Experimental Evaluation of Behavioral Activation Treatment of Anxiety (BATA) in Three Older Adults

Jarrod.S.Turner & David.J.Leach

Abstract

This report describes three single-case experimental evaluations of Behavioral Activation Treatment of Anxiety (BATA) applied with a 51-year-old male, a 62-year-old female, and a 53-year-old female, each of whom met DSM-IV criteria for anxiety. Each case was a clinical replication of an initial trial of BATA reported in Turner and Leach (2009). Treatment was delivered in twelve weekly 60-minute individual sessions and evaluated using an A-B-C phase change with repeated measurement design. Decreased scores in self-reported anxiety were obtained in each case and the improvements were maintained during a 3-month no treatment maintenance phase. Compared to baseline, each participant also recorded increases in activity levels in some key life areas during the treatment phase. These preliminary findings suggest that increased activation in functionally positive areas is associated with reported decreases in anxiety and that BATA could be an effective stand-alone treatment for anxiety in adults.
Keywords: behavioral activation (BA), anxiety, third-wave, single-case, time-series

Introduction

Behavioral Activation Treatment (BA) involves systematic and structured attempts to increase the level of meaningful activity in a person's everyday life, thereby helping clients to contact sources of positive reinforcement for behaviors that correspond with clinical improvements (Jacobson, Martell, & Dimidjian, 2001). BA has been classed as one of the 'new' or 'third-wave' behavior therapies alongside others, including Acceptance and Commitment Therapy (ACT; Hayes, Strosahl, & Wilson, 1999) and Functional Analytic Psychotherapy (FAP; Kohlenberg & Tsai, 1991) (Hayes, 2004). The third-wave therapies have a common emphasis on the application of principles of operant psychology including positive and negative reinforcement. Philosophically, they are grounded in radical behaviorism (Chiesa, 1994; Skinner, 1953). There are two current accounts of BA, Brief Behavioral Activation Treatment for Depression (BATD; Lejuez, Hopko, & Hopko, 2001) and Behavioral Activation (BA; Martell, Addis, & Jacobson, 2001) that are commonly applied in clinical settings.

BA has received strong empirical support as a stand-alone treatment for depression (Mazzucchelli, Kane, & Rees, 2009; Sturmey, 2009). In their seminal study, Jacobson and colleagues showed that the BA component of cognitive-behavior therapy (CBT) was as effective in the treatment of depression as a full CBT package (Jacobson, Dobson, Truax, Addis, Koerner, et al., 1996). A more recent replication of the Jacobson et al. study showed again that BA was as effective as CBT in the treatment of depression, and that it was actually more effective than CBT for participants who were rated as being more 'severely depressed' (Dimidjian, Hollon, Dobson, Schmaling, Kohlenberg, et al., 2006). Importantly, these findings have suggested that targeting overt behavior change alone was sufficient to produce corresponding improvements in covert correlates of depression (i.e., thinking and feeling).

The function of escape and avoidance behavior has been emphasised in recent behavioral models of depression (Kanter, Cautilli, Busch, & Baruch, 2005). In these models, depressed individuals show a class of responses defined by common functions of escape and avoidance. Depressed individuals tend to substitute behaviors that provide immediate relief for behaviors that might cause some short-term discomfort but can prove to be clinically helpful in the longer term. For example, avoiding contact with the social community by staying in bed all day can function to avoid exposure to situations that elicit aversive thoughts and feelings in the individual. The Matching Law (Hernstein, 1961) suggests that

response allocation (i.e. either avoidant or approach behavior) is a function of the relative reinforcement associated with each class of responses. Thus, concurrent schedules of negative reinforcement of avoidant behavior and decreased positive reinforcement of approach behavior maintain depression. BA is an effective treatment for reported depression because it leads to decreases in avoidance behavior as well as increases in approach behavior. Such changes lead to a higher probability of expanding behavioural repertoires maintained by response-contingent positive reinforcement, such that depressed individuals engage in more activities that have anti-depressant effects (Dimidjian, Martell, Addis, & Herman-Dunn, 2008).

Anxiety shares functional similarities with depression because (anxious) individuals who report high levels of anxiety respond to a relatively high frequency of negative reinforcement where avoidance behavior is commonplace (Hayes, Wilson, Gifford, Follette, & Strosahl, 1996). Avoidance is a key feature of the diagnostic criteria for an anxiety-related disorder (American Psychiatric Association (APA), 2000). Anxiety is a common mental health problem in Western societies with a lifetime prevalence rate of nearly 30% in the United States (Kessler, Berglund, Demler, Jin, Merikangas, et al., 2005) and a 12-month prevalence rate of nearly 20% or approximately 40 million adults (Kessler, Chiu, Demler, & Walters, 2005). Along with the human cost this represents an economic burden in excess of $40 billion annually in the US alone, 85% of which is the cost of psychiatric and non-psychiatric medical treatment (Greenberg, Sistsky, Kessler, Finkelstein, Berndt, et al., 1999). Contemporary psychological treatments for anxiety require further development because clinically significant outcomes are not achieved in 20 % to 80% of the clinical population who receive CBT and other empirically supported, established treatments (Barlow, 2002).

BA alone may be as effective in treating anxious behaviours as in the treatment of depressive behaviours. Increased access to response-contingent positive reinforcement for approach behavior with concurrent decreases in negative reinforcement for avoidance behavior could lead to greater engagement in activities that have anxiolytic functions, with a gradual extinction of anxious responses. Increased approach behavior may also result in behavioral cusps that are defined by Rosales-Ruiz and Baer (1997, p.534) as “behavior change that has consequences for the organism beyond the change itself, some of which may be considered important”. However, despite the functional similarities with depression, BA treatment has rarely been applied with participants reporting predominately anxiety symptoms. Also, in prior investigations of BA treatment of anxiety, there has been a tendency to confound traditional BA models as described by Jacobson et al. (1996) with the use of adjunctive technologies, such as gradual exposure and relaxation training (e.g., Hopko, Lejuez, & Hopko, 2004; Hopko, Roberstson, & Lejuez, 2006). Further, as far as can be ascertained, no study applying BA to either anxiety or depression has yet to include a measure of real-time activity levels even though increased activation is the primary aim of BA treatment.

This study investigated the effectiveness of behavioral activation treatment of anxiety (BATA) within a series of three older adults reporting clinical anxiety using single-case experimental designs. The BA approach utilised was pared down for research purposes to the essential elements of BA. The elements selected were those common to the main contemporary BA models for depression (e.g., BA, BATD) and supported by principles of operant psychology. All adjunctive treatment elements such as relaxation training and cognitive rehearsal were excluded. A core question asked was whether increased activation in important life areas was associated with self-reports of decreased anxiety over time. The research also aimed to address several limitations within the extant BA literature. For example, participants were included in the study if they met the DSM-IV criteria for an anxiety disorder but excluded if there were signs of co-morbidity (e.g., depression). Single-case experimental methodology was used including the establishment of adequate baselines before beginning treatment, using measures of real-time activity levels, and including measures of treatment fidelity from a random sample of 33.3% of all treatment sessions conducted for each participant. Treatment integrity is considered essential to the valid

interpretation of results from psychotherapy research (Waltz, Addis, Koerner, & Jacobson, 1993), yet is often poorly established (Perepletchikova, Treat, & Kazdin, 2007). Each case in this study is a replication of a previously-reported controlled clinical trial of BATA applied to a 64-year-old male (Turner & Leach, 2009).

Method

Participants

The three participants were recruited from the local community via an advertisement in a community newspaper asking for "anxiety sufferers" who would be interested in being involved in a study investigating a new treatment for anxiety. They completed a comprehensive intake assessment and were deemed eligible for participation due to having met the criteria for an anxiety-related disorder without meeting criteria for other Axis I disorders, according to the DSM-IV (APA, 2000). Diagnosis was confirmed using the clinical standards from the Structured Clinical Interview for the DSM-IV Axis I Disorders (SCID-I; First, Spitzer, Gibbon, & Williams., 1997).

Experimental Design

A single-case within-subject experimental (A/B/C) design was used for evaluating treatment effects on the reported anxiety levels of each participant. The A phase was baseline; B phase was treatment; and C phase was maintenance/follow-up. Standardised repeated measures of anxiety were collected during each phase and the participants were required to self-monitor their anxiety-related behaviours daily. They were not required to self-monitor during phase C to control for the potential therapeutic effects of self-monitoring alone (Barlow, Hayes, & Nelson, 1984).

Procedure

Potential participants who responded via telephone to the community newspaper advertisement were scheduled to complete the individual intake assessment. This assessment was conducted by the first author who was in his second year of Post-graduate training in Clinical Psychology. Initially, potential participants were provided with an information letter describing the features of the study and were given the opportunity to ask questions or state any concerns. Once formal consent was obtained the SCID-I (First, et al., 1997) was administered along with the Beck Anxiety Inventory (BAI; Beck & Steer, 1990) and the short version of the Depression Anxiety Stress Scales (DASS-21; Lovibond & Lovibond, 1995). If participants met DSM-IV criteria for an anxiety-related disorder, without also meeting criteria for other Axis I disorders, they were included in the study. They were provided with materials and instructions for self-monitoring and were required to return on-site for appointments at the University Psychology Clinic at weekly intervals for approximately 15 to 20 mins in order to submit their self-monitoring diaries and complete the BAI and the DASS-21 until the commencement of treatment.

Phase A: Baseline

During baseline, each participant was required to complete daily self-monitoring of anxiety and activity levels using diaries developed for this study. The participants were required to return on-site weekly to submit monitoring forms and receive new forms. Also, at each weekly meeting, participants were administered the BAI and the DASS-21. Each meeting was of approximately 15 to 20 mins duration. No treatment was conducted during these weekly meetings and any discussion was perfunctory and limited to the procedural concerns of accurate assessments and self-monitoring. The duration of the baseline phase A varied across participants and was determined by the length of time required to adequately establish stability in the obtained self-monitoring data using times-series analysis procedures implementing the treatment phase (Tryon, 1982). Participants' baseline duration ranged from 28 to 38 days.

Phase B: Treatment

The duration of phase B was 84 days for all three participants. The treatment was termed 'Behavioural Activation Treatment of Anxiety' (BATA) and combined what were understood to be the

essential, common principle-based elements of contemporary behavioral activation (BA; Martell, et al., 2001) and brief behavioral activation treatment for depression (BATD; Lejuez, et al., 2001). Each participant received the same treatment as set out in the BATA protocol developed by the authors for use in the present study (available by request).

Treatment consisted of twelve weekly 60-min individual sessions. All treatment sessions with each participant were audio-recorded using a Digitech ™ Digital Voice Recorder. One-third of the recordings of each participant's treatment sessions were randomly selected and independently rated for treatment integrity by the first and second author using a coded-interval recording sheet which included categories of therapist verbal-behaviors that were both compatible and incompatible with the specific treatment modality (Appendix A). Using partial-interval time-sampling, the listener was required to code the therapist's verbal behaviors for each 20 second interval for the whole session (Appendix B). Treatment was delivered by the first author on-site at Murdoch University in a standard-size, regularly furnished consulting room.

Treatment Description

The aim of BATA was to increase the amount of approach-oriented, socially important behaviors in the participant's daily life while decreasing the frequency of habitual avoidance behaviours. This was achieved by helping participants bring their overt behaviors more under the control of life goals and related scheduled daily-activities. BATA was delivered in an individual format over twelve 60 min weekly sessions. Throughout the treatment sessions the participants were given ongoing education about the function of their clinically-relevant behaviors and were shown how to conduct a standard functional (ABC) assessment of their anxiety-related behaviors. The key components of BATA were self-monitoring, psycho-education, functional assessment, goal-setting, activity planning and scheduling, activity reviews, and collaborative problem solving using a behavioral framework.

Phase C: Maintenance

The duration of phase C for each participant was 84 days (3 months) and the phase commenced immediately after the completion of the treatment phase B. This phase technically was not a return to baseline due to participants having not been required to complete formal self-monitoring. The aim was to observe participant behaviour independent of the structural variables inherent in the earlier baseline and treatment phases. During maintenance, participants were only required to return on-site for approximately 15 to 20 mins at 1 week, 2 weeks, 4 weeks, 8 weeks, and 12 weeks only for individual administration of the BAI and the DASS-21.

Measurement

A variety of measures were used in this study. The dependent variables were self-reported anxiety, and stress. In addition, self-monitoring was used to measure daily activity levels.

Anxiety Measures

The *Beck Anxiety Inventory* (BAI; Beck & Steer, 1990) is a 21-item questionnaire designed to identify symptoms of anxiety and is one of the most widely used measures of anxiety in clinical practice and research. The BAI has strong, well-established psychometric properties and is highly correlated with other measures of anxiety (Antony, Orsillo, & Roemer, 2001). It has been used across a range of populations including older adult outpatients (Kabacoff, Segal, Hersen, & Van Hasselt, 1997) and has been shown to differentiate anxiety from depression in large community samples (Creamer, Foran, & Bell, 1995).

The *Depression Anxiety Stress Scale-21* (DASS-21; Lovibond & Lovibond, 1995) is a 21-item questionnaire consisting of three 7-item self-report scales that identify the level of symptoms of depression, anxiety and stress as occurred during the previous week and has strong psychometric properties (Henry & Crawford, 2005). The DASS Stress subscale has been shown to be especially useful

in differentiating people who meet criteria for generalised anxiety disorder (GAD) and correlates highly with other measures of GAD (Brown, O'Leary, & Barlow, 2001). The DASS Depression scale is highly correlated with the Beck Depression Inventory and the DASS Anxiety scale is highly correlated with the BAI (Lovibond & Lovibond, 1995).

The *Daily Anxiety Rating Scale* (DARS) is an unpublished daily self-monitoring instrument developed by the authors. It utilises a subjective rating scale (0 = no anxiety to 100 = extreme anxiety), with the participants rating anxiety intensity during six time periods - waking to 9.00, 9.00 to 12.00, 12.00 to 3.00, 3.00 to 6.00, 6.00 to 9.00, and 9.00 to bedtime. Scores for each time period were summed and divided by the number of recording periods (i.e., 6) to calculate a daily average.

Activity Measures.

The Behavior Self-Monitoring Diary (BSMD) was developed by the authors for this study. It is a daily diary for recording minutes of activity during three time periods (waking to 12.00, 12.00 to 6.00, 6.00 to bedtime) under four broad classes of overt behaviour: 1) self and other (e.g., pet) care, 2) housework and errands, 3) paid or volunteer work, and 4) interests, hobbies and recreation (e.g., reading, education, visiting friends). Participants were instructed to record the time spent on a particular activity to the nearest 15 minute interval. They were also asked to record whether the reported activity was conducted inside or outside of the home and whether they were alone or with others at the time.

Data Analyses

The data are presented in standard graphical form for single-case experimental research. With self-monitoring data a visual aid was provided by superimposing a horizontal middle line, based on the phase median, across the baseline and treatment phases. To further improve the accuracy of the visual analysis, no-count rates (i.e., 0-mins) were omitted from the graphical display (White & Haring, 1980) but remained within the statistical analysis. Adjunctive non-parametric techniques were used for statistical data analysis. Changes in treatment and follow-up BAI and DASS-21 scores from baseline were analysed using time-series analyses to identify any non-random variations (Tryon, 1982). Baseline scores in self-monitored data from the DARS and the BSMD were also assessed for non-random variations (i.e., trends).

Results

Case 1

'Frank' was a 51-year-old male reporting a history of chronic anxiety with repeating periods of abdominal discomfort, tightness in the throat area, hot flushes, sweating, rapid breathing, and intense worry occurring since adolescence. According to Frank, events in two broad contexts typically occasioned his anxiety. Firstly, there were situations requiring him to perform social activities including lecturing and meeting people for the first time, and everyday social situations such as using public transport and making retail purchases. Secondly, there were everyday events that required him to complete some type of chore, such as paying bills, vehicle refueling and house cleaning. In addition, he reported that he often engaged in worry about his relationships, work, his long-term life direction, and anxiety itself. At intake, Frank met DSM-IV (APA, 2000) criteria for Social Anxiety Disorder (SAD; generalised) and Generalised Anxiety Disorder (GAD). At intake, he scored 20 on the BAI (moderate; Beck & Steer, 1993), 9 on the DASS-21 Depression scale (normal), 16 on the DASS-21 Anxiety scale (severe), and 24 on the DASS-21 Stress scale (moderate) (Lovibond & Lovibond, 1995).

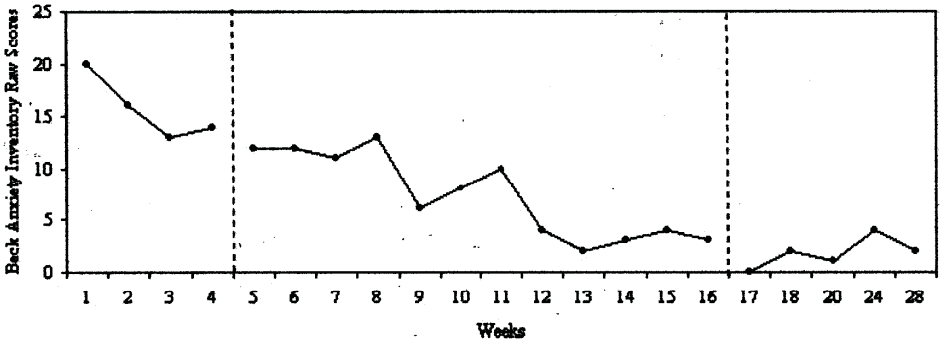

Figure 1: Case 1 BAI raw scores at baseline, treatment, and maintenance phases. *Note:* Scores below 7 = normal, 8-15 = mild, 16-25 = moderate, above 26 = severe.

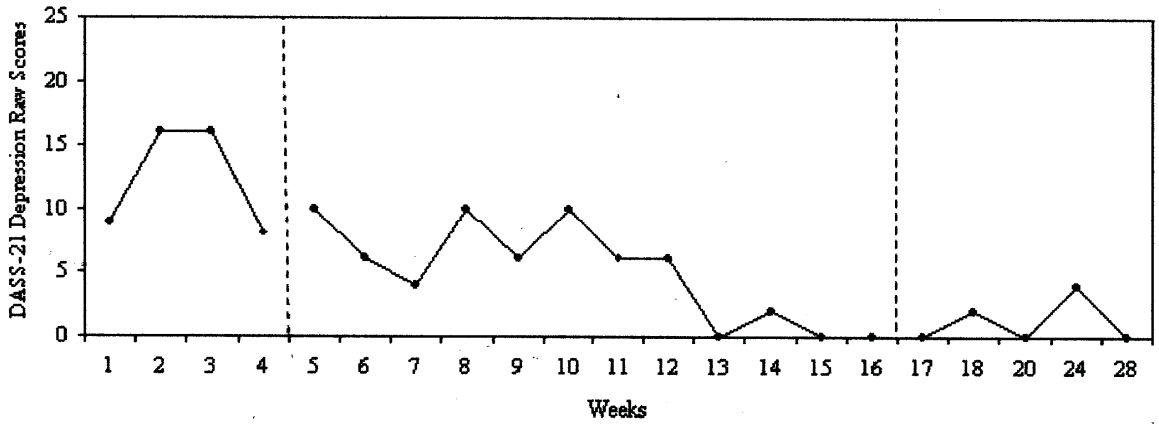

Figure 2: Case 1 DASS-21 Depression raw scores at baseline, treatment, and maintenance phases. *Note:* Scores below 9 = normal, 10-13 = mild, 14-20 = moderate, 21-27 = severe, above 28 = extremely severe.

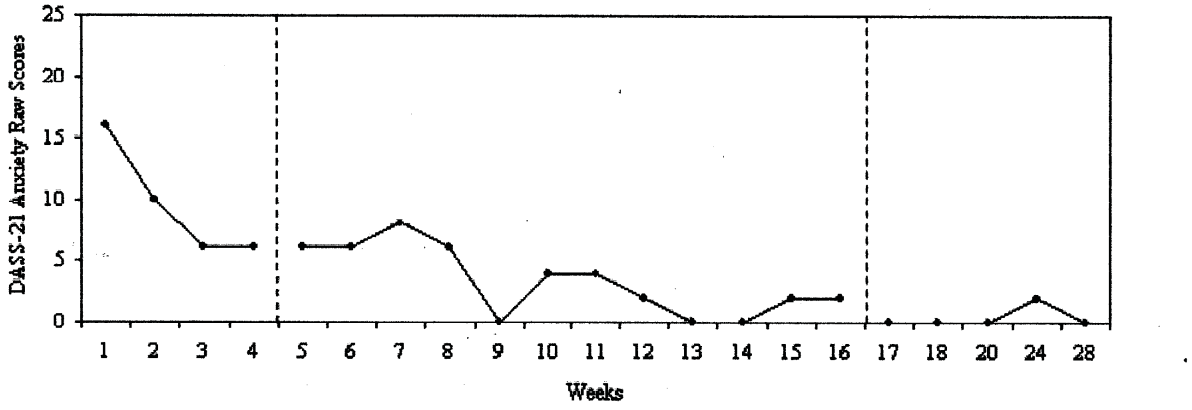

Figure 3: Case 1 DASS-21 Anxiety raw scores at baseline, treatment, and maintenance phases. *Note:* Scores below 7 = normal, 8-9 = mild, 10-14 = moderate, 15-19 = severe, above 20 = extremely severe.

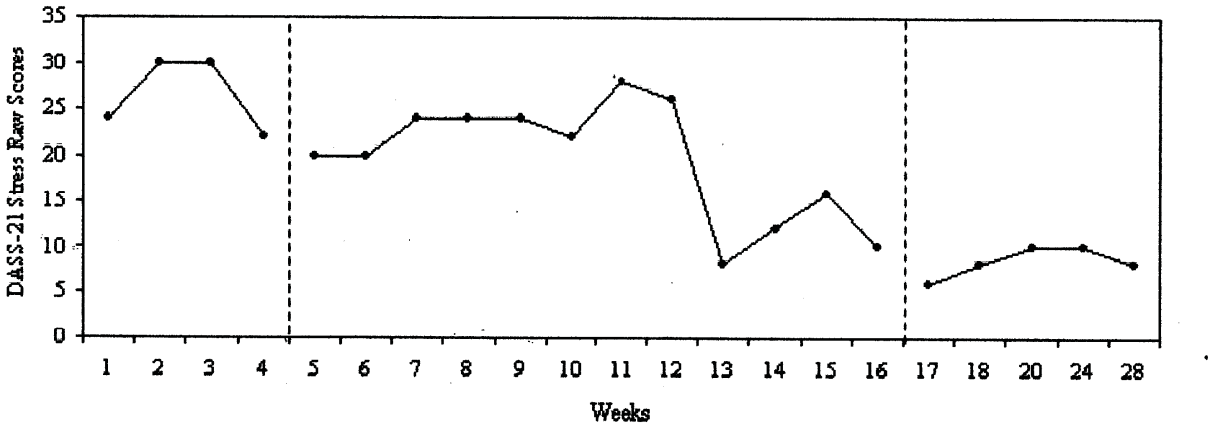

Figure 4: Case 1 DASS-21 Stress raw scores at baseline, treatment, and maintenance phases. *Note:* Scores below 14 = normal, 15-18 = mild, 19-25 = moderate, 26-33 = severe, above 34 = extremely severe.

Frank's BAI scores are presented in Figure 1. Analysis of Frank's combined BAI raw scores through the treatment and maintenance phases revealed evidence of a downward trend within the data, $Z = 3.43$, $p < .001$. Figures 2, 3 and 4 show DASS-21 scores through all phases. Analysis of Frank's combined DASS-21 raw scores through the treatment and maintenance phases confirmed the presence of a downward trend within Depression scores, $Z = 2.57$, $p < .01$, Anxiety scores, $Z = 2.79$, $p < .01$, and Stress scores, $Z = 3.23$, $p < .001$.

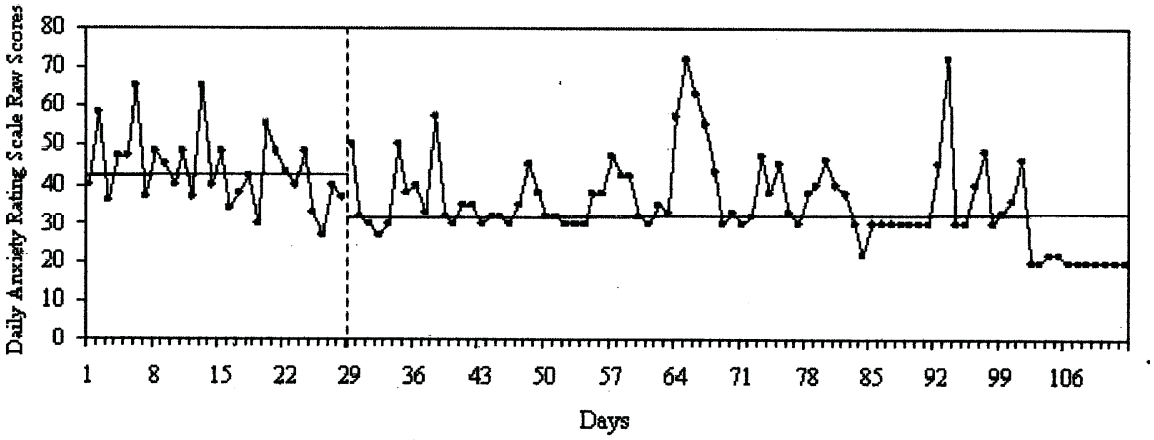

Figure 5: Case 1 Daily Anxiety Rating Scale (DARS) scores across baseline and treatment phases.

Frank's DARS scores are presented in Figure 5. Analysis of the baseline phase revealed an absence of a significant trend within the data, $Z = 0.68$, $p > .05$. However, compared to baseline, there was a mean daily decrease during treatment in daily self-monitored anxiety of 8 points (18% decrease).

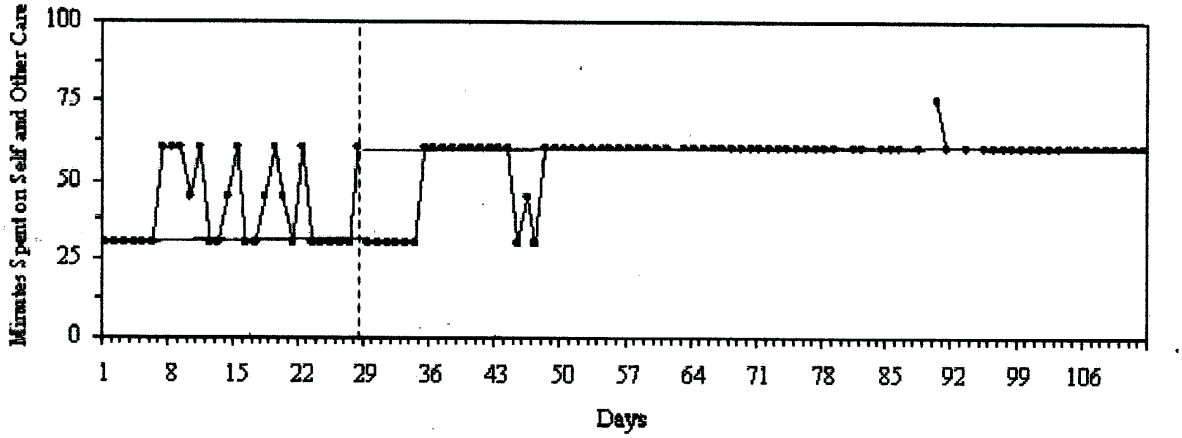

Figure.6: Case 1Minutes spent per day on Self- and Other-Care across baseline and treatment phases.

Frank's Self- and Other-Care data across baseline and treatment phases are presented in Figure 6. Analysis of the baseline phase revealed an absence of a significant trend within the data, $Z = 1.60$, $p > .05$. However, compared to baseline, there was a mean increase during the treatment phase in the amount of time Frank spent on self- and other-care of 11 minutes (27% increase) per day.

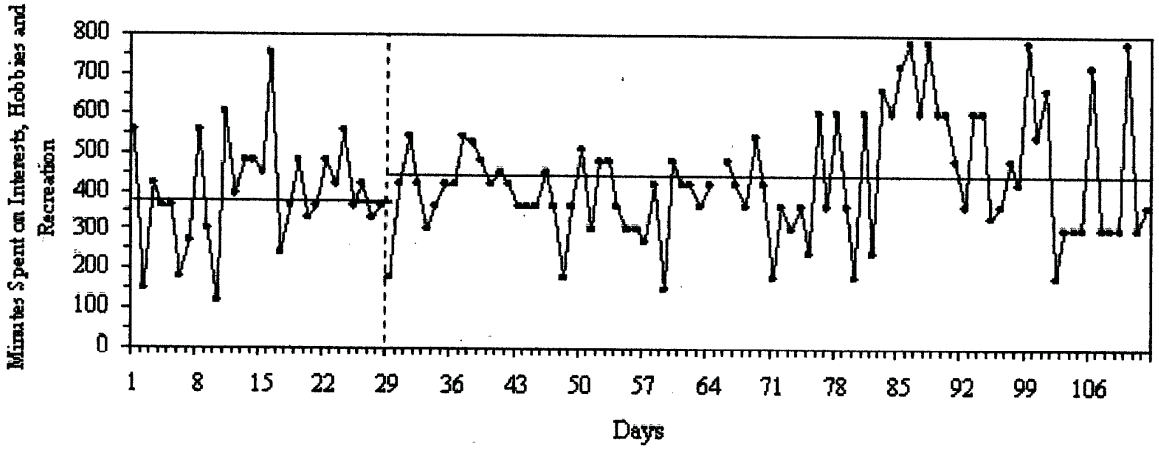

Figure 7: Case 1Minutes spent per day on Interests, Hobbies, and Recreation across baseline and treatment phases.

Frank's Interests, Hobbies, and Recreation data across baseline and treatment phases are presented in Figure 7. Analysis of the baseline phase revealed an absence of a significant trend within the data, $Z = 0.95$, $p > .05$. However, compared to baseline, there was a mean increase during the treatment phase in the amount of time Frank spent on interests, hobbies and recreation of 28 minutes (7% increase) per day.

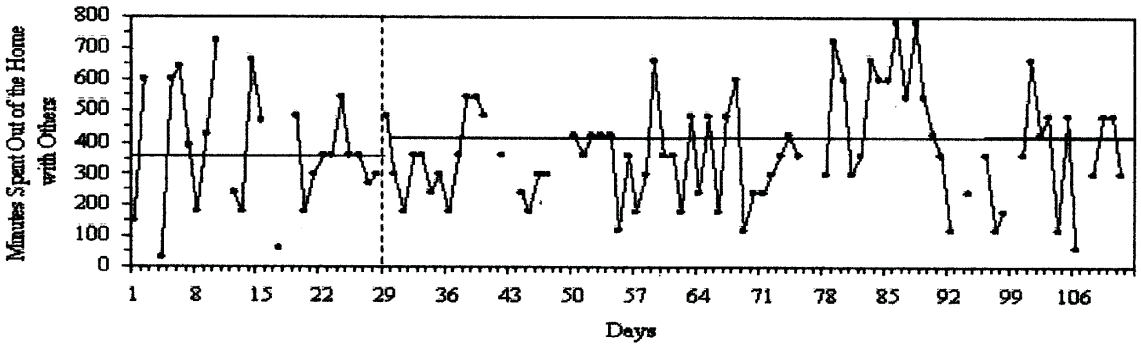

Figure 8: Case 1Minutes spent per day Out of Home with Others across baseline and treatment phases.

Frank's Out of the Home with Others data across phases are presented in Figure 9.11 (zero rates were omitted). Analysis of the baseline phase revealed an absence of a significant trend within the data, $Z = 0.01$, $p > .05$. However, compared to baseline, there was a mean increase during treatment in the amount of time Frank spent out of the home with others of 11 minutes (3.5% increase) per day.

All of Frank's treatment sessions were audio-recorded and 33.3% ($n = 4$) of sessions were randomly selected and independently scored for treatment integrity. Inter-observer agreement on coded therapist verbal behaviors for all 20 sec intervals averaged 98.1% across scored sessions, with 94.5% of therapist in-session behaviour compatible and 5.5% incompatible with the treatment (BATA) protocol.

Case 2

"Mary" was a 62-year-old female who reported strong anxiety in relation to road- and vehicle -related activity. She stated that she had never driven independently, did not have a driving licence, had "always been nervous" when travelling in cars and buses, and experienced fear when walking adjacent to or crossing highly-populated roads and traffic intersections. According to Mary, on these occasions she would experience muscle tension, headache, dryness in the mouth, hot flushes, abdominal discomfort, and restlessness. She reported extensive patterns of self-talk characterised by the forecasting of potential life-threatening outcomes. She also reported more generalised aspects of anxiety, including ongoing and often uncontrollable concerns about finances, health, relationships, and her work. She often had night awakenings during sleep and complained of feelings of irritability and restlessness. She reported that she had been fearful of cars and car -travel since she was a child although she couldn't explain why. In relation to her more generalised anxiety, she said that she began to experience more frequent and intense worry and stress subsequent to her migration to Australia three years prior to treatment. At intake, Mary met DSM-IV (APA, 2000) criteria for Specific Phobia (situational) and Generalised Anxiety Disorder (GAD). She scored 12 on the BAI (mild), 14 on the DASS-21 depression scale (moderate), 6 on the DASS-21 anxiety scale (normal), and 20 on the DASS-21 stress scale (moderate).

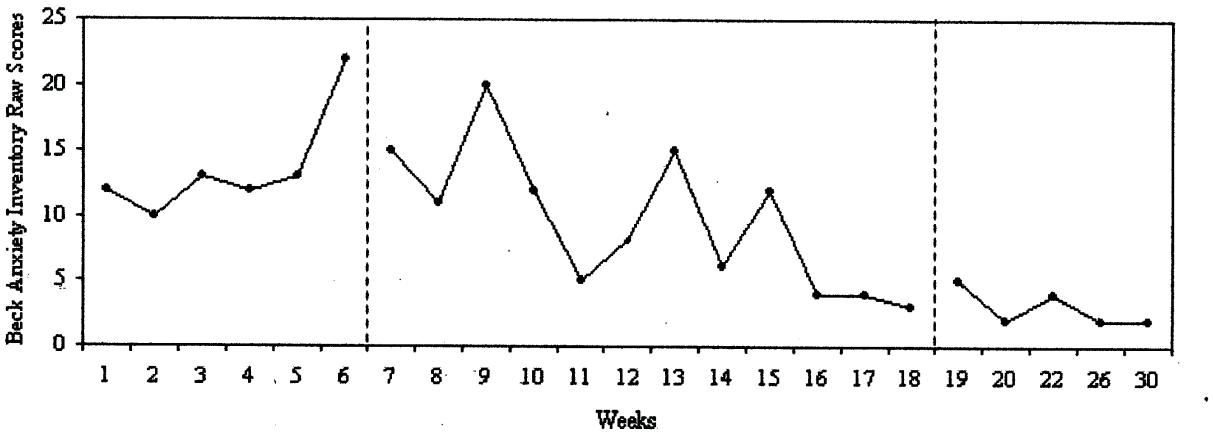

Figure 9: Case 2 BAI raw scores at baseline, treatment, and maintenance phases. *Note:* Scores below 7 = normal, 8-15 = mild, 16-25 = moderate, above 26 = severe.

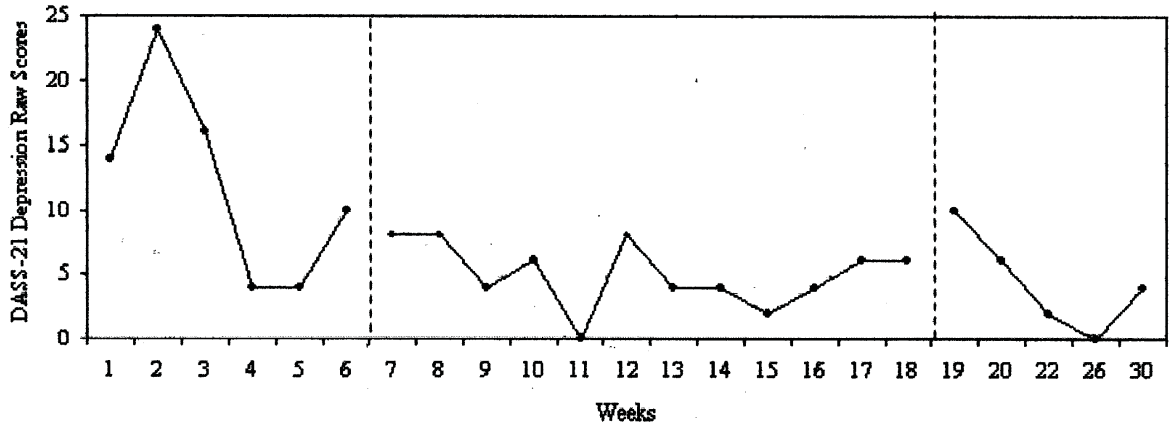

Figure 10: Case 2 DASS-21Depression raw scores at baseline, treatment, and maintenance phases. *Note:* Scores below 9 = normal, 10-13 = mild, 14-20 = moderate, 21-27 = severe, above 28 = extremely severe.

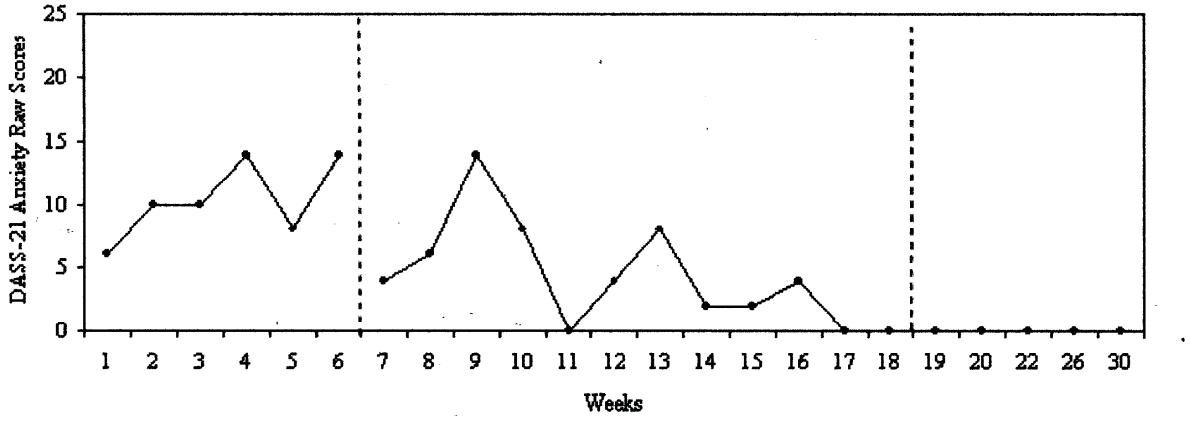

Figure 11: Case 2 DASS-21 Anxiety raw scores at baseline, treatment, and maintenance phases. *Note:* Scores below 7 = normal, 8-9 = mild, 10-14 = moderate, 15-19 = severe, above 20 = extremely severe.

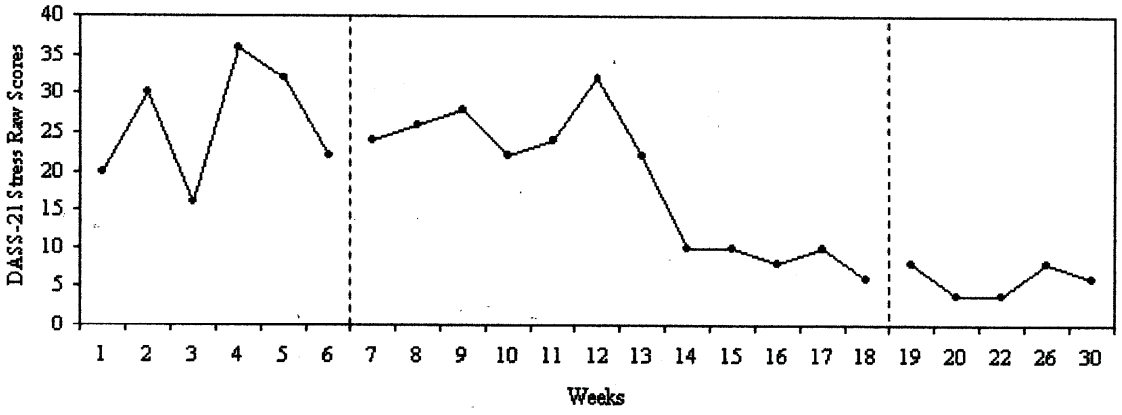

Figure 12: Case 2 DASS-21 Stress raw scores at baseline, treatment, and maintenance phases. *Note:* Scores below 14 = normal, 15-18 = mild, 19-25 = moderate, 26-33 = severe, above 34 = extremely severe.

Mary's BAI scores are presented in Figure 9. Analysis of Mary's combined BAI raw scores through the treatment and maintenance phases revealed evidence of a downward trend within the data, $Z = 2.25$, $p < .05$. Figures 10, 11 and 12 show DASS-21 scores through all phases. Analysis of Mary's combined DASS-21 raw scores through the treatment and maintenance phases confirmed the presence of a downward trend within Anxiety scores, $Z = 2.19$, $p < .05$ and Stress scores, $Z = 3.75$, $p < .001$. There was no significant trend in Depression scores, $Z = 0.69$, $p > .05$.

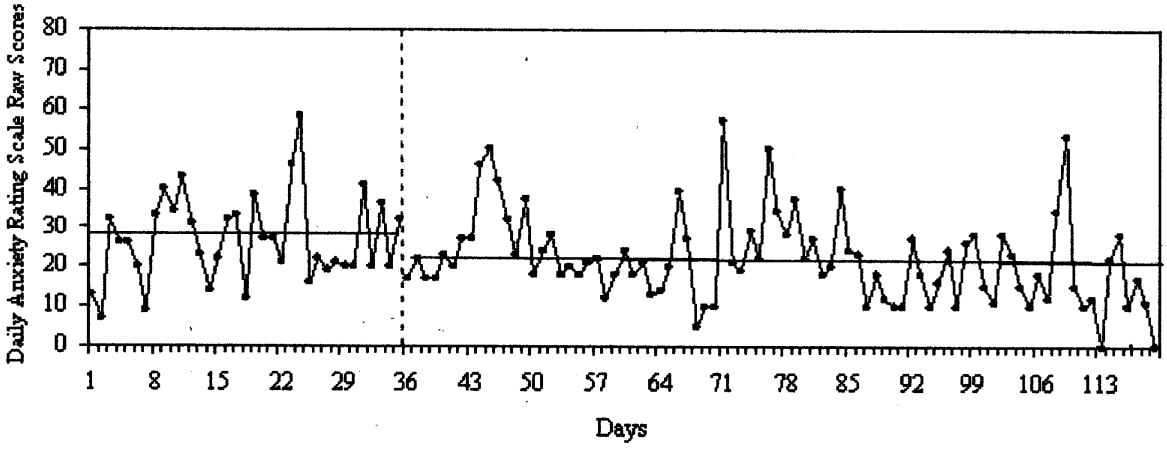

Figure 13: Case 2 Daily Anxiety Rating Scale (DARS) scores across baseline and treatment phases.

Mary's DARS scores across phases are presented in Figure 13. Analysis of the baseline phase revealed no trend within the data, $Z = 0.004$, $p > .05$. Compared to baseline, there was a mean daily decrease during the treatment phase in self-monitored anxiety of 5 points (18.5% decrease).

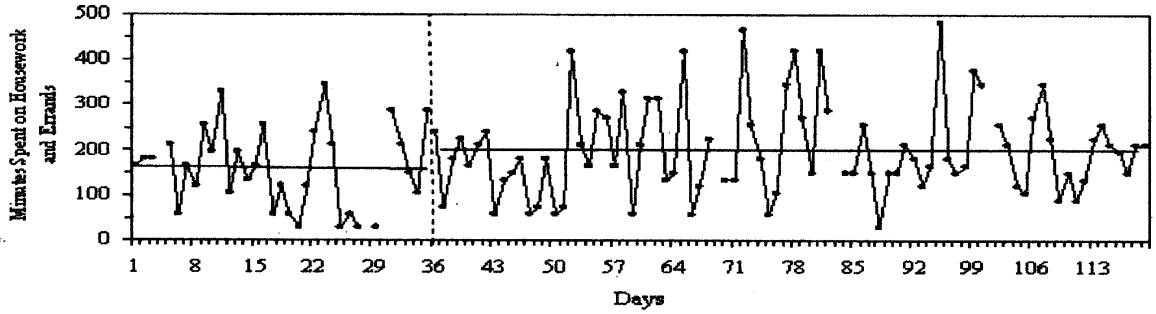

Figure 14: Case 2 Minutes spent per day on Housekeeping and Errands across baseline and treatment phases.

Mary's Housekeeping and Errands data across baseline and treatment phases are presented in Figure 14 (zero rates were omitted). Analysis of the baseline phase revealed an absence of trend within the data, $Z = 1.46$, $p > .05$. Compared to baseline, there was a mean increase during the treatment phase in the amount of time Mary spent on housekeeping and errands of 48 minutes (33% increase) per day.

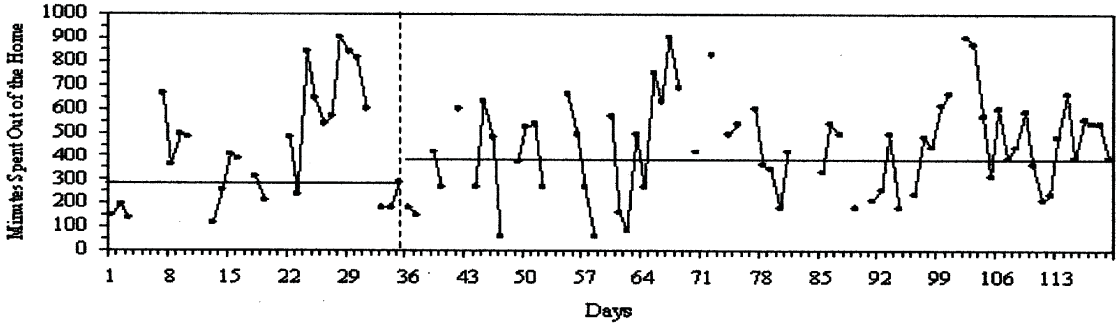

Figure 15: Case 2 Minutes spent per day Out of the Home across baseline and treatment phases.

Mary's Out of the Home data across baseline and treatment phases are presented in Figure 15 (zero count-rates were omitted). Analysis of the baseline phase revealed instability within the data, $Z = 3.38$, $p < .001$. Compared to baseline, there was a mean increase during the treatment phase in the amount of time Mary spent out of the home of 25 minutes (7.8% increase) per day.

All of Mary's treatment sessions were audio-recorded and 33.3% ($n = 4$) of sessions were randomly selected and independently scored for treatment integrity. Inter-observer agreement on coded

therapist verbal behaviors for all 20 sec intervals averaged 95.3 % across scored sessions, with 90.7 % of therapist in-session behaviour compatible and 9.3 % incompatible with the treatment protocol (BATA).

Case 3

"Stacey" was a 53-year-old female who reported having experienced such a large amount of stress and that her life had been "out of my control". She said, "There's too much going on in my head", and "I feel anxious all the time". She reported that her physical signs of anxiety included an accelerated heart-rate, "tingling" in her hands, light headedness, chest tightness, dryness in the mouth, difficulty swallowing, and muscle tension. She said that she often "found it hard to relax" and that she had experienced difficulty concentrating and remaining on-task for long lengths of time. She believed this was especially true when she was feeling anxious. Stacey reported that she had experienced episodes of brief and intense panic previously. She complained of past difficulties with self-management of her time and that she had been unable to be assertive with family, friends, and work colleagues. She reported that her feelings of anxiety would often be occasioned in everyday social situations in her workplace, and that in home, work and social settings she had engaged in worry behaviors that included ruminating and complaining to others about her finances, relationships, health, and work-situation. Stacey reported that her first experience of anxiety had occurred in young adulthood. She said she had "suffered for years" and that her condition had gradually worsened over time. At intake, Stacy met DSM-IV (APA, 2000) criteria for Generalised Anxiety Disorder (GAD) and she scored 13 on the BAI (mild), 0 on the DASS-21 Depression scale (normal), 4 on the DASS-21 Anxiety scale (normal), and 18 on the DASS-21 Stress scale (mild).

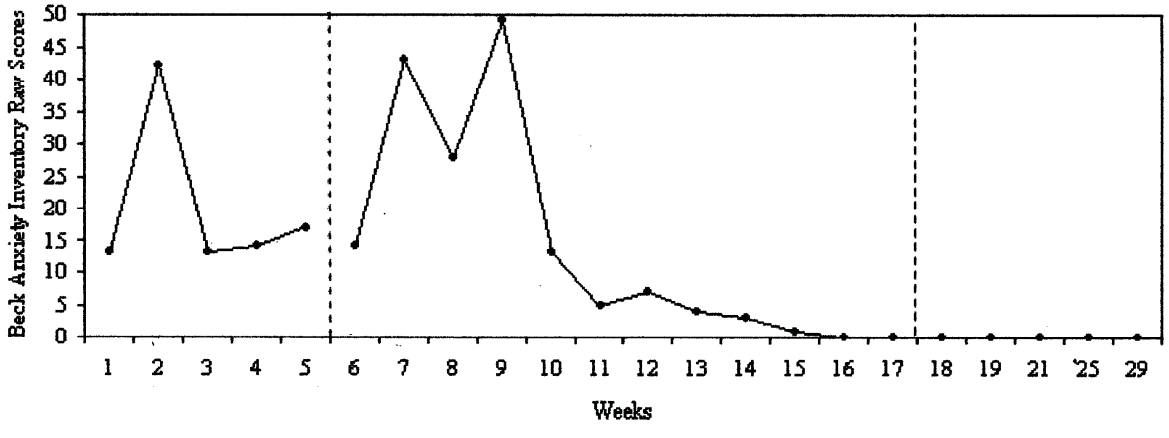

Figure 16: Case 3 BAI raw scores at baseline, treatment, and maintenance phases. *Note:* Scores below 7 = normal, 8-15 = mild, 16-25 = moderate, above 26 = severe.

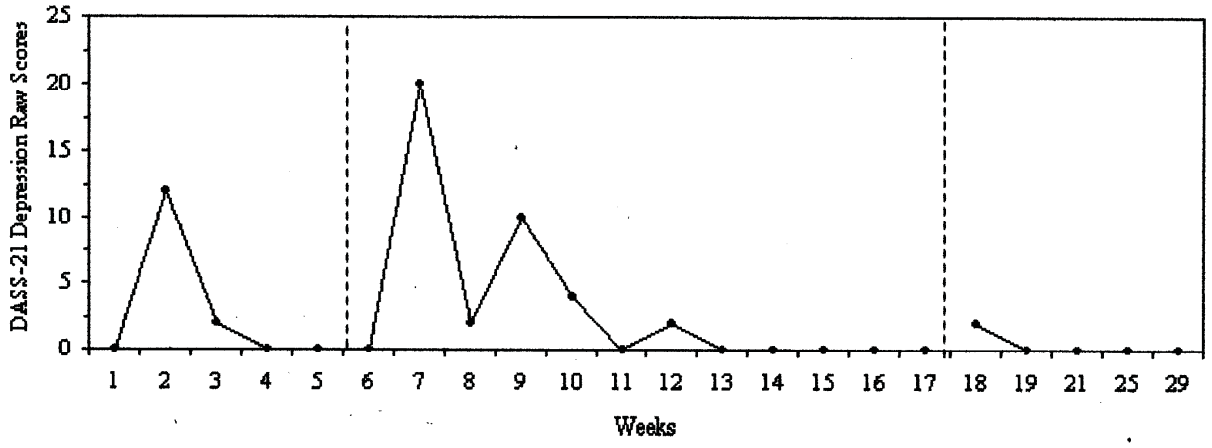

Figure 17: Case 3 DASS-21 Depression raw scores at baseline, treatment, and maintenance phases. *Note:* Scores below 9 = normal, 10-13 = mild, 14-20 = moderate, 21-27 = severe, above 28 = extremely severe.

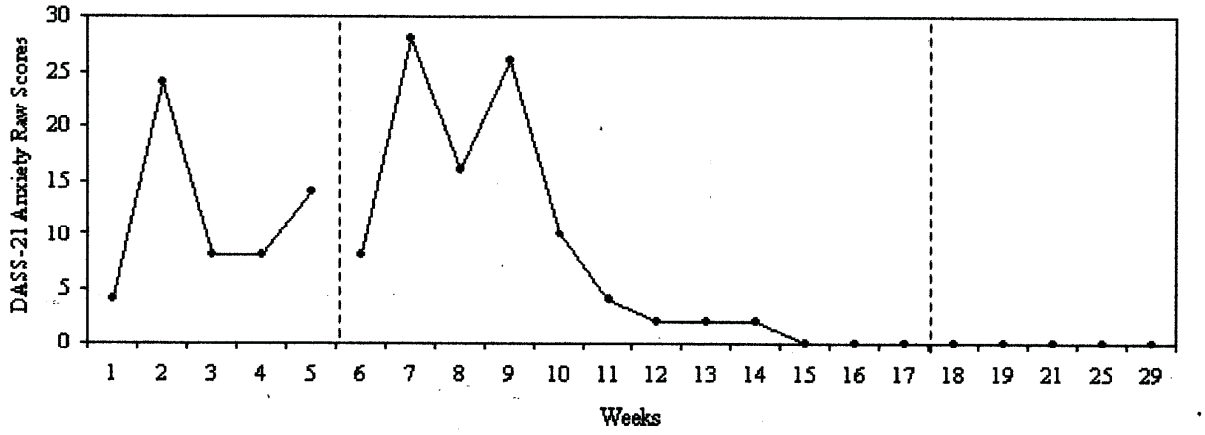

Figure 18: Case 3 DASS-21 Anxiety raw scores at baseline, treatment, and maintenance phases. *Note:* Scores below 7 = normal, 8-9 = mild, 10-14 = moderate, 15-19 = severe, above 20 = extremely severe.

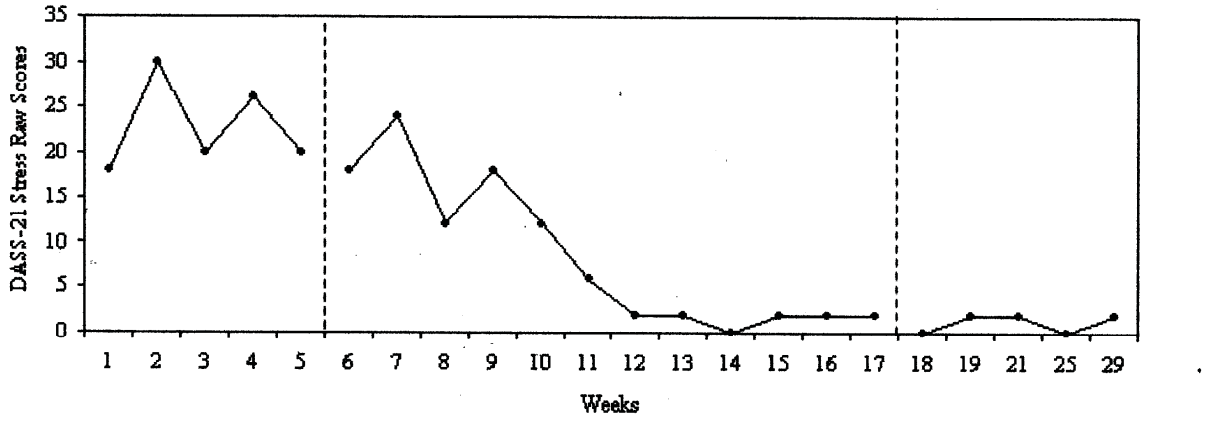

Figure 19: Case 3 DASS-21 Stress raw scores at baseline, treatment, and maintenance phases. *Note:* Scores below 14 = normal, 15-18 = mild, 19-25 = moderate, 26-33 = severe, above 34 = extremely severe.

Stacey's BAI scores are presented in Figure 16. Analysis of Stacey's combined BAI raw scores through the treatment and maintenance phases revealed evidence of a downward trend within the data, $Z = 2.74$, $p < .01$. Figures 17, 18 and 19 show DASS-21 scores through all phases. Analysis of Mary's combined DASS-21 raw scores through the treatment and maintenance phases confirmed the presence of a downward trend within Anxiety scores, $Z = 2.84$, $p < .01$ and Stress scores, $Z = 3.59$, $p < .001$. There was no significant trend in Depression scores, $Z = 0.05$, $p > .05$.

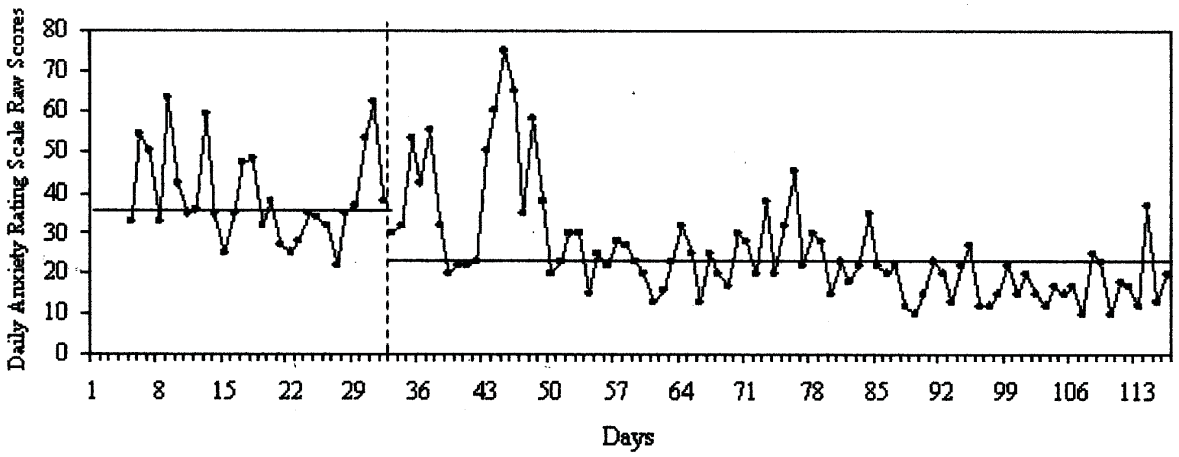

Figure 20: Case 3 Daily Anxiety Rating Scale (DARS) scores across baseline and treatment phases.

Stacy's DARS scores across baseline and treatment phases are presented in Figure 20. Stacy completed a 32 day baseline. The first 4 entries were missing from her diary during the baseline phase. Analysis of the baseline phase revealed an absence of trend within the data, $Z = 1.29$, $p > .05$. Compared to baseline, there was a mean daily decrease during the treatment phase in self-monitored daily anxiety of 14 points (35% decrease).

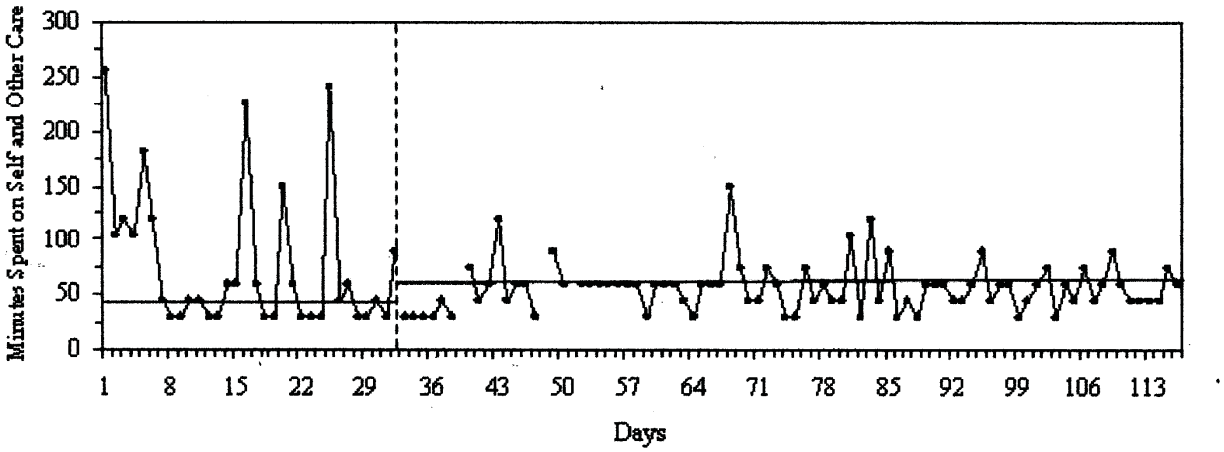

Figure 21: Case 3 Minutes spent per day on Self- and Other-Care across baseline and treatment phases.

Stacey's Self- and Other-Care data across baseline and treatment phases are presented in Figure 21. Analysis of the baseline phase revealed an absence of trend within the data, $Z = 1.38$, $p > .05$. Compared to baseline, there was a mean increase during the treatment phase in the amount of time Stacy spent on self- and other-care of 23 minutes (30% increase) per day.

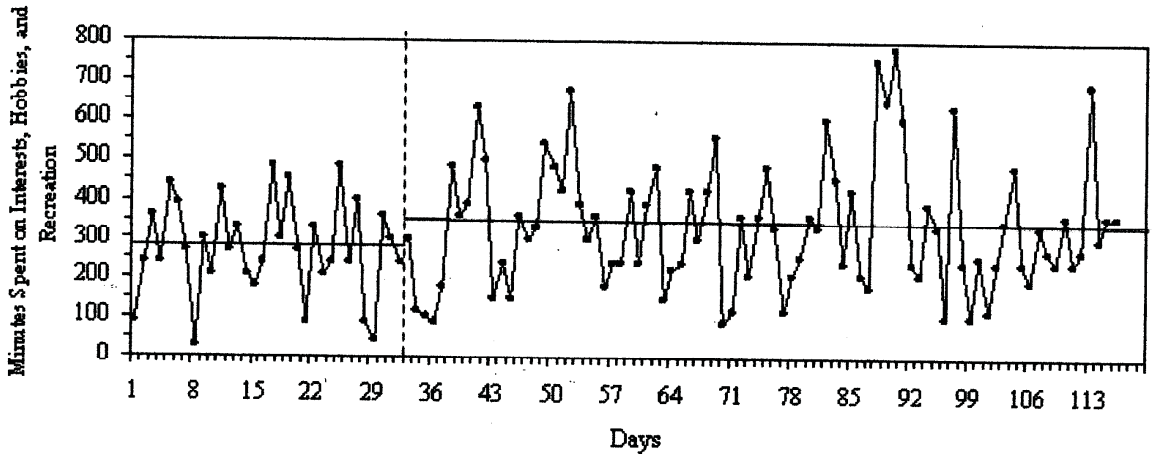

Figure 22: Case 3 Minutes spent per day on Interests, Hobbies, and Recreation across baseline and treatment phases.

Stacey's Interests, Hobbies, and Recreation data across baseline and treatment phases are presented in Figure 22. Analysis of the baseline phase revealed an absence of trend within the data, $Z = 0.55$, $p > .05$. Compared to baseline, there was a mean increase during the treatment phase in the amount of time Stacey spent on interests etc. of 54 minutes (19% increase) per day.

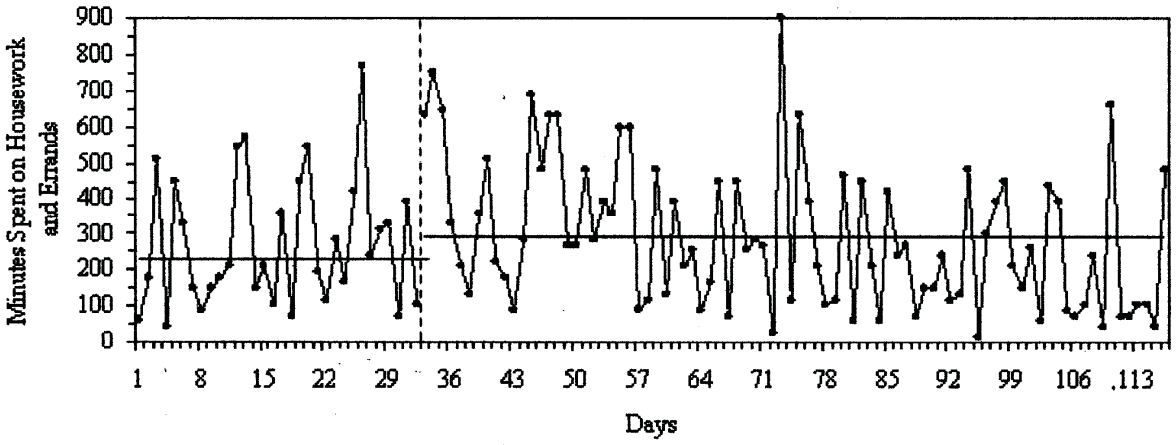

Figure 23: Case 1 Minutes spent per day on Housework and Errands across baseline and treatment phases.

Stacey's Housework and Errands data across phases are presented in Figure 23. Baseline analysis revealed an absence of trend within the data, $Z = 0.03$, $p > .05$. Compared to baseline, there was a mean increase during the treatment phase in the amount of time she spent on housework and errands of 19 minutes (7% increase) per day.

All of Stacey's treatment sessions were audio-recorded and 33.3% ($n = 4$) of sessions were randomly selected and independently scored for treatment integrity. Inter-observer agreement on coded therapist verbal behaviors for all 20 sec intervals averaged 93.9% across scored sessions, with 91.5% of therapist in-session behaviour compatible and 8.5% incompatible with the treatment protocol (BATA).

Discussion

This study describes three single-case experimental evaluations of behavioral activation treatment of anxiety (BATA). Each case was a replication of an initial clinical trial of BATA with a 64-year-old anxiety-sufferer, reported in Turner and Leach (2009). Dependent variables were self-reported and self-monitored anxiety, and self-monitored real-time activity levels. A measure of treatment integrity was included. Clinically significant decreases in self-reported anxiety on standardised measures (BAI, DASS-21) were shown in each case and were maintained up to a 3 month post-intervention follow-up. Decreases in self-monitored anxiety (DARS) corresponded with decreases in self-reported anxiety. In each case, the introduction of BATA corresponded with decreases in reported anxiety. There were also associated increases relative to baseline in the activity levels in some key life areas for each participant. Treatment integrity data showed that in each case the therapist's verbal behaviors were rated as highly matching the prescribed techniques outlined in the treatment protocol.

These data provide preliminary, promising support for the use of BATA with adults who primarily report symptoms of anxiety and confirm previous reports (Turner & Leach, 2009). They also provide evidence that real-time increases in activity-levels (activation) that are functionally related to anxious behaviours might be associated with decreases in anxiety. Few previous attempts to treat anxiety with BA have been reported and there has been a tendency to confound traditional BA models with the use of adjunctive technologies when treating anxiety, such as gradual exposure and relaxation training (e.g., Hopko et al., 2004; Hopko et al., 2006; Lundervold, Talley, & Buermann, 2006). In the BATA model, anxiety is conceptualised as a contingency-shaped disorder of avoidance behavior with associated affective and cognitive characteristics. Thus, the analysis of anxiety can include potentially modifiable

conditions in the anxiety-sufferer's environment and directly observable and measurable aspects of his or her behavior that form the basis of his or her treatment. The outcomes of this study suggest that the participants' increased approach behaviors replaced avoidance behaviors and were maintained by naturally occurring contingencies of reinforcement in their home, work, and community contexts. It is likely that the natural arrangement of contingent positive reinforcement for approach behaviors led to concurrent decreases in negative reinforcement for avoidance behaviors and a gradual extinction of anxiety responses. It may be concluded that the data provide provisional support that BATA is an effective and efficient model of treatment for anxiety, without adjunctive technologies or theories.

There were limitations to this study. Assessment and treatment delivery were delivered by one practitioner, potentially limiting the generalisation of the results. Changes in anxiety were determined by analysis of self-reported data and there was no independent objective measure of treatment outcomes. The activity measure used in this study was designed to measure the time spent engaged in broad classes of activity during waking hours. These self-monitored data were again not supported by independent, objective reports. The three participants in the study were willing to be involved in the research program and had identified themselves as chronic 'sufferers' of anxiety. As such, they were self-selected and there was no opportunity for random allocation to the treatment condition. Finally, although a relative strength is that the treatment integrity system developed and used in this study met almost all of the standards recommended for psychotherapy outcome research (Perepletchikova & Kazdin, 2005), it could be improved if future research used assessors who were not directly involved in the project.

There were notable strengths to this study. Multiple assessment methods were used to evaluate anxiety and activity. The self-monitored real-time ratio measure of daily activity levels (BSMD) used is unique in BA research and provided evidence of activation and its relationship to self-reported anxiety. The independent variable (BATA) was clearly defined and reliable treatment integrity data showed that treatment corresponded highly with the treatment protocol. Such measures are essential in experimental evaluations of clinical therapies if reviews of their effectiveness are to have meaning and validity. A single-case within-subject experimental design was used for each participant including follow-up measurement to 3 months. Efforts were made to establish a high quality baseline with adequate data for analysis and in each case the experimental conditions were replicated. Participants met the criteria for clinical anxiety and they received treatment under typical conditions in a normal clinical outpatient setting.

The outcomes of the study have important implications for the practitioner seeking to provide cost-effective treatment for adult anxiety in typical out-patient settings. In Australia, the public have had access to a federal Medicare-funded health rebate scheme since late that provides rebates of up to 90% of the scheduled fee for 12 individual sessions of private out-patient allied mental health services (including psychotherapy) per calendar year (www.health.gov.au/internet/main/publishing.nsf/Content/health-pcd-programs-amhpm). Thus, practitioners and their clients will benefit from straight-forward technologies that can produce clinically-relevant change across relatively brief time-frames. As Yates (1994) noted, the effectiveness of treatment should not only be assessed clinical outcomes but also by the use of temporal, personal, financial, and spatial resources. The findings of this study suggest that BATA produced clinically relevant outcomes over a short period of time for these clients who met DSM-IV criteria for anxiety-related disorders.

Finally, there have been calls for more accounts of the application of behavior analysis in the treatment of 'everyday' clinical problems beyond its more popular use in specialised populations such as individuals with developmental disabilities (Friman, 2010). Anxiety and depression occur frequently enough to be considered the 'common-colds' of clinical psychology. This report of BATA therapy supports its use in everyday, typical clinical settings with chronic adult anxiety sufferers.

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Author's Contact Information

Jarrod S Turner
School of Psychology
Murdoch University
South Street Murdoch
Western Australia 6150, Australia
E-mail: jarrod.s.turner@gmail.com