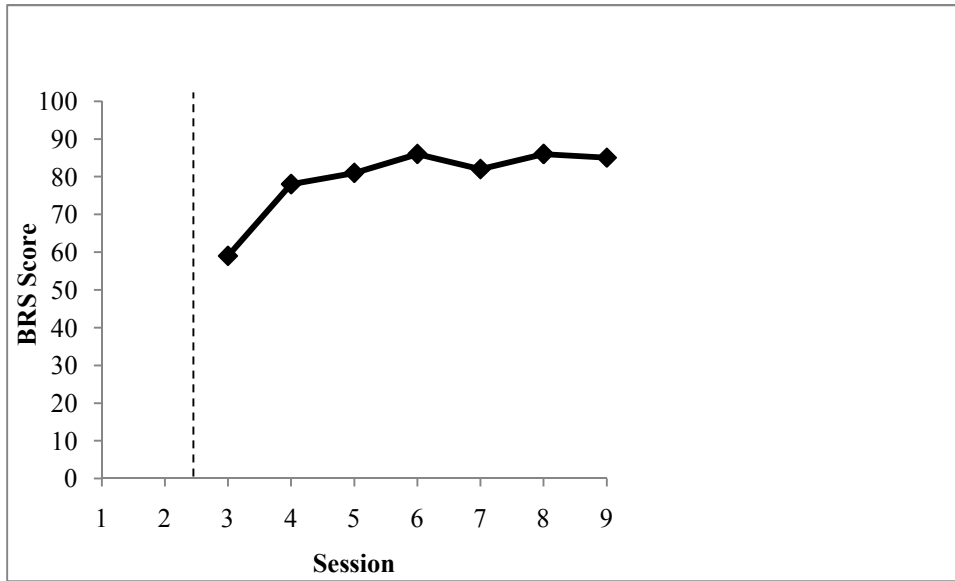
Figure 1

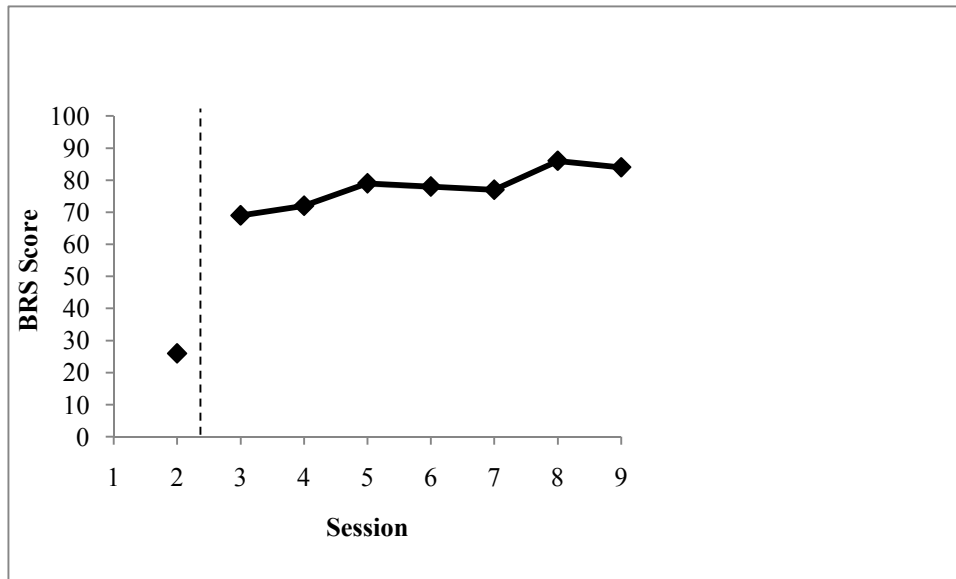Behavioral Relaxation Scale scores for participant 1

Figure 2

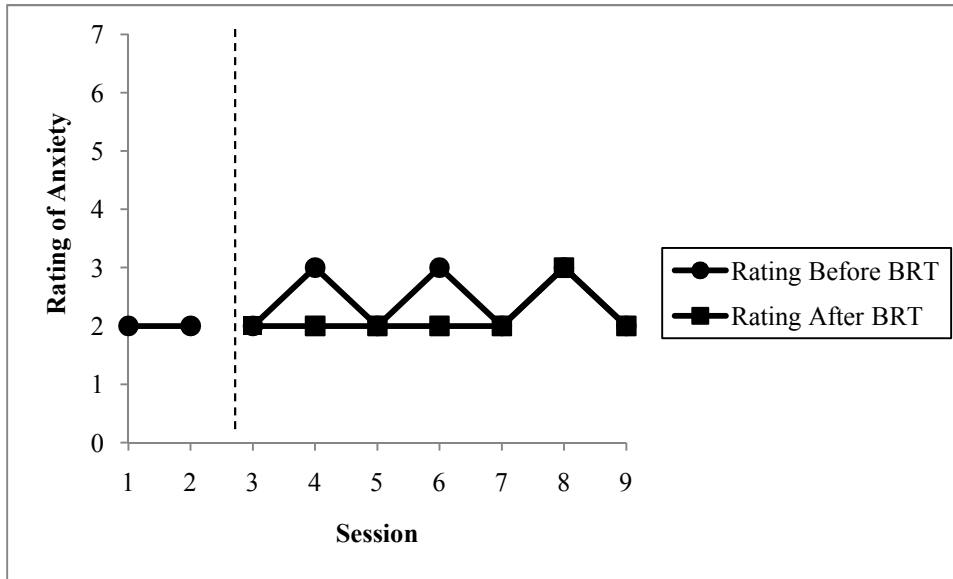Behavioral Relaxation Scale scores for participant 2

Figure 3

Likert Rating of anxiety before and after BRT for participant 1
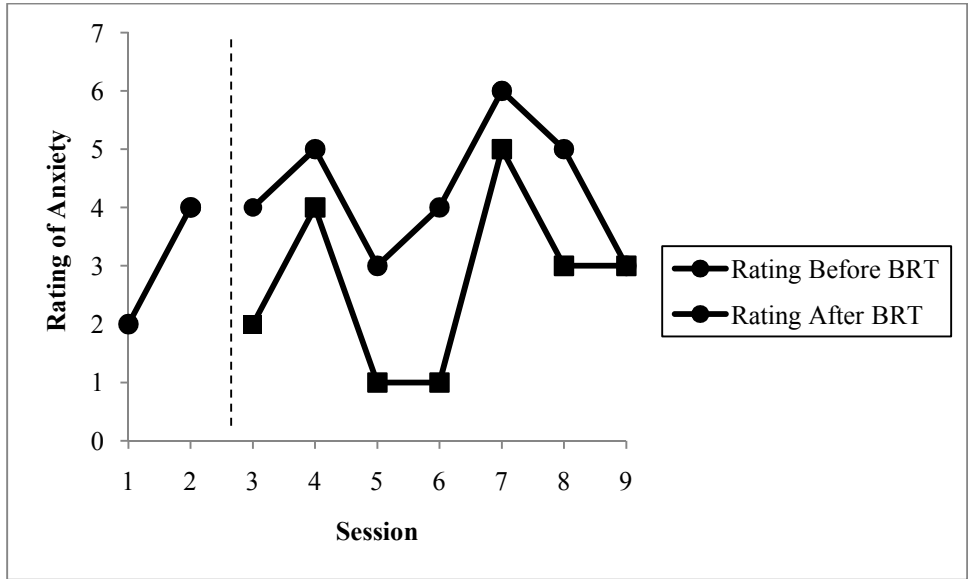
Figure 4

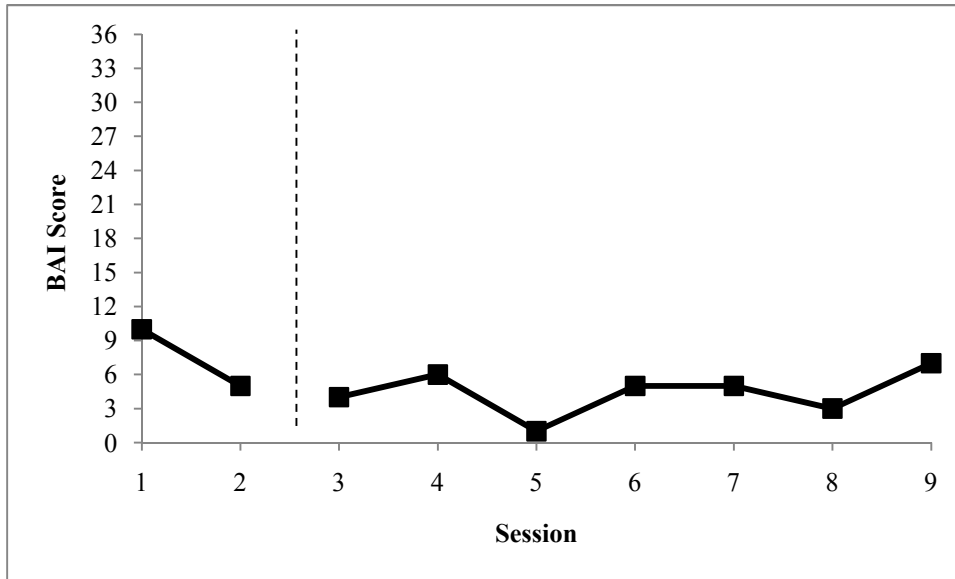Likert Rating of anxiety before and after BRT for participant 2

Figure 5

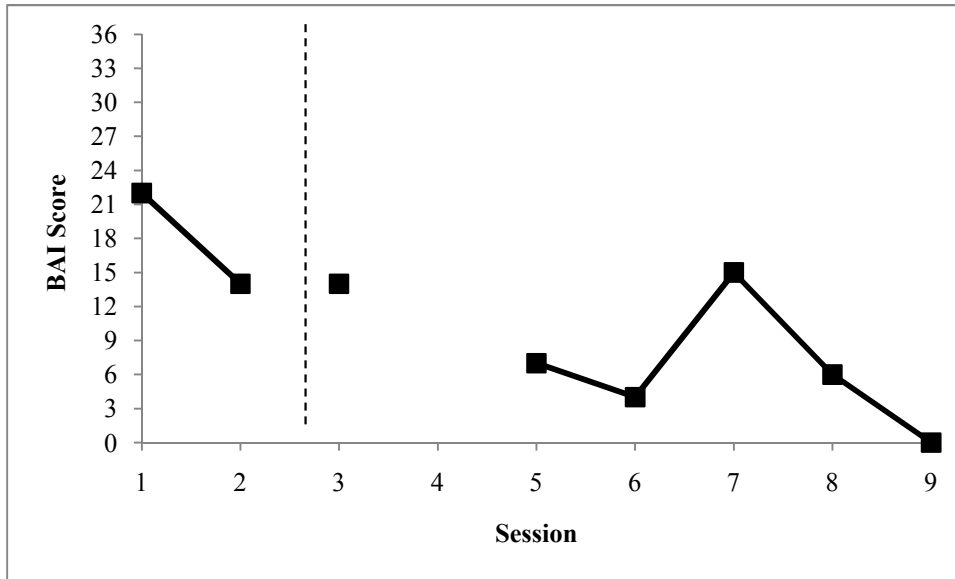Beck Anxiety Inventory scores for participant 1

Figure 6

Beck Anxiety Inventory scores for participant 2
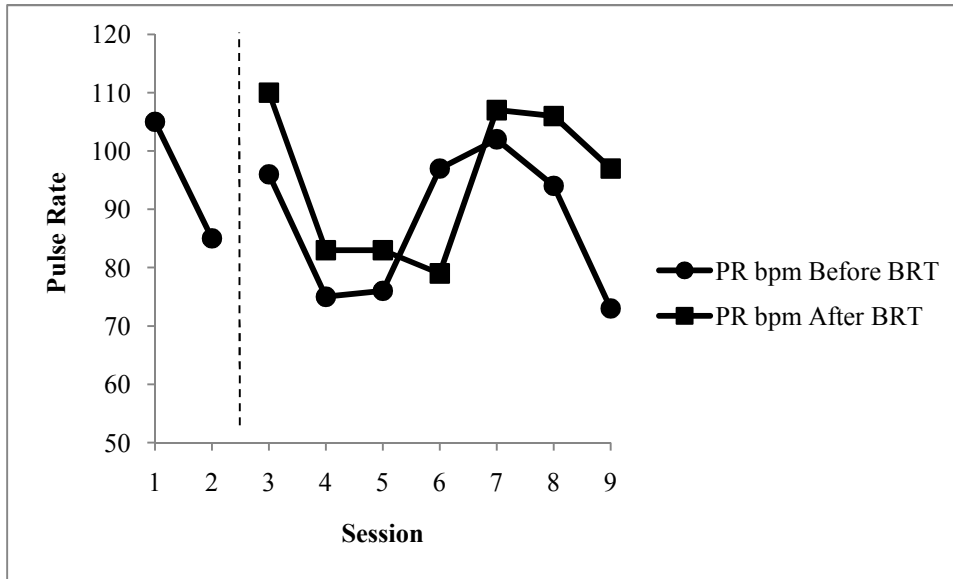
*No data were collected during session 4

Figure 7

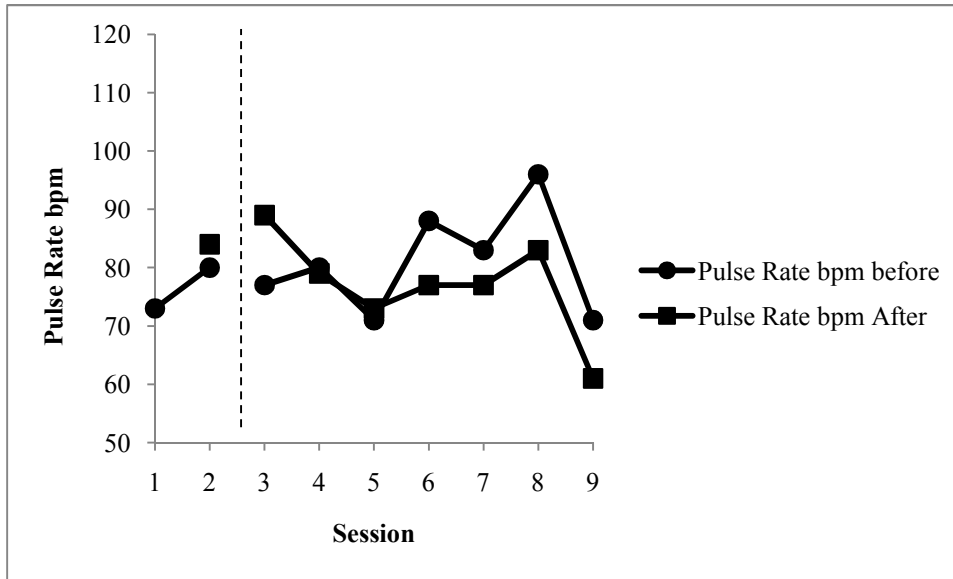Pulse Rate (bpm) before and after BRT for participant1

Figure 8

Pulse Rate bpm before and after BRT for participant 2