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Subtypes of Attentional Bias within Social Anxiety Disorder: Evaluating Changes following Cognitive Behavioral Therapy

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Abstract: Prominent theories of social anxiety disorder (SAD) describe the role of attentional bias in the disorder's etiology and maintenance; some models implicate bias toward social threats (e.g., Rapee & Heimberg, 1997) and others implicate bias to avoid them (e.g., Clark & Wells, 1995). The present investigation examined: 1) whether a clinical sample of individuals with SAD comprises two distinct groups based on attention bias for social threat (vigilant, avoidant), and 2) group-specific changes in attention bias following cognitive behavioral therapy (CBT) for SAD. Consistent with predictions, results yielded evidence of two pre-treatment groups (vigilant and avoidant). After eight weeks of treatment, the direction of change in attention bias differed between groups, such that the vigilant group became less vigilant, and the avoidant group became less avoidant, with the avoidant group showing a significant change in attention bias from pre- to post-treatment. These findings provide preliminary support for the hypothesis that SAD comprises subgroups with both threat vigilant and threat avoidant attentional styles and change in different directions following treatment. Implications for how individuals who exhibit one attentional bias or the other may differentially respond to treatment are discussed.

March 17, 2011

To whom it may concern:

We have attached an original research article entitled "Subtypes of Attentional Bias within Social Anxiety Disorder: Evaluating Changes following Cognitive Behavioral Therapy" for your consideration for publication in *Journal of Anxiety Disorders*.

In this manuscript, we report findings that suggest a novel way to refine conceptualizations of Social Anxiety Disorder (SAD) and to better target treatment for affected individuals. Specifically, our findings provide preliminary support for the idea that individuals with SAD constitute two distinct subgroups with differing attentional styles and whose respective threat bias patterns change in different ways following Cognitive Behavioral Therapy for SAD. We are confident that this study will be particularly meaningful to the readership of *Journal of Anxiety Disorders*. We trust that you will agree and will give this submission due consideration.

Yours truly,

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***Research Highlights**

Running Head: ATTENTIONAL BIAS SUBTYPES WITHIN SAD

Subtypes of Attentional Bias within Social Anxiety Disorder: Evaluating Changes following Cognitive Behavioral Therapy

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Introduction

A recent meta-analysis of the literature on attention bias and anxiety found that anxious individuals, including those with social anxiety disorder (SAD), exhibit reliable and robust vigilance for threat when data are aggregated across studies (Bar-Haim, Lamy, Pergamin, Bakermans-Kranenburg, & van Ijzendoorn, 2007). Notably, however, close examination of individual empirical studies of socially anxious samples raises questions about whether threat vigilance is uniformly evident in this population (for reviews, see Bögels & Mansell, 2004; Heinrichs & Hofmann, 2001). Although most studies find that, on average, individuals with SAD or symptoms show a vigilant bias (e.g., Asmundson & Stein, 1994; Maidenberg, Chen, Craske, & Bohn, 1996; Mogg & Bradley, 2002), other studies of this population also find evidence of avoidant (e.g., Mansell, Clark, Ehlers, & Chen, 1999) or vigilant-avoidant (e.g., Garner, Mogg, & Bradley, 2006; Vassilopoulos, 2005) patterns of attention to threat.

Methodological differences across studies, including variations in task type (e.g., Stroop versus dot probe), stimulus type (e.g., faces, words, household objects), and stimulus presentation duration offer one potential explanation for these mixed findings regarding direction of attention bias in the context of social anxiety (Mogg, Philippot, & Bradley, 2004; Schultz & Heimberg, 2008). An additional, and as yet underexplored explanation is that inconsistencies across studies reflect individual differences in attentional bias among socially anxious adults, with some individuals showing vigilance toward and others showing avoidance of socially threatening stimuli.

If evidence emerged that such individual differences exist in this population, it could help unify distinct conceptualizations of attention bias across theoretical models of

SAD (Clark & Wells, 1995; Mathews, 1988; Rapee & Heimberg, 1997). Rapee and Heimberg (1997) propose that socially anxious individuals show enhanced selective attention to negative evaluation or rejection cues. Their model predicts that socially anxious individuals will rapidly detect environmental signs of impending social disapproval or criticism (e.g., frowns), and will have difficulty disengaging attention from them, which, in turn, leads to negative and unbalanced appraisals of social situations. Clark and Wells (1995), in contrast, posit that directing attention *away* from external threat cues and focusing instead on internal cues such as body-state information (e.g., heart rate, blushing) plays an important role in the emergence and maintenance of social anxiety.

In the present study we gathered preliminary pilot data to examine whether a clinical sample of individuals diagnosed with SAD could be divided into distinct groups based on their patterns of attention to social threat (e.g., vigilant versus avoidant) using a dot probe task. Specifically, we hypothesized that our sample would comprise two subgroups: threat avoidant and threat vigilant. For each group, we predicted that mean attention bias scores would differ significantly from 0, with scores for the vigilant group exceeding 0 and those for the avoidant group falling below 0. This study also tested the hypothesis that each group's mean attention bias would change following treatment for SAD. Although we predicted that the *magnitude* of change would not differ between groups (i.e., both groups would change equally), we anticipated that the *direction* of change would differ. In particular, we expected the vigilant group to become less vigilant and the avoidant group to become less avoidant after treatment. Finally, we predicted

that at post-treatment, neither group would show a significant attention bias in either direction, nor would bias scores differ between groups.

One published study has used the dot probe paradigm to examine attention bias after treatment for SAD (Pishyar, Harris, & Menzies, 2008). Results showed that mean pre-treatment attention bias scores differed significantly from zero in the positive direction (indicating vigilance) and that at post-treatment the group mean was significantly different from zero in the negative direction (indicating avoidance). Recent research from our group also shows that an avoidant attentional bias prior to treatment is associated with an attenuated response to cognitive behavioral therapy for social phobia, relative to those with a vigilant attentional bias at pre-treatment (Price, Tone, & Anderson, in press). The present study attempts to builds upon Pishyar and colleagues' (2008) research, as well as our own recent findings, by examining potential attention bias subtypes and how they change following treatment for SAD.

Method

Data for the present study were collected through two larger treatment trials. The first, a randomized trial, compared Exposure Group Therapy (EGT) and Virtual Reality Exposure Therapy (VRE) for SAD. The attention bias task was added to this study toward the end of participant recruitment. The second trial examined amygdala activity as a predictor of treatment response to VRE using functional magnetic resonance imaging (fMRI). The attention bias task was included in this study from its inception. For the purposes of the present study, the procedures are the same across the two trials, with the exception that participants in the fMRI trial were not randomly assigned to treatment; they all received VRE.

Figures 1 and 2 were prepared in accordance with guidelines outlined in the CONSORT (Consolidated Standards of Reporting Trials; Altman et al., 2001) and TREND (Transparent Reporting of Evaluations with Nonrandomized Designs; Des Jarlais, Lyles, Crepaz, 2004) statements. The figures show the flow of participants through Trial 1 after the dot probe paradigm was introduced and through Trial 2 from its inception. The present manuscript reports data from all participants who completed the dot probe task at pre-treatment and post-treatment (n = 14 from Trial 1 and n = 10 from Trial 2). The majority of participants (n=15) completed VRE, and the remaining participants (n=9) completed EGT.

Participants

Participants were 24 English-speaking individuals who met DSM-IV (APA, 2000) criteria for a primary diagnosis of SAD and identified public speaking as their most feared social situation. Eligible participants on psychoactive medication were required to be stabilized on their current medication(s) and dosage(s) for at least 3 months and to remain on the stabilized regimen throughout research participation. Exclusion criteria included (a) history of mania, schizophrenia, or other psychoses; (b) recent prominent suicidal ideation; (c) current alcohol or drug abuse or dependence; (d) inability to wear a virtual reality helmet; (e) history of seizures; and (f) inability to undergo fMRI (e.g., metallic implants; Trial 2 only). A third of participants (*n* = 9) met criteria for the generalized subtype of SAD. Most participants (*n* = 21; 87.5%) had no comorbid diagnoses. The secondary diagnoses were Specific Phobia (*n* = 2) and Panic Disorder (*n* = 1). Females composed roughly a third of the sample (29.2%, *n* = 7). Participants' ages ranged from 20 to 67 years, with a mean age of 41.38 (*SD* = 11.26). Most participants

self-identified as –Caucasian‖ (*n* = 11; 45.8%) or –African American‖ (*n* = 6; 25%). Two participants self-identified as –Hispanic‖ (8.3%), 2 as –Asian American‖ (8.3%), and 3 as –Other‖ (12.5%). Seventy-one percent reported that they had completed college, 58.3% were married or living with someone as though married, and 58.3% had an annual income of $50,000 or greater.

Measures

Dot Probe Task. A modified version of the computerized dot probe task was used to assess attentional bias toward threatening faces (Mogg & Bradley, 1999), using facial stimuli developed and validated by Bradley et al. (1997). During each of 160 trials, participants viewed a fixation marker (a –+‖) in the center of the screen (500 ms), followed by a face pair (500 ms). After the offset of the faces, the probe (an asterisk) appeared in the spatial location of one of the faces for 1100 ms. Participants were instructed to press the –1‖ (left) or –2‖ (right) keys as quickly as possible to identify the probe location on the screen. The probe appeared equally on the left and right sides of the screen. The inter-trial interval varied randomly between 500 and 1250 ms.

Face pairs consisted of 128 stimulus photographs (digitally sized to 45 x 70 mm) of 64 different models, each of whom posed two facial expressions: one neutral and the other either threatening or happy. Thus, there were 32 threatening faces and 32 happy faces, each paired with a neutral face of the same person. During the 128 critical trials, each of the 64 face pairs was presented twice, once with the emotional face on the left, and once with the emotional face on the right, yielding 64 threat-neutral face pairs and 64 happy-neutral pairs. In addition to the 128 critical trials, there were 32 trials of neutral-

neutral face pairs. In total, the dot probe task comprised 160 experimental trials presented in a new random order to each participant.

Participants were seated approximately 120 cm in front of a computer screen and instructed to "hover" the first two fingers of their dominant hand over the "1" and "2" buttons of the keyboard. Participants were instructed to press the "1" or "2" button on the keyboard to identify as quickly as possible the location (left or right) of the asterisk that followed each face pair. After a brief practice round consisting of five trials (all neutral-neutral face pair stimuli that did not appear in the actual task), participants completed the dot probe task. Previous research conducted with variations of this task indicates that it validly discriminates between adults diagnosed with SAD and normal controls (Mogg et al., 2004), and between controls and adults diagnosed with GAD (Bradley, Mogg, White, Groom, & de Bono, 1999).

Structured Clinical Interview for the DSM-IV (SCID; First, Gibbon, Spitzer, & Williams, 2002). The SCID is a structured diagnostic clinical interview used to assess psychological disorders based upon DSM-IV criteria. Several studies (Basco et al., 2000, Fenning, Craig, Lavelle, Kovasznay, & Bromet, 1994; Kranzler, Kadden, Babor, & Tennen, 1996) have demonstrated that the diagnostic validity of the SCID exceeds that of standard clinical interviews. For the current project, the SCID was used to determine eligibility as well as presence of a variety of Axis I conditions within the mood, alcohol/substance use, and anxiety disorders modules. In the present study, 25% (n = 6) of SCIDs were viewed on videotape by an independent rater to assess inter-rater reliability. There was 100% agreement on primary diagnosis and one disagreement on illness severity.

Procedure

Setting and Personnel. All procedures for this study were conducted at the Psychology Clinic at Georgia State University and were approved by the University's Institutional Review Board. Four doctoral candidates in clinical psychology conducted all assessment procedures, including telephone screening and in-person assessments. Doctoral students were trained in diagnostic interviewing via training tapes and practice interviews, which were reviewed by a licensed clinical psychologist. Doctoral student assessors received weekly supervision, which included videotape reviews. The therapists for Trial 1 included two licensed psychologists with 3-8 years of experience as research therapists delivering manualized therapy (including VRE), as well as three doctoral students in clinical psychology. Each therapist administered both the group and the individual therapy. For the group therapy, a senior and junior therapist co-facilitated each group. All therapists reviewed written manuals and attended two-day workshops (didactics, demonstration by the workshop leader, role plays, and discussion) delivered by the developers of each of the therapies. All assessment and treatment sessions were videotaped. For Trial 2, two junior therapists from Trial 1 administered the treatment.

Eligibility was determined through a two-part process, involving a brief telephone screening and an in-person, pre-treatment assessment. During the phone screen, potential participants were asked questions to rule out obvious exclusion criteria (e.g., began psychoactive medication within the past 3 months). Following the phone screen, interested and eligible individuals were scheduled for face-to-face pre-treatment assessments. In Trial 1, the pre-treatment assessment included a structured diagnostic clinical interview (SCID), administered by a doctoral student, a videotaped speech, and

the dot probe task. Eligible participants were then randomly assigned to VRE or EGT (See Figure 1). In Trial 2, participants underwent the same pre-treatment assessment, with the addition of a ―mock‖ fMRI scan to ensure that participants could tolerate the scanning process. Following pre-treatment assessment, eligible participants then underwent an fMRI scan at a nearby hospital. Participants in Trial 2 were not randomly assigned to treatment groups; all received VRE Therapy (See Figure 2).

Treatment

Treatments were designed to be as similar as possible, with the exception of the modality for exposure delivery. Both treatments were administered approximately weekly, for eight sessions. Both introduced the rationale for exposure therapy in the first session and reviewed treatment and relapse prevention strategies in the last session. Of particular interest for the current study is the extent to which treatments explicitly addressed attentional processes. Both treatments aimed to reduce self-focused attention and to develop realistic appraisals of external social threat. With regard to self-focused attention, participants in both treatment arms reviewed videotapes of themselves giving speeches while focusing on the self or the audience. With regard to addressing external social threats, both treatments targeted cognitive appraisals about the audience as threatening or negative.

Finally, the VRE and EGT treatments both specifically targeted public speaking fears. VRE therapists relied on the virtual environment to facilitate exposure to public speaking fears, while EGT therapists relied on other group members to help facilitate exposure. During virtual reality exposure, participants were fitted with a head mounted display containing screens for each eye, stereo headphones and a head tracking device,

through which they experienced one of three virtual environments [a virtual conference room (~5 audience members), a virtual classroom (~35 audience members), and a virtual auditorium (appearance of 100+ audience members)]. VRE therapists could manipulate audience reactions [e.g., making them appear interested/bored, supportive/hostile, distracted], as well the difficulty of questions posed by audience members, according to each client's treatment goals. During EGT, each participant engaged in public speaking exposure using group members as the audience. Group members provided each other with positive feedback.

Data Analysis

Threat bias. Data from trials with response errors were excluded from analysis. Error rates were low; no participant had an error rate that exceeded 1.0% of trials. Reaction times less than 200 ms and greater than two standard deviations above the participant's mean reaction time were defined as outliers. Four percent of trials were considered outliers and discarded. Threat bias scores were calculated by subtracting average reaction time to probes replacing threatening faces from average reaction time when probes replace neutral faces. Positive bias scores indicate faster responses to probes following threatening stimuli (vigilance), whereas negative scores indicate slower responding to probes following threatening stimuli (avoidance). This method of calculating threat bias scores produces results identical to those obtained using the difference formula described by MacLeod and Mathews (1988):

$$\text{Threat Bias Score} = 0.5*[(\text{TrPl} - \text{TlPl}) + (\text{TlPr} - \text{TrPr})]$$

where T = threat face, P = probe, l = left position, and r = right position. Separate mean threat bias scores for each subject were computed at Time 1 (pre-treatment) and Time 2 (post-treatment).

Assumptions. Inspection of data for errors, normality, skewness, excessive missing cases, and outliers using the approach described in Tabachnik & Fidell (2007) yielded no evidence of outliers. Threat bias scores at pre-treatment were positively skewed; therefore analyses were conducted using both untransformed and logarithmically transformed scores. The two sets of analyses yielded comparable results; thus, to facilitate interpretation, only the analyses of untransformed scores are reported.

Power Analysis. An a priori power analysis (calculated with G*Power; Faul & Erdfelder, 1992) found that a sample size of n = 12 and error probability of $\alpha = .05$, power = 0.80 would provide adequate power to detect an effect the size of that found in Pishyar et al. (2008; $d = 1.86$).

Results

First, to provide grounds for comparisons with prior studies, we examined mean threat bias scores at pre-treatment using a single-sample t-test. Overall mean threat bias scores at pre-treatment were positive and significantly different from zero, $t(23) = 2.30$, $p < .05$, indicating that on average, the sample showed vigilance toward threatening faces prior to treatment. We next divided the sample into two groups: participants who showed attentional avoidance (defined as threat bias scores less than zero) and those who showed vigilance (defined as threat bias scores greater than zero) at pre-treatment. Most participants (n = 15; 62.5%) demonstrated threat vigilance prior to treatment; however,

37.5% (n = 9) showed avoidance of threatening faces. Descriptive statistics for threat bias at Time 1 and Time 2 for the divided sample are shown in Table 1.

To test the hypothesis that pre-treatment threat bias scores for each group (vigilant, avoidant) differed from zero, we conducted two single-sample t-tests. Results showed that, prior to treatment, threat bias scores differed significantly from zero for both the vigilant group, $t(14) = 4.03$, $p < .01$, and the avoidant group, $t(8) = -3.19$, $p < .05$.

Next, we examined changes in threat bias scores following treatment for both the vigilant and avoidant groups. A 2 x 2 mixed design analysis of variance (ANOVA) of bias scores was carried out with Time (pretreatment vs. post-treatment) as the within-subjects variable and Group (vigilant vs. avoidant at pretreatment) as the between-subjects variable. There was a significant main effect for Group [$F(1, 57) = 14.50$, $p < .01$, partial eta-squared = .22], which was qualified by a significant Time x Group interaction [$F(1, 57) = 13.46$, $p < .01$, partial eta-squared = .20]. A follow-up paired samples t-test showed that the avoidant group became significantly less avoidant after treatment, $t(8) = -2.83$, $p < .05$, with post-treatment scores indicative of slight vigilance on average. As can be seen in Figure 3, the vigilant group showed a different, although non-significant, pattern of change, becoming less vigilant following treatment, $t(14) = 1.60$, $p = .07$.

Finally, to test the hypotheses that post-treatment threat bias scores for both groups would approximate 0 and would no longer differ from each other, we conducted two single-sample t-tests and one independent samples t-test. Contrary to expectations, post-treatment threat bias scores for the vigilant group continued to differ from zero in the positive (vigilant) direction, $t(14) = 2.27$, $p < .05$. As hypothesized, however, mean

post-treatment bias scores for the avoidant group were no longer significantly different from zero, $t(8) = .85$, p = ns. Additionally, the two post-treatment mean scores did not significantly differ from each other, $t(22) = .67$, p = ns.

Discussion

The primary purpose of the present investigation was to conduct a preliminary investigation of 1) whether a clinical sample of individuals with social anxiety disorder could be meaningfully divided into two groups according to type of attentional bias towards social threat (vigilant or avoidant), and 2) whether and how attention bias for each group would change after treatment. At the start of treatment, although the mean attention bias for the entire sample was vigilant and significantly different from zero, 62.5% of the sample displayed attentional vigilance for threat, and 37.5% displayed avoidance. After eight weeks of treatment, the direction of change in attention bias differed between groups, such that the vigilant group became less vigilant, and the avoidant group became less avoidant, with the avoidant group showing a significant difference in attention bias from pre- to post-treatment. Indeed, avoidant participants exhibited a slightly, but not significantly, vigilant pattern of response at post-treatment. Broadly, these findings, while suggestive in nature, provide very preliminary support for the idea that individuals with SAD could constitute two distinct subgroups with differing attentional styles—one with a tendency for vigilance toward social threat, and a second with a tendency to avoid threat cues—and whose respective threat bias patterns change in different ways following CBT for SAD.

Our findings of post-treatment vigilance in participants who were avoidant at pre-treatment raise an interesting question about what constitutes ―improvement‖ in attention

bias. Of particular interest is the question of whether the increased vigilance evident in the avoidant group after treatment reflects progress. On the one hand, some previous investigations of attention bias in clinical and non-clinical samples have found that healthy controls and participants scoring low on measures of social anxiety are likely to show a neutral pattern of response (Mogg, Bradley, and Philippot, 2004; Pineles and Mineka, 2005). The non-significant levels of post-treatment vigilance could thus be consistent with an adaptive shift toward more neutral responding. Alternatively, in light of other findings that healthy and low-anxious individuals tend to show a small bias *away* from threatening faces (Bradley, Mogg, et al., 1997; Mansell et al., 1999; Chen et al., 2002; Pishyar et al., 2004; Sposari & Rapee, 2007), the avoidant group's increased vigilance after treatment could be viewed as problematic. Additional research using multi-modal assessment of treatment response (e.g., assessment of physiological, self-report, and observer-report changes, as well as remission status) will facilitate a better understanding of whether and how attention bias is associated with symptom relief. Indeed, data from this sample suggests that an avoidant bias at pre-treatment attenuates response to treatment, as measured by standardized self-report measures (Price, Tone, & Anderson, in press). However, additional work with improved methodology and larger samples is clearly needed, as detailed below.

The current study has several limitations, foremost of which is the lack of a control group. The use of convenience samples, one of which disallowed random assignment to treatment, is a significant confound. As such, results must be viewed as suggestive rather than conclusive. Future investigations should recruit both healthy and patient control groups to determine whether changes in attention bias are merely an effect

of the passage of time and/or statistical regression to the mean. It should also be emphasized that our study does not address the question of whether attentional biases play a causal role in social anxiety or are merely symptomatic correlates of the condition. A longitudinal study of remission status over time as it relates to treatment-associated changes in attention bias is needed to examine this issue. Also, given evidence that social threat manipulations influence patterns of attention to threat (Amir, McNally, Riemann, & Burns, 1996; Sposari & Rapee, 2007), as well as evidence that use of a priming condition increases task reliability in some samples (Schmukle, 2005), extending the present study to include a priming manipulation might yield more robust results, particularly for the initially vigilant group. Finally, debate about the measurement of attention bias has a long history. Although the dot probe task used in the current study is widely considered to be a robust measure of attention bias, scholars have raised issues related to the reliability (Schmulke, 2005) and the ecological validity (Tone et al., under review) of this task.

Despite these limitations, this study is the first to address the heterogeneity within SAD by classifying affected individuals according to the direction of their attentional bias. The results of the current study may provide an alternative or complementary explanation for the discrepant findings among previous attention bias investigations (with some studies reporting levels of avoidance (e.g., Mansell, Clark, Ehlers, & Chen, 1999) and others reporting vigilance (e.g., Mogg & Bradley, 2002)) that have typically been attributed to methodological differences. The notion that there are different types of attentional bias also converges nicely with leading models of social anxiety, which variously emphasize the roles of bias to external social threat (Rapee & Heimberg, 1997)

or bias to focus on oneself (Clark & Wells, 1995). It should be noted that the task in the current study does not provide a direct comparison of these two types of attentional bias; rather, it is presumed to be a measure of bias towards external social threat. It is thus unclear whether ―avoidant‖ participants in this study showed heightened vigilance to internal body-state information or some other stimuli. Future research testing avoidance and vigilance to both external social threat and internal anxiety-related cues would be an interesting future step.

Should subsequent research support our preliminary findings that both vigilant and avoidant attentional biases characterize individuals with SAD, there are potentially interesting implications for extant treatments for SAD, which typically address vigilance for threat. For example, one aim of Heimberg's (1990) Cognitive Behavioral Group Therapy (CBGT) for SAD is to help clients form accurate (i.e., less threatening) perceptions of the audience and of the self as perceived by the audience. Teaching clients to attend to non-threatening aspects of the social environment may help them re-appraise social situations in a more balanced and accurate manner, thus reducing anxiety. Computerized attention training programs designed to facilitate attentional disengagement from threatening faces have also shown efficacy for reducing symptoms of social anxiety (Schmidt et al., 2009, Amir et al., 2009). Such treatment approaches may be of particular value for individuals who demonstrate strong pre-treatment biases to attend to threat.

Other SAD treatment approaches, however, address the possibility that attending to perceived threat, rather than diverting attention away from it, can lead to healthier reappraisals of social situations by blocking clients' attempts to escape and seek safety,

thus challenging their perceptions of danger (Bogels & Mansell, 2004). Treatments that encourage sustained attention to and reappraisal of threat cues have been associated with reductions in self-focused attention and symptom relief (Woody, Chambless, & Glass, 1997). Such treatment approaches that emphasize constructive attention toward threat might be especially useful for individuals who are prone, pre-treatment, to attentional avoidance.

In conclusion, the preliminary findings of the present study suggest that there may be subtypes of attention bias for external threat within SAD. These patterns of attention appear to change in different ways following CBT for SAD, though more research with controlled and longitudinal designs and with larger samples is clearly needed. Identification of subtypes of attention bias may help explain some of the mixed findings in the extant literature on SAD and attention bias. Future research should examine the utility of attention bias subtypes for facilitating better understanding and treatment of SAD.

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Figure Captions

Figure 1. Participant flow chart for Study 1.

Figure 2. Participant flow chart for Study 2.

Figure 3. Changes in attention bias by subgroup following treatment.

Table

Table 1

Descriptive Statistics of Threat Bias Scores of the Divided Sample at Pre- and Post-treatment

	Time 1	Time 2
Vigilant (n = 15)	18.99 (18.24)	8.38 (14.29)
Avoidant (n = 9)	-7.09 (6.66)	4.28 (15.07)

Figure 1

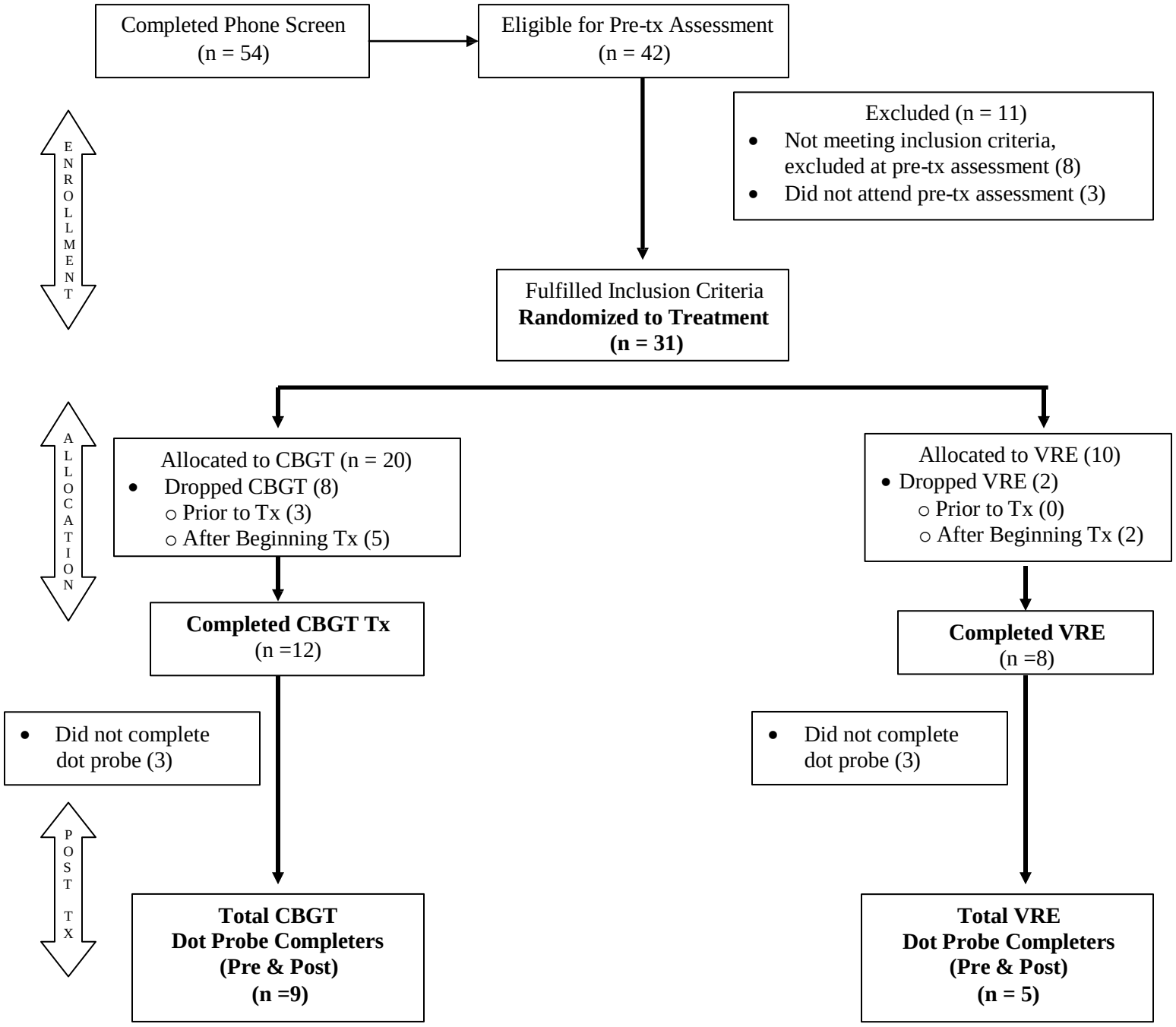

Figure 1. Participant flow chart for Study 1.

Figure 2

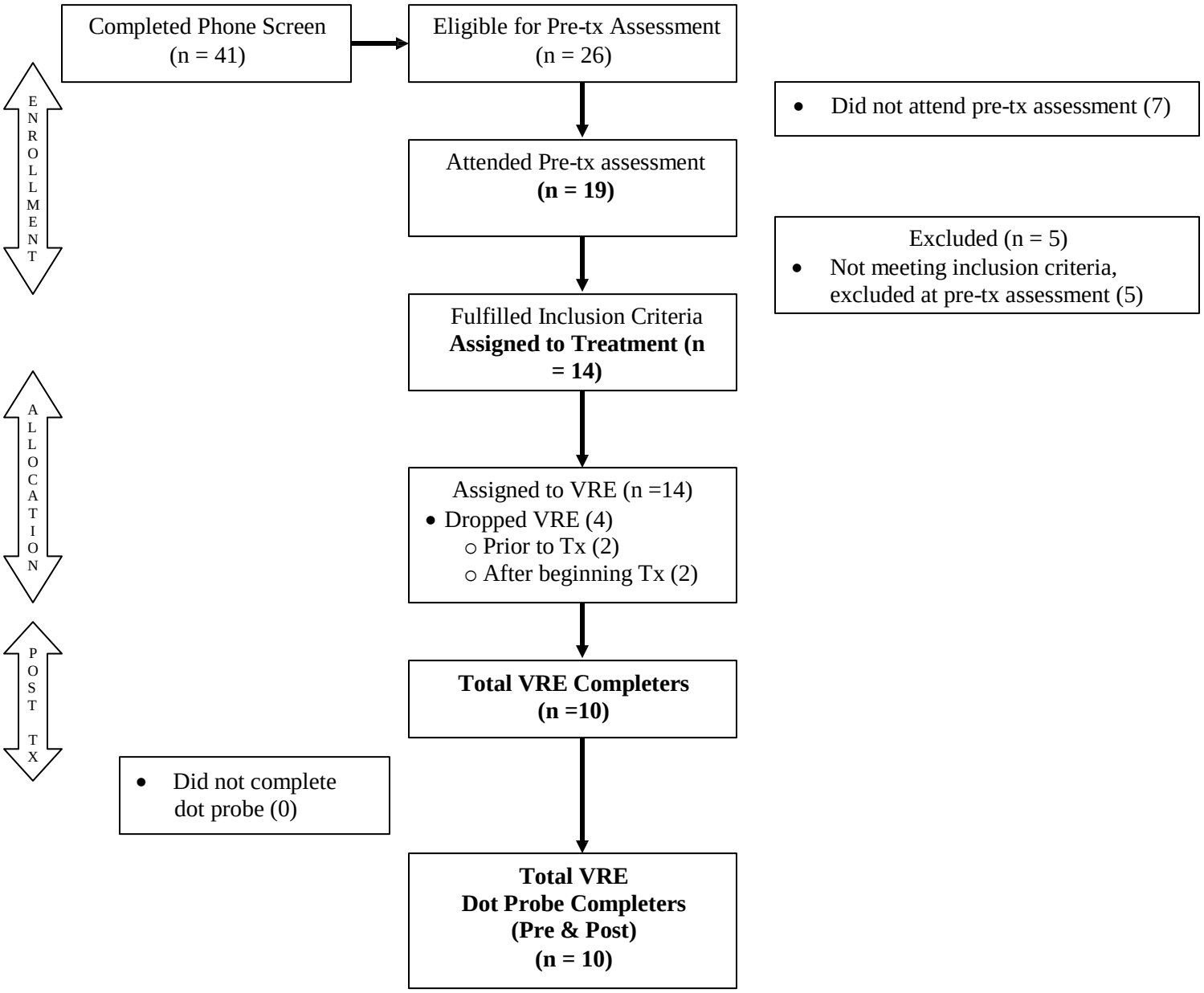

Figure 2. Participant flow chart for Study 2.

Figure 3

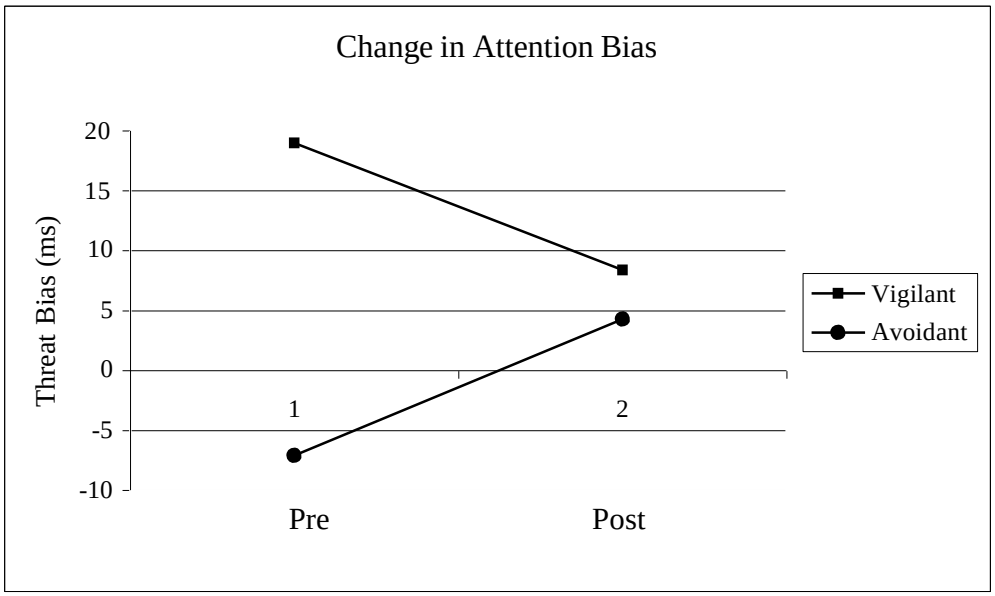

Figure 3. Change in attention bias by subgroup following treatment.