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Forming Bonds to Challenge Fears: Course of the Working Alliance during Cognitive Behavioral Treatment for Social Anxiety Disorder

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FORMING BONDS TO CHALLENGE FEARS: COURSE OF THE WORKING ALLIANCE DURING COGNITIVE BEHAVIORAL TREATMENT FOR SOCIAL ANXIETY DISORDER

by

IRENE NGAI

Under the Direction of Page Anderson and Erin Tully

ABSTRACT

Social anxiety disorder (SAD) is the 3rd most common psychiatric diagnosis, and is associated with significant social, occupational, health, and educational impairment. Fortunately, both pharmacological and psychological treatments can reduce symptoms. Cognitive behavioral therapy is considered the gold standard treatment for SAD, and a robust literature supports its effectiveness. In contrast, process related factors, including the role of the working alliance, have received less attention in treatment of SAD.

The current study examined development of the working alliance for a SAD sample. The working alliance is characterized as the collaborative relationship between a client and therapist, and includes shared goals, strategies, and an attachment bond. Within the context of SAD, the working alliance is particularly interesting, as the alliance itself is a social relationship that may elicit anxiety, which, in turn, may impact

development of the alliance. The present study also investigated whether treatment type, that is, exposure group therapy (EGT) versus virtual reality exposure (VRE) therapy, or pre-treatment symptom severity influenced the working alliance trajectory.

Data were provided by an adult sample presenting with a primary diagnosis of SAD. Participants were randomly assigned to one of two treatment conditions, both involved use of a manualized CBT treatment approach. Standardized measures of social anxiety were administered pre-treatment whereas working alliance ratings were obtained after each session.

Results indicated high levels of working alliance and significant change in ratings over time. Treatment condition did not contribute to significant differences in the working alliance trajectory. Regarding the impact of SAD symptoms, initially high ratings of fear was associated with progressively increasing rates of growth in the working alliance whereas high initial ratings of avoidance signified steeper increase in the working alliance earlier in treatment followed by a declining rate of change over time.

The current study contributes to the limited literature regarding the working alliance trajectory for clients with SAD, and is the first to consider the impact of VRE treatment on this trajectory. Findings also provide preliminary evidence for the differential impact of initial fear and avoidance as well as a potential curvature for the working alliance trajectory when using CBT.

INDEX WORDS: Social anxiety disorder, Working alliance, Virtual reality exposure therapy, Cognitive behavioral group therapy

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For my little ones and their never ending supply of greatest moments.

I am so very grateful to share them with you.

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INTRODUCTION

Social Phobia (also referred to as Social Anxiety Disorder - SAD) has an estimated lifetime prevalence rate of 3 to 13%, and is the most common anxiety disorder (DSM-IV-TR, 2000; National Comorbidity Survey Replication, 2005). According to criteria outlined in the Diagnostic and Statistical Manual for Mental Disorders – 4th Edition, Text Revision (DSM-IV-TR, 2000), social phobia is characterized by a marked and persistent fear of one or more performance situations during which a person may be exposed to unfamiliar persons and/or subject to scrutiny by others; immediate anxiety when confronted with social situations; recognition that this fear is excessive or unreasonable; and, either avoidance or intense distress in social situations. To meet diagnostic criteria, these symptoms must be sufficiently severe to negatively impact major areas of functioning (e.g., daily routine, occupational, social) and/or contribute to substantial distress for the person. Significant emotional distress may be reflected in physiological symptoms such as intense fear states, racing heart, blushing, excessive sweating, dry throat and/or mouth, trembling, difficulty swallowing, and muscle twitches, particularly around the face and neck (DSM-IV-TR, 2000). SAD is also associated with greater risk for developing depression, suicidal ideation and alcoholism, less social support, more frequent use of medical facilities, and greater impairment in occupational, school, and social functioning compared to those without this diagnosis (Fedoroff and Taylor, 2001; Taylor, 1996). Co-morbidity (e.g., other anxiety disorders, depression, avoidant personality disorder) as well as generalized social anxiety disorder has been associated with more severe impairment in domains of work/studies and social life, as well as less symptom improvement with treatment (Aderka, Hofmann,

Nickerson, Hermesh, Gilboa-Schechtman & Marom, 2012; Hofmann, 2004). Individuals with social anxiety also report less satisfaction with their quality of life compared to non-anxious adults in the community, particularly in the case of co-morbid depression (Barrera & Norton 2009). Without treatment, social phobia is chronic and has a low remission rate (Fedoroff & Taylor, 2001; Heimberg, Salzman, Holt & Blendell, 1993; Hofmann, 2004; Taylor, 1996), which warrants efforts to better understand and treat the disorder.

Treatment for Social Phobia

Ample research has been devoted to the development of treatments for social phobia. Cognitive-behavioral therapy (CBT) administered in both individual and group formats has been shown to be especially efficacious in the treatment of social phobia (Fedoroff & Taylor, 2001; Heimberg 2002). Behavioral aspects of CBT generally include exposure therapy, which targets avoidant behaviors through engagement with anxiety-provoking stimuli. Exposure is theorized to induce change by generating new learning pathways that compete with original fear responses, so that clients may access alternate behavioral choices for use in future feared social situations (Rodebaugh, Holaway, & Heimberg, 2004). Cognitive aspects of CBT typically involve client and therapist collaboration in identification and confrontation of perceptions and beliefs that are often automatic, elicit distress, and produce behavioral avoidance, which, in turn, reinforces fear.

A robust literature indicates that CBT is an effective treatment for SAD. However, there is some debate as to whether cognitive strategies provide additional benefit above and beyond exposure therapy, and whether individual or group treatment yields better treatment outcomes. One meta-analysis compared the relative effect of

cognitive and exposure therapy (Gould, Buckminster, Pollack, Otto, & Yap, 1997). Results showed a mean effect size for CBT of 0.74 standard deviation units, using the delta (Δ) procedure developed by Smith and Glass. Moreover, CBT was found to impact other aspects of psychological functioning including depression (Δ = 0.67) and cognitive change (Δ = 0.76). Notably, treatment gains following CBT were sustained during a 3 to 6-month follow-up period (Gould et al., 1997; Rapee, Gaston, & Abbott, 2009). Within CBT, the authors found that exposure had the largest effect size whether used alone (Δ = 0.89) or in combination with cognitive restructuring (Δ = 0.80), whereas cognitive restructuring alone yielded a moderate effect (Δ = 0.60). Similarly, in their meta-analysis of 12 studies involving CBT and 9 exposure-based treatments for social phobia, Feske and Chambless (1995) determined that CBT and exposure treatment only were equally effective in impacting pre-post and pre-follow-up self-report measures of social phobia, cognitive symptoms, and depressed-anxious mood, although a higher number of exposure sessions was related to more improvement in the post-treatment phase. Regarding treatment format, group treatment (Δ = 0.88) tended to be more effective than individual therapy (Δ = 0.44), but this was at the level of a trend (Gould et al., 1997). In summary, exposure seems to be a primary treatment element necessary for positive treatment outcome, whereas the impact of treatment format has been inconclusive.

Pharmacotherapies also have received much research attention, and have been found to be an effective treatment for social phobia (Fedoroff & Taylor, 2001). Pharmacotherapy alone has a mean effect size of 0.62 and 0.49 when combined with psychotherapy (Gould et al., 1997). Selective serotonin re-uptake inhibitors (Cohen's *d* = 1.89) and benzodiazepines (*d* = 0.72) have yielded the largest effects (Fedoroff &

Taylor, 2001; Gould et al., 1997). Despite these large effects, participants receiving medication alone show a higher incidence of relapse compared to clients that receive some form of psychotherapy (Rodebaugh, Holaway, & Heimberg, 2004). Similarly, Fedoroff and Taylor (2001) noted that, although the pharmacotherapies were more potent when effects are measured immediately following treatment, only the psychological therapies have shown sustained treatment effects over time. Taken together, these findings suggest that psychotherapy contributes to better long-term treatment gains compared to medication, and may stem treatment relapse associated with medication.

Among the cognitive-behavioral approaches for addressing SAD to date, cognitive-behavioral group therapy (CBGT) as developed by Heimberg (1990) has the most empirical support, and is recognized as an empirically supported treatment by Division 12 of the American Psychological Association (Turk, Heimberg, & Hope, 2001). Heimberg's CBGT comprises several major components including: (a) structured exercises to train clients in the identification, analysis, and disputation of problematic cognitions; (b) within group exposure to simulations of anxiety-provoking situations; (c) instruction in cognitive restructuring strategies to allow clients practice with controlling maladaptive thoughts before, during, and after simulated exposures; (d) homework assignments involving in-vivo exposure to situations first practiced during group-based exposure simulations; and (e) homework assignments for self-administered cognitive restructuring before and after completion of behavioral homework assignments.

A number of studies conducted over a decade provide empirical support for CBGT. First, Heimberg, Dodge, Hope, Kennedy, Zollo, and Becker (1990) compared CBGT to an educational-supportive group psychotherapy (ES). Although both showed

significant general improvement, only CBGT clients were rated as more improved by an independent assessor and reported less anxiety before and during an individualized behavioral test immediately post-treatment and at 6-month follow-up. In a longer term follow-up involving a sub-sample of participants from the original study, Heimberg, Salzman, Hope, and Blendell (1993) indicated that CBGT clients continued to demonstrate superior treatment gains compared to ES clients on self-report symptom measures of social anxiety and depression, as well as independent clinician ratings (Heimberg et al., 1993).

Research has generated some support for another exposure-based group treatment model developed by Hofmann, that is, exposure group therapy (EGT). Hofmann (2004) tested whether cognitive change mediated symptom reduction for two different treatments: CBGT and EGT. Specifically, this research tested the notion of "social cost" posed by Clark and Wells (1995): that individuals with social phobia fear that they may behave in an inept and unacceptable fashion, and that this behavior will contribute to disastrous consequences in terms of loss of status, loss of worth, and rejection. Results showed that changes in estimated social cost mediated change across both treatments. Moreover, both treatments were significantly better than the wait-list control condition in reducing social anxiety but did not significantly differ from each other. Taken together, these findings suggest that CBGT and EGT have the potential for comparable treatment effects.

Despite effective treatments for social phobia, the vast majority of sufferers do not seek treatment (Olfson, Guardino, Struening, Schneier, Hellman, & Klein, 2000). Research has identified uncertainty about where to obtain treatment and fear of what others might think, as major barriers (Olfson et al., 2000). One development to address

these barriers is the use of virtual reality technology for exposure. As virtual reality exposure (VRE) is typically administered in an individual format, it averts challenges such as avoidance and scheduling incompatibility, related to forming therapy groups for social phobia. During VRE, the participant wears a head-mounted display that includes a helmet, eye gear, and earpiece. Participants are presented with computer-generated scenarios of feared stimuli. For example, in treating public speaking anxiety, someone with SAD enters a virtual environment comprised of a virtual podium, upon which the text of prepared speech(es) may be downloaded for viewing. The theoretical basis for the use of virtual reality for exposure is emotion processing theory (Foa & Kozak, 1986), which posits that there are two conditions necessary for effective exposure therapy: activating the fear structure and experiencing things inconsistent with the fear structure. For example, through exposure, a client may learn to think, "my anxiety does not spiral out of control if I stay in the situation long enough." In summary, provided the virtual reality environment activates the fear structure, it may function as a medium for exposure therapy.

A handful of studies have examined the effectiveness of VRE for social phobia. Anderson, Zimand, Hodges, and Rothbaum (2005) conducted an open clinical trial to explore the utility of manualized VRE treatment for fear of public speaking. Ten participants completed 8 sessions of treatment, 4 of which focused on anxiety management training including breathing retraining, cognitive restructuring, and behavioral experiments to challenge cognitions. The remaining 4 sessions were used for exposure to a virtual audience according to a fear hierarchy. Results indicated effect sizes between 1.1-1.5 standard deviation units post-treatment, and 0.8-1.5 standard deviation units at 3-month follow-up. The authors defined treatment response as a 30%

reduction in self-reported symptom scores; 80% of the sample improved on at least half the measures at post-treatment and the rate was 75% at follow-up. In another study, Klinger, Bouchard, Legeron, Roy, Lauer, and Chemin et al. (2005) compared the effectiveness of VRE treatment to a standard group based CBT. Thirty-six participants matched by gender, age, duration of symptoms, severity of social phobia, ability to use computers or virtual reality software, and availability for participation in pre-scheduled groups were assigned to one of the two treatment conditions. All participants were seen for 12 weekly sessions, with VRE participants receiving 45-minute sessions with no more than 20 minutes of exposure therapy and group participants receiving 2-hour sessions. The authors reported statistically and clinically significant effect sizes for both treatments with regard to reducing self-reported symptoms and improving social and global functioning. Effect sizes were comparable for both treatments on most measures, although differences between treatments emerged for assertiveness behavior, which were higher for CBGT participants. Taken together, these findings provide preliminary support for the effectiveness of VRE treatment in addressing symptoms of social phobia in general, and fear of public speaking in particular.

The Working Alliance

Whereas virtual reality exposure therapy is a new technology for the treatment of anxiety disorders, the working alliance has long been discussed as an important factor, with some scholars suggesting that it accounts for approximately 30% of treatment progress (Asay & Lambert, 1999). The concept of the working alliance emerged from literature regarding the psychoanalytic treatment process and clinicians' observation of the impact of the therapeutic relationship on treatment outcome. However, the working

alliance has been presumed to be relevant across different theoretical orientations (Horvath & Bedi, 2002).

Bordin (1979) was the first to develop a pantheoretical operational definition for the working alliance. This definition provides the framework for understanding the concept of the working alliance while also leaving room for differences in the way the working alliance is built and maintained across theoretical orientations. He distinguished three primary components that characterize the working alliance between a client and therapist, including: (1) agreed-upon *goals*; (2) strategies or *tasks* that will be used in treatment; and (3) the *bonds* formed within the therapy relationship. Bordin indicated that explicit and implicit goals as well as the extent to which the client and therapist collaborate to determine goals, will be determined by theoretical orientation. For persons presenting with SAD, shared goals may include increasing ability to engage in social situations, and relatedly, satisfaction with social functioning. Tasks are the specific roles and function attributed to the client and therapist. For example, in the present study, the therapist is responsible for providing instruction in various cognitive or behavioral coping strategies whereas the client is tasked to learn these skills through in-session practice and homework. Bordin (1979) describes the bond in terms of the "human relationship" between the client and therapist that comprises trust and sense of attachment. He again asserts that this may vary by theoretical orientation, and is "defined by the difference between a caretaker and a consultant." In the context of CBT for SAD, the bond may be fostered through the instructional process of goal setting and skill building early in treatment, and enhanced by the experience of progressing through exposure and experiencing symptom relief. Finally, Bordin (1979) explained that the working alliance is a dynamic process that involves a constant interaction between the

needs and disposition of the client with the skills and disposition of the therapist. He posited that a successful match between the client's needs and therapist's skills would improve the strength of the alliance. In other words, these processes would be interdependent, such that positive change in one would facilitate development of the other (Horvath & Luborsky, 1993).

The Working Alliance and Treatment Outcome

Empirical evidence supports the hypothesis that the therapeutic alliance has a significant and positive impact on treatment outcomes. Meta-analyses completed by Horvath and Symonds (1991) as well as Martin, Garske, and Davis (2000), provide a comprehensive review of this relationship. Both meta-analyses selected studies that: (a) identified the relationship construct as either the "working," "helping," or "therapeutic alliance, (b) measured the alliance and indices of treatment outcome, (c) were clinical in nature, and (d) were based on data from 5 or more participants. Horvath and Symonds (1991) used the product-moment correlation coefficient (*r*) whereas Martin, Garske, and Davis (2000) used a variation of the product-moment correlation (*r* bar) to generate effect size estimates. Results from these meta-analyses indicated moderate effect sizes ranging from 0.21 to 0.23 (Horvath & Symonds, 1991; Martin, Garske, & Davis, 2000). These effects were observed for a variety of presenting problems (e.g., anxiety, depression, "general psychological functioning") and regardless of therapeutic orientation (e.g., psychodynamic, Gestalt, cognitive). Horvath and Symonds (1991) also noted that client ratings of working alliance were better at predicting treatment outcomes than those of therapists or observers; however, this was a statistical trend. In summary, the working alliance is a non-specific factor relevant across therapeutic approaches, and is related to positive therapeutic outcome.

Trajectory of the Working Alliance

Although there is evidence that the working alliance has a positive effect on treatment, limited empirical research has examined how it develops over the course of therapy. Bordin (1979) noted that different therapies would be expected to exert different demands on the relationship, and therefore, as Horvath and Bedi (2002) described, the "profile" of the ideal working alliance may be different across theoretical orientations. Within the realm of psychodynamic therapy, Bordin (1979) was the first to hypothesize a "tear-and-repair" pattern of change in the working alliance. Gelso and Carter (1994) described this pattern as involving an initially sound working alliance that may be expected to decline during the middle phase of treatment, during which challenging therapeutic work may occur, but should again increase toward the end of treatment. Bordin (1979) indicated that the "tear" in the working alliance is inevitable due to the expected negative impact of client symptoms on the therapeutic relationship, as well as the necessity of repairing the alliance as an essential part of the therapy process. Moreover, in their theoretical review article, Gelso and Carter (1994) posited that early development of a strong working alliance would contribute to improved treatment outcomes, particularly in short-term treatment, and would facilitate effective management of crises throughout treatment. In line with this hypothesis, Horvath and Marx (1990) used a single case design (n = 4) to explore temporal changes in the working alliance during time-limited treatment using either a "Gestalt, experiential emotive" or cognitive-behavioral, rational emotive theoretic orientation. Results showed a "developmental-partial decay-repair" pattern for the working alliance. In other words, initial positive development of the working alliance was followed by a mid-treatment decline, typically when exposure processes occurred, and improvement

toward the end of treatment. However, Horvath and Marx (1990) cautioned that these temporal patterns varied based on therapist or client report, and urged future exploration of how client and therapist interactions shape the alliance over the course of treatment. Golden and Robbins (1990) reported a similar trajectory in their case study involving time-limited, psychodynamic treatment of two White males clients who were seeking treatment for symptoms indicative of panic disorder or significant difficulty in a romantic relationship. The authors discussed how this trajectory of change in the working alliance was consistent with psychodynamic theory regarding expected phases of treatment (beginning, middle, and termination). Specifically, the beginning phase is characterized by rapid development of positive feelings regarding the therapist and treatment. The second phase of treatment is anticipated to include a decrease in enthusiasm as well as ambivalence toward the therapist and treatment outcomes. As ambivalence is "clarified and worked through" during the final phase of treatment, the strength of the working alliance is expected to improve again. Kivlighan and Shaughnessy (2000) noted that the "high-low-high" pattern observed by Golden and Robbins (1990) and the "developmental-partial decay-repair" pattern reported by Horvath and Marx (1990) may both be interpreted as evidence of a U-shaped, rupture/repair phenomenon.

Whereas early work on the trajectory of the working alliance examined mean scores over time, later research involved larger samples and more sophisticated statistical methodology. Kivlighan and Shaughnessy (1995) investigated the changes in working alliance over the course of treatment and its impact on treatment response with a sample of 21 client-therapist dyads using hierarchical linear modeling. Clients were undergraduate students that presented for treatment at the counseling center of a large,

Midwestern university and therapists were 1st to 3rd year practicum students trained in psychodynamic and interpersonal therapy. Therapist ratings of working alliance were used to predict client-rated treatment outcome. Inconsistent with the notion of the "rupture-repair" pattern, results showed a linear pattern of increasing working alliance over time. In a later study, Kivlighan and Shaughnessy (2000) used cluster analysis to examine 3 patterns of change for two samples of (n = 38) and (n = 41) undergraduate students that volunteered for participation in treatment as part of a course requirement. Volunteers were students at a large, mid-Western university that met criteria for "moderate" interpersonal difficulties. Therapists were graduate-level practicum students trained in time-limited, dynamic psychotherapy. Cluster analysis verified 3 different patterns of alliance including: (1) stable alliance – little change in alliance over time, (2) linear growth – positive, linear change, and (3) quadratic growth – high-low-high pattern of change. These preliminary findings suggest that the working alliance changes over the course of treatment, with some research indicative of positive linear change, and other studies suggestive of quadratic change (e.g., rupture/repair). However, existing research has been subject to methodological limitations, such as use of heterogeneous clinical samples, non-clinical samples, small sample sizes, limited theoretical orientations, and lack of long-term follow-up data. Therefore, general conclusions about the shape of the working alliance trajectory are not yet warranted.

Working Alliance within the Context of Treatment for Social Anxiety Disorder

A central component of social anxiety disorder involves an individual's experience of intense distress when engaged in social situations, as well as avoidance of such situations. In seeking to address their symptoms, persons with SAD are inevitably forced to encounter social interaction with one or more therapists, and in the case of

group therapy, other group members. During treatment, it may be possible to observe what Alden and Taylor (2004) describe as a "self-perpetuating interpersonal cycle" wherein persons with social phobia may "establish negative interpersonal cycles between themselves and others in which they adopt behavioral strategies that evoke negative reactions" (p. 860). For persons with SAD, negative reactions from others, may, in turn, confirm negative beliefs about the self and others. Additionally, previous research has suggested that the lack of prosocial behavior (e.g., nonverbal warmth and interest, reciprocal self-disclosure) can have a salient impact on others' reactions to persons with SAD (Alden & Taylor, 2004). Given this potential pattern in relationships, it is reasonable to anticipate that the developmental trajectory of the working alliance may be different for individuals with SAD. Yet little research has examined the relationship between these variables.

Only three studies have explored the working alliance among people with social anxiety disorder. Hayes, Hope, VanDyke, and Heimberg (2007) investigated the relationship between working alliance and habituation during the first in-session exposure of a group administered cognitive-behavioral treatment for SAD among a treatment-seeking sample (N=18). Results indicated that, in general, per item ratings of the working alliance were high for clients (M = 5.89, SD = 1.11) and observers (M = 5.35, SD = 0.93); item scores ranged from 1 to 7, with higher scores indicating stronger alliance. The authors concluded that clients were able to form strong working alliances with the therapist despite general interpersonal difficulty associated with SAD. This is a particularly striking result given that 8 participants had a comorbid diagnosis, including generalized anxiety disorder, dysthymia, substance abuse, and schizophrenia.

Woody and Adessky (2002) examined the trajectory of working alliance, using data from 53 clients who participated in group treatment for a primary diagnosis of social phobia. To develop the rationale for examining the impact of the working alliance in the context of group therapy, the authors cited prior research by Hand, Lamontagne, and Marks (1974) which indicated that increased group cohesiveness boosts client confidence for giving and receiving feedback on social performance and increases active involvement during and between sessions (in terms of homework compliance). Moreover, based on informal observations, group members with a good alliance and cohesion approached feared situations sooner in treatment, provided more support to each other during exposure, and were less likely to seek escape from the exposure situation (Hand, Lamontagne, & Marks, 1974). Woody and Adessky examined the development of the working alliance by administering the full, 36-item WAI after each group session. Treatment was based on Heimberg's (1991) CBGT protocol for social phobia. Results showed positive linear change in general ratings of working alliance over the course of treatment. Consistent with the Hayes et al (2007) results, overall alliance ratings were generally high (M = 5.84 per item). Interestingly, data also indicated that clients presenting with public speaking phobia showed more improvement in their working alliance compared to those with generalized social phobia (Woody & Adessky, 2002).

One recent study examined the process by which the working alliance impacts treatment outcome within social phobia (Hoffart, Borge, Sexton, Clark and Wampold, 2012). Participants (n =80) were seeking psychotherapy for social phobia at a national clinic that offered residential treatment for people without local treatment options or who failed to respond to less intense outpatient services. Participants were randomized

to manualized treatment using a cognitive-behavioral or interpersonal approach. Findings revealed that the working alliance impacted treatment outcomes "indirectly" through cognitive processes, including the focus of attention (self or external situation), estimated probability and estimated cost of negative social events, and the use of safety behaviors. The authors found that cognitive processes mediated the facilitative impact of the alliance on treatment progress for persons with social phobia. In essence, the working alliance has the potential to influence the underlying mechanisms of change (cognitive processes) in treatment of social anxiety. Unfortunately, given the purpose of their study, these authors did not report levels of working alliance, or how it changed over the course of treatment.

In summary, given the characteristics of SAD and demands of treatment, it would be reasonable to expect impairment in the working alliance for persons with SAD. To date, little research has provided evidence to support or refute this notion, but what exists suggests that people with SAD can form a working alliance. In addition, rather than the rupture and repair pattern posited in the mostly psychodynamic literature, there is evidence that the strength of the working alliance between clients presenting with SAD and their therapists, steadily increase over time. Finally, one recent study suggested that the effect of the working alliance on treatment outcomes may be through its impact on cognitive processes. Collectively, these findings indicate that clients with a primary diagnosis of social phobia are capable of forming collaborative therapeutic relationships that grow over time, and seem to contribute to positive treatment outcomes by enhancing the treatment process itself.

Working Alliance within Virtual Reality Exposure Therapy

The advent of virtual reality in treatment of psychological disorders is relatively recent with a literature of presence of approximately 12 years. Meta-analysis of studies involving use of virtual reality exposure therapy (VRE) in treatment of anxiety disorders has indicated that the effects of treatment were better than for wait-list control, there were no differences in attrition rates between VRE therapy and in-vivo exposure conditions, and the stability of treatment gains over time were comparable to those of classic evidenced-based treatments (Opris, Pintea, Garcia-Palacios, Botella, Szamoskozi & David, 2012). Moreover, in another meta-analysis of VRE therapy for anxiety disorders, Powers and Emmelkamp (2008) reported a large mean effect size for VRE therapy compared to control conditions, Cohen's d = 0.35 (SE = 0.15). These meta analyses identified only 4 studies that examined the role of VRE in treatment of social anxiety disorder. Within this small pool of existing literature on VRE in treatment of SAD, research on process oriented variables such as the working alliance has not yet occurred; rather, it must be inferred from research involving VRE treatment and other anxiety disorders.

Only one study has examined the therapeutic alliance within VRET for anxiety disorders. Meyerbroker and Emmelkamp (2008) examined whether the quality of the therapeutic alliance predicted significant reduction in anxiety symptoms for participants presenting for treatment of specific phobia including fear of flying and heights. The authors postulated that the specific requirements of VRE treatment (e.g., using an HMD) may negatively influence formation of the alliance as there is no face-to-face contact during active treatment. Thirty clients with a primary diagnosis of specific phobia completed participation in 4 weekly sessions of VRE treatment. Results

suggested that the quality of the working alliance was positively related to treatment improvement for fear of flying, but not agoraphobia. The authors posited that this finding may have been due differences in exposure-related treatment demands for the two phobias (i.e., magnitude of increase in fear situation). In their 2010 review of process-and-outcome studies, Meyerbroker and Emmelkamp stated, "there is a clear need for further studies into the mediating role of the therapeutic relationship in VRET." Although the present study does not examine working alliance as a mediator, it will be the only study to examine development of the working alliance for VRE treatment of social phobia.

Predictors of the Working Alliance among people with Social Phobia

Despite research suggesting that the working alliance facilitates treatment outcome, very little is known about predictors of working alliance or how it develops within SAD. Given that social anxiety disorder is essentially an interpersonal fear, and that many people with social anxiety disorder have social skills deficits, people with higher levels of social phobia may have more difficulty developing and maintaining a working alliance. Interpersonal factors, such as difficulty with maintaining social relationships and poor family relationships have been shown to be related to a lower likelihood of developing a strong alliance (Horvath & Symonds, 1991). In addition, research suggests that higher severity of pre-treatment symptoms hinders development of the working alliance. For example, Eaton, Abeles and Gutfreund (1988) examined a sample of college-aged clients presenting with a variety of treatment concerns and found that higher patient symptomatology was associated with less positive and more negative therapeutic alliance. Whether greater levels of social phobia symptoms are negatively related to the working alliance has yet to be tested.

The potential influence of pre-treatment interpersonal functioning on the therapeutic relationship has also been considered in treatment of SAD. In a review article, Alden and Taylor (2004) investigated how the interpersonal process of therapy may be impacted by social anxiety and reported general heterogeneity in findings across the literature. They indicated some evidence that clients described as "cold," that is, hostile and emotionally detached did not benefit from treatment as much as their "warm" counterparts, who seemed more motivated and invested in the treatment process and relationship. Muran, Segal, Samstag, and Crawford (1994) investigated the impact of pre-treatment interpersonal functioning, measured using the Inventory of Interpersonal Problems and Millon Clinical Multiaxial Inventory, on the working alliance as measured by the client Working Alliance Inventory (WAI). Results indicated that friendly-submissive interpersonal difficulties were positively related to the working alliance full, task, and goal subscale scores, but that a negative correlation was observed for hostile-dominant interpersonal difficulties. Taken together, these findings suggest that personality traits of persons presenting with social anxiety disorder may promote or impede development of the working alliance.

Therapist perceptions of clients' interpersonal skills and characteristics also seem to impact development of the working alliance. In a study of college men presenting with symptoms of depression, anxiety, and social introversion, Moras and Strupp (1982) demonstrated that clinical judgments of interpersonal relations predicted patients' level of collaborative, positively-toned participation in a therapeutic relationship. Similarly, for a sample of clients with a variety of presenting concerns, Kokotovic and Tracey (1990) found that therapist perceptions of client hostility in treatment, as well as a history of poor past and current relationships, was predictive of poor working alliances.

So, similar to findings regarding interpersonal characteristics as rated by clients, therapists' perceptions of problematic client interpersonal skills and hostility are salient in predicting impairment in development of the working alliance.

2

CURRENT STUDY

In summary, only a handful studies have examined development of the working alliance for persons with a primary diagnosis of social phobia. Given the social difficulties that comprise the nature of this disorder, it is possible that persons with SAD may have difficulty developing a working alliance or that the trajectory of the working alliance in therapy may differ from persons presenting with other disorders or without any diagnoses. A handful of studies show that people with SAD can develop a working alliance and that the working alliance increases in a linear form over time. However, findings regarding the trajectory have varied, and include either linear or quadratic change. Specifically, most research has investigated a rupture/repair pattern of change in the context of psychodynamic treatment for a variety of presenting problems. Moreover, previous research has typically involved use of small sample sizes and few waves of data.

The present study adds to the empirical literature by examining the working alliance among people diagnosed with social phobia and its trajectory over the course of two types of cognitive behavioral therapy, exposure group therapy and individual virtual reality therapy. Thus, it is the first study to examine the working alliance among people receiving VRE for social phobia. Finally, the study explored whether initial ratings of social anxiety symptom severity impact mid-treatment scores as well as session-by-session change in client ratings of the working alliance

Multi-level modeling was used to examine the following hypotheses:

1. Working alliance ratings were expected to exhibit a positive linear or quadratic ("U" shaped) rate of change over the course of treatment. In the case of linear change,

working alliance scores were anticipated to increase at a steady rate over the course of therapy. For quadratic change, working alliance ratings were expected to be moderately high at the beginning of treatment, decrease during the middle phase of treatment, and increase again during later sessions.

2. The trajectory of change in the working alliance during treatment was expected to reflect slightly steeper change for EGT participants compared to VRE participants. The rationale for proposing larger increases for EGT participants was based on the potential interference of VR equipment in development of the working relationship for VRE participants.

3. Pre-treatment symptom severity was hypothesized to impact change in working alliance scores over the course of treatment. Specifically, high levels of social anxiety symptoms at pre-treatment were anticipated to contribute to lower overall ratings of working alliance as well as either smaller linear change or deceleration in working alliance ratings over time.

Method

Participants

Participants for the current study were drawn from a federally funded randomized clinical trial (*N*=63) comparing virtual reality exposure therapy to exposure group therapy to a waiting list control. Participants presented with a primary diagnosis of social anxiety disorder and a primary fear of public speaking. Of these participants, *n* = 32 (50.8%) also met criteria for the generalized subtype. Specific information regarding distribution of diagnoses and comorbidity is described in *Table 1*. Diagnoses were based on criteria set forth in the Diagnostic and Statistical Manual of Mental Disorders – 4th Edition (DSM-IV) and confirmed via use of the Structured Clinical

Interview for the DSM-IV (SCID) by trained research personnel. In addition to meeting criteria for social anxiety disorder, participants were required to speak and be literate in English. Participants taking psychoactive medication were required to be stabilized on their medication(s) and dosage(s) for at least 3 months prior to participation in treatment; the same dosage was to be maintained for the duration of the study. Individuals meeting any of the following criteria were excluded: (a) history of mania, schizophrenia, or other psychoses; (b) active suicidal ideation; (c) current substance dependence; (d) inability to tolerate the virtual reality helmet; and (e) history of seizures.

Table 1
Frequency of comorbidity in sample.

Diagnosis	*Primary Diagnosis*	*Secondary Diagnosis*	*Third Diagnosis*	*Fourth Diagnosis*
Social Phobia: Generalized	32			
Social Phobia: Public Speaking	31			
Specific Phobia		4	3	
Major Depression		3	1	
Generalized Anxiety		3	1	
Dysthymia		2		
Panic Disorder without Agoraphobia		2		
PTSD				1
Hypomania				1

Strategies for recruitment included use of newspaper advertisements, posted flyers, internet-based sources targeted for persons with fear of public speaking, contacts with professionals, and word-of-mouth. The sample was predominately female (61.9%, n = 39). Average age of participants was 40.02 years with a standard deviation of 11.96 years. Based on participant description, ethnic distribution of the sample was as follows: “White” (54%, n = 34), “African American” (28.6%, n = 18), “Latino” (4.8%, n =

3), Asian American" (3.2%, *n* = 2), or "Other" (9.5%, *n* = 6). Within the "Other" category, participants self-identified as African (*n* = 1), Multi-racial (*n* = 1), Chinese (*n* = 1), Eritrean American (*n* = 1), and "Other-Not Specified" (*n* = 2). Regarding educational attainment, 1.6% reported some high school, 3.2% completed high school, 28.5% had attended some college, 33.3% completed college, 17.5% had some graduate training, and 15.9% completed graduate school. A large portion of the sample (44.4%) was middle class, with an annual income of $50,000 or more. The majority of the participants did not have a comorbid diagnosis (*n* = 49, 77.8%).

Measures

As described below, select modules of a widely used, structured clinical interview were used to determine whether diagnostic criteria were satisfied. One measure was used to evaluate the working alliance. Two self-report questionnaires were used to assess various characteristics of social anxiety disorder.

Diagnosis

The *Structured Clinical Interview for the DSM-IV (SCID; First, Gibbon, Spitzer, & Williams, 2002)* is a structured clinical interview intended for use by trained mental health providers. The interview questions evaluate psychiatric symptoms based on criteria set forth in the DSM-IV (2000). Several studies have demonstrated the superior diagnostic validity of the SCID compared to standard clinical interviews (Basco et al., 2000; Fenning, Craig, Lavelle, Kovasznay, & Bromet, 1994; Kranzler, Kadden, Babor, & Tennen, 1996). Administration time ranges from approximately 15 minutes to a few hours, depending on whether a client presents with either little to no psychopathology/psychiatric history or extensive psychiatric comorbidity. For the present study, at pre-assignment, the anxiety, mood, and substance disorder modules

were administered to determine whether participants met inclusion criteria for a primary diagnosis of social anxiety disorder. Interview data was also used to identify any co-morbid Axis I disorders. The anxiety module alone was administered at the 3 month follow-up assessment to determine the status of social anxiety symptoms.

Working Alliance

The *Working Alliance Inventory – Short Form (WAI-SF; Horvath & Greenberg, 1989)* is a 12-item instrument used to evaluate the therapeutic alliance. The original measure was developed to assess working alliance, regardless of therapeutic orientation (Horvath & Luborsky, 1993). It permits assessment of the relationship as a whole (total score) as well as three major aspects of the relationship described by Bordin (1979) including: (1) mutually agreed upon goals, (2) tasks used to pursue goals, (3) and the bond between the client and therapist. The short form of the WAI was developed by selecting the four items that were most "indicative" of each factor (Tracey & Kokotovic, 1989) from the original 36-item scale. Participants are asked to rate items on a 7-point Likert scale to best represent their feelings with answers ranging from 0 (Not at All) to 7 (Very Much). Total scores range from 0 to 84, with higher scores indicating a stronger alliance. Subscale scores range from 0 to 28. Content validity has been indicated through both rational (expert rater agreement) and empirical (multitrait-multimethod analyses) methods (Tracey & Kokotovic, 1989). Internal consistency for the total scores is excellent $\alpha = 0.93$ (Tracey & Kokotovic, 1989). In comparison of the original WAI and WAI-SF, scores were highly correlated, had comparable descriptive statistics, internal consistencies, and subscale intercorrelations within and across rater perspectives (Busseri & Tyler, 2003).

Social Anxiety

The *Fear of Negative Evaluation – Brief Form* (FNE-B; Leary, 1983) is a 12-item instrument used to measure fear of negative evaluation by others. Participants are asked to rate their level of agreement with each statement on a 5-point Likert scale with 1 = "Not at all" and 5 = "Extremely." Total scores range from 12 to 60, with higher scores representing increased anxiety regarding potential negative evaluation. Two recent studies examined the psychometric properties of the FNE-B among clinical samples of socially anxious adults (Collins, Westra, Dozois, & Stewert, 2005; Weeks et al., 2005). Results from both studies indicated that the FNE-B scores shows excellent psychometric properties, including test-retest reliability (r = 0.94), internal consistency (α = 0.89 to 0.97), convergent validity, and discriminant validity. Both studies also reported that the FNE-B is sensitive to change as a result of treatment. Lastly, the scale highly correlates (r = 0.96) with the original form from which it was derived (Leary, 1983).

The *Liebowitz Social Anxiety Scale– Self Report Version* (LSAS-SR; Fresco, Coles, Heimberg, Liebowitz, Hami, Stein et al., 2001) is a 24-item questionnaire used to assess fear and avoidance of social interactions as well as performance situations. Participants are asked to rate their experience in the past week, on a 4-point Likert scale. Fear is rated according to perceived severity (0 = None to 3 = Severe) whereas avoidance is rated according to frequency with 0 = "Never" (0%) and 3 = "Usually" (67 - 100% of time). Summary scores range from 0 to 144 (M = 69.1, SD = 25.5). For the fear subscale, M = 37.2, SD = 12.9, whereas M = 33.2, SD = 14.4 for the avoidance subscale. The measure has demonstrated good psychometric properties within a clinical sample (Baker, Heinrichs, Kim, & Hofmann, 2002; Oakman, Van Ameringen, Mancini,

& Farvolden, 2003). Test–retest reliability estimates over a 12-week period were r = 0.83 for the summary score, r = 0.79 for the fear and r = 0.83 for avoidance subscale. Internal consistency coefficients for the total scores and each of the subscales were 0.79 or higher. The LSAS-SR also has exhibited convergent validity with the clinician-rated version, as well as other measures of social anxiety, including the Social Phobia and Anxiety Inventory (SPAI) and the Self Statements during Public Speaking (SSPS) scale (Baker, Heinrichs, Kim, & Hofmann, 2002). Lastly, the instrument demonstrated sensitivity in measuring treatment change (Baker, Heinrichs, Kim, & Hofmann, 2002).

Procedure

Radio and newspaper advertisements were used to facilitate recruitment. One hundred eighty two potential participants contacted research personnel (via phone or the internet) to express interest in the study. A telephone interview was used to evaluate whether participants would meet any obvious exclusion criteria (e.g., currently in treatment for social phobia). Eligible candidates were subsequently invited to participate in an in-person assessment to establish whether inclusion criteria were satisfied. Specifically, the SCID was used to discern whether social anxiety disorder was the primary diagnosis for potential participants, and to identify any co-morbid diagnoses. The initial assessment was conducted by one of four doctoral candidates with training in the structured clinical interview. Training was accomplished through videotape review, in-vivo practice, and supervision by a licensed clinical psychologist. Weekly supervision of assessments occurred for the duration of recruitment. Inter-rater reliability for the primary diagnosis was calculated for a random selection (10%) of the video-taped interviews by a licensed clinical psychologist, and was 100%. See *Figure 1* for a flow chart of participant enrollment and attrition for the current study.

Assessments

Self-report measures used to assess social anxiety were given to participants prior to their involvement in treatment. Participants randomized to the wait-list condition completed one additional set of measures immediately following the end of the 8-week wait period, and before participation in treatment. For data analysis, pre-treatment assessment scores will be obtained from the initial assessment for all participants including those who completed an assessment after the wait-list period, and before engaging in treatment. Following each therapy session, participants were asked to rate the working alliance. See *Table 2* for the timeline regarding administration of measures.

Table 2
Timeline of Measure Administration

	Screening	*Treatment Sessions*							
Measure	*Pre-Treatment*	1	2	3	4	5	6	7	8
SCID	✓				✓				
FNE-B	✓								
LSAS	✓								
WAI		✓	✓	✓	✓	✓	✓	✓	✓

Note: SCID = Structured Clinical Interview for DSM Disorders. FNE-B = Fear of Negative Events – Brief Form. LSAS = Liebowitz Social Anxiety Scale. WAI = Working Alliance Inventory.

Treatment

Five study therapists administered both types of treatment. The study therapists comprised two licensed clinical psychologists (senior therapists) and three doctoral students in clinical psychology (junior therapists). In preparation for the study, all therapists attended a 2-day training workshop provided by developers of each treatment model. Every therapist conducted both treatment programs.

A manualized treatment protocol was used for VRE (Anderson et al., 2005) and EGT (Hofmann, 2004). Both treatments addressed processes commonly shown to maintain social anxiety, such as self-focused attention, negative perceptions of self and others (in social situations), perceptions of poor negative emotion regulation, ruminative tendencies, and unrealistic or lack of goal setting in social contexts. Targets for treatment are addressed through combined use of cognitive techniques that focus on deconstructing and ameliorating the impact of negative perceptions as well as behavioral strategies for increasing tolerance of physiological distress (that cue anxiety), coping with emotions, and reducing avoidant behavior. Moreover, participants were expected to receive approximately 3 hours of exposure therapy for both treatment conditions. The primary distinguishing characteristic between treatment models was the method of delivering exposure therapy. That is, participants were either assigned to the individual, VRE or group-based, EGT condition. Another difference between the conditions involved the onset of exposure therapy; exposure for VRE began during session 5 whereas in-vivo exposure commenced during session 2 of the EGT condition. Participants were randomly assigned to one of the two treatment conditions before completing treatment, either immediately following screening or after completion of the wait-list period.

For the VRE condition, primary session elements included: (1) providing a treatment rationale, outlining an anxiety hierarchy, and introduction of the breathing retraining skill; (2) cognitive restructuring with associated thought record; (3) address self-perceptions associated with video tape of pre-treatment assessment speech; (4) address self-focused attention, perceptions of emotional control, and safety behaviors during videotape feedback as well as using interoceptive exposure; and (5-8) virtual

reality exposure. For the individually administered VRE, virtual reality scenarios used to elicit anxiety comprised: (1) a conference room with approximately 5 audience members, (2) a classroom setting with approximately 35 audience members, and (3) a large auditorium with approximately 100 audience members. To facilitate the real-world sense of the audience, high-resolution digital video of actual people was embedded within the virtual environment. Participants viewed these scenes through a head mounted display (HMD) that consisted of a helmet with accompanying goggles and headphones (to block external stimuli). The therapist communicated with the participant via a microphone during VRE. During exposure sessions, the therapist was also able to control audience variables expected to increase fear, such as apparent level of interest, boredom, and applause. To promote mastery of CBT skills, strategies were practiced during the session, a hand out was provided, and additional practice was recommended as between session homework. The final session included review of treatment progress as well as discussion of preventing relapse. Of note is the VRE manual also explicitly stated the need for establishing a therapeutic alliance and conveying both warmth and empathy at the onset of treatment, and throughout the first 4 sessions.

For EGT, treatment teams, including one senior and one junior therapist, co-facilitated each group session. The initial session consisted of providing the rationale for treatment, description of learning objectives (i.e., social standards and goals, self-focused attention, social cost, emotional control, social skills, self-perception, avoidance cycle, post-event rumination), identification of treatment goals as well as introduction of the fear and avoidance hierarchy and daily record of fearful situations. The second session involved review of the treatment model as well as initial practice with in-session

exposures. Sessions 3 through 7 comprised in-group exposure to elicit anxiety of at least 6 or more on a 1 to 10-points scale as well as individual and therapist-assisted in vivo exposure. In-vivo exposure was primarily accomplished by having each participant provide a brief vocal presentation in front of the group followed by audience feedback. Heightened anxiety for later exposure sessions was accomplished through manipulation of the topic, the situation, or the participant's condition (e.g., participants instructed to purposefully engage in social mishaps during their speeches). The final session was devoted to summarizing and highlighting treatment gains as well as discussing relapse prevention.

To evaluate adherence to treatment protocols, developers of each treatment method provided ratings for a randomly selected (14%) subset of video recordings. Good compliance ratings of 92% and 93% were indicated for completion of essential components of VRE and EGT methods, with a single infraction noted per treatment type.

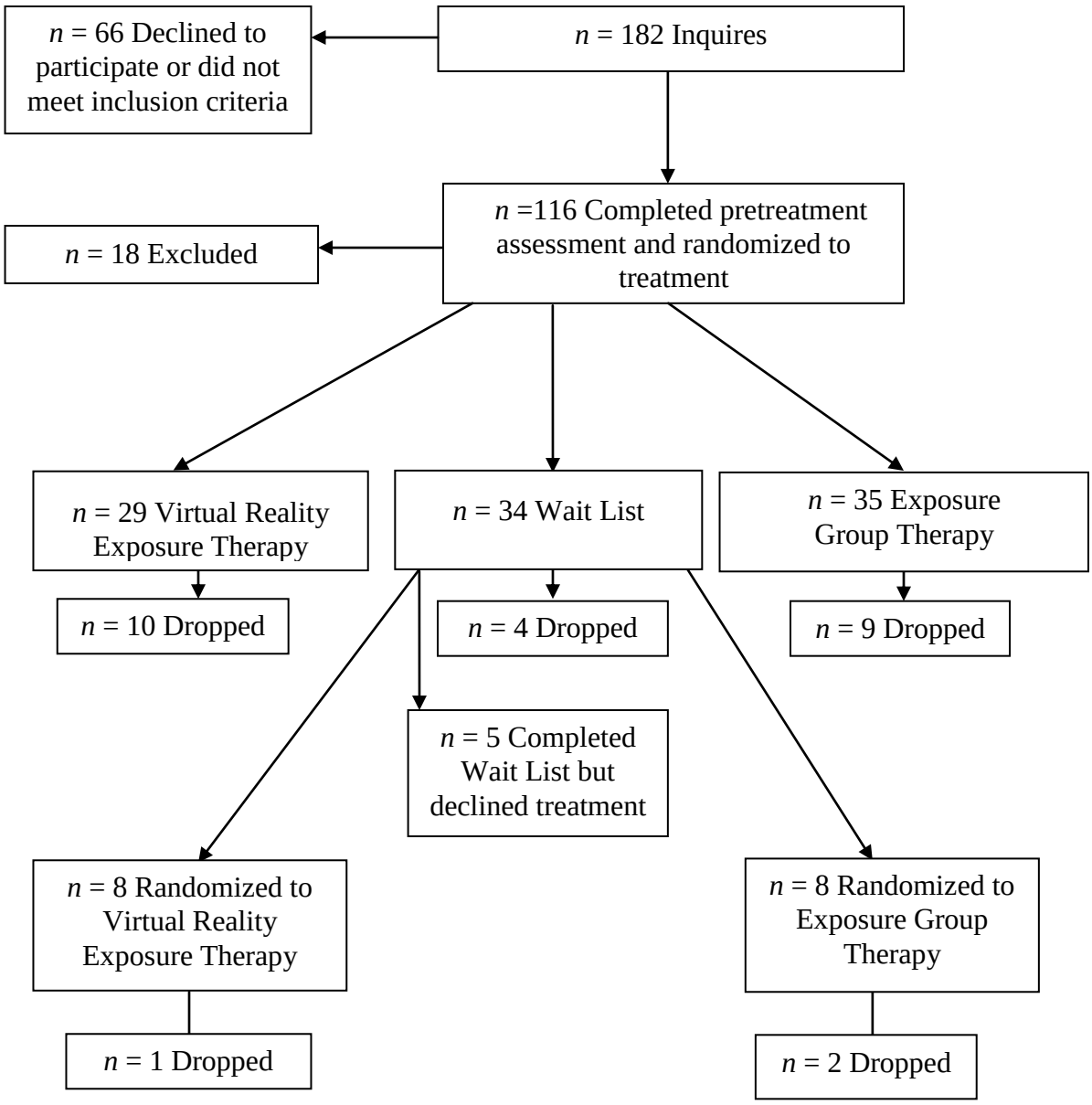

Figure 1. Flowchart of participants

3

DATA ANALYSIS

Prior to testing hypotheses, data were examined using descriptive statistics to generate measures of central tendency and variability, and to identify any statistical outliers. Using SPSS, statistical outliers were identified through review of raw data distributions of all variables. Cases with raw data points that appeared extreme, that is, approximately 2 or more standard deviations away from the center of the distribution, were removed to determine whether the shape of the distribution would normalize. Removal of these values did not result in normal distributions; normality was tested using the Kolmogorov-Smirnov test in SPSS. Thus, these relatively extreme values were retained for analyses. *Tables 3* and *4* contain descriptive information regarding predictor and outcome variables. Of note, scores on the WAI were quite high, ranging from 73 to 80 (of a maximum possible score of 84) across the 8 sessions. In addition to testing the normality assumption for raw data distributions, residual values obtained from HLM analyses of the impact of time on WAI outcome variables were plotted to determine whether these values were normally distributed. As most residual values were distributed close to the line of best fit, this assumption was seemingly satisfied.

To determine whether there was a pattern of missingness, the missing values analysis tool for SPSS was used. The statistical test of missingness used the Missing Completely at Random (MCAR test) developed by Little (1988), to test the null hypothesis that the data are not missing at random (NMAR). Results of this test indicated that there was no pattern of missingness for any of the study variables. In other words, missing values analyses provided no evidence that uncontrolled or unidentified factors systematically influenced the pattern of missing data.

Table 3

Descriptive Statistics for Social Anxiety Symptoms Pre-treatment (Predictor Variables).

Variable	Group	Mean	Standard Deviation
FNE-B	EGT	44.19	7.66
	VRE	41.61	10.81
	All	42.92	9.35
LSAS Avoidance	EGT	28.00	10.96
	VRE	21.45	9.28
	All	24.78	10.61
LSAS Fear	EGT	30.41	11.14
	VRE	26.94	10.95
	All	28.70	11.10

Note: FNE-B = Fear of Negative Evaluation, Brief Form. LSASAV = Liebowitz Social Anxiety Scale, Avoidance subscale. LSASFE = Liebowitz Social Anxiety Scale, Fear subscale. EGT = Exposure Group Therapy. VRE = Virtual Reality Exposure. All = All participants, regardless of treatment condition.

Table 4

Descriptive Statistics for Working Alliance as measured by the WAI (Outcome Variable).

		WAI Scale			
Session	Group	Total	Bond	Task	Goal
1	EGT	73.65 (9.08)	24.35 (3.43)	25.23 (3.22)	24.08 (3.98)
	VRE	75.07 (8.99)	24.33 (4.08)	25.19 (2.70)	25.56 (2.82)
	All	74.38 (8.97)	24.34 (3.74)	25.21 (2.94)	24.83 (3.48)
2	EGT	75.63 (8.78)	25.50 (2.88)	25.00 (3.58)	25.13 (3.75)
	VRE	75.08 (7.12)	25.05 (2.74)	25.35 (2.55)	24.67 (3.58)
	All	75.35 (7.95)	25.28 (2.80)	25.17 (3.09)	24.90 (3.64)
3	EGT	75.48 (6.66)	25.63 (2.76)	25.85 (3.01)	24.00 (3.81)
	VRE	77.32 (6.46)	25.93 (2.52)	26.10 (2.13)	25.29 (3.07)
	All	76.46 (6.56)	25.79 (2.62)	25.98 (2.56)	24.69 (3.46)
4	EGT	78.33 (5.85)	26.51 (2.46)	26.73 (1.82)	25.09 (3.92)
	VRE	78.18 (6.25)	26.04 (2.56)	26.39 (2.08)	25.75 (2.78)
	All	78.25 (6.00)	26.26 (2.50)	25.56 (1.95)	25.43 (3.36)
5	EGT	78.34 (7.09)	26.45 (2.28)	26.48 (2.97)	25.41 (3.73)
	VRE	78.19 (6.14)	25.90 (2.79)	26.45 (2.34)	25.84 (2.75)
	All	78.27 (6.56)	26.17 (2.55)	26.47 (2.64)	25.63 (3.24)
6	EGT	79.52 (6.85)	26.56 (2.32)	26.64 (2.71)	26.32 (2.70)
	VRE	79.32 (5.79)	26.46 (2.36)	26.68 (2.21)	26.18 (2.44)
	All	79.42 (6.25)	26.51 (2.32)	26.66 (2.43)	26.25 (2.54)
7	EGT	78.32 (7.86)	26.32 (2.59)	26. 80 (2.53)	25.20 (4.39)
	VRE	79.24 (6.41)	26.62 (2.13)	27.03 (1.68)	25.59 (4.02)
	All	78.81 (7.06)	26.48 (2.34)	26.93 (2.10)	25.41 (4.16)
8	EGT	78.21 (7.72)	26.57 (2.47)	26.61 (2.95)	25.04 (4.17)
	VRE	80.41 (5.67)	26.78 (2.24)	26.56 (2.65)	27.07 (1.88)
	All	79.29 (6.82)	26.67 (2.34)	26.58 (2.78)	26.04 (3.38)

Note: Values in parentheses are standard deviations. WAI = Working Alliance Inventory. EGT = Exposure Group Therapy. VRE = Virtual Reality Exposure. All = All participants, regardless of treatment condition.

The Optimal Design software (Raudenbush, Spybrook, Congdon, Liu, & Martinez, 2011) was used to estimate the sample size necessary to detect a medium effect size of d = 0.50 in the absence of literature based estimates. A value of 1 was used as a standardized estimate of effect size for both the variability associated with treatment and error. Of note is that the need for estimates of effect size as well as estimates of the expected variability for the level-1 fixed and residual effects is a statistical consideration specific to the use of HLM. Using the above-mentioned value in concert with a desired power of 0.8 and an alpha level of 0.05, a sample size of n = 60 was required to detect linear change whereas n = 145 was necessary to detect quadratic change. As data for the present study had already been collected, to best approach the required sample size, all participants that completed a treatment protocol were included to obtain a sample size of n = 63. Thus, the sample size was sufficient for detecting linear change, but was underpowered for detecting quadratic change.

Hierarchical linear modeling (HLM) was used to examine growth trajectories for each hypothesis. A major benefit of HLM is that it permits simultaneous estimation of variance associated with individual (within-group) and population (between-group) growth trajectories (Raudenbush & Bryk, 2002). Maximum likelihood estimation was used to estimate the parameters. Maximum likelihood estimation is advantageous for three reasons: (1) it is an iterative estimation process that converges on unknown population parameters, resulting in parameter estimates with smaller variances and less bias as sample sizes increase; (2) sampling distributions used to estimate population parameters are approximately normal with known variance, which allows for generating confidence bounds and hypothesis testing; and (3) standard errors are smaller relative to those generated using other estimation techniques (Singer & Willett, 2003).

Additionally, HLM allows for missing data at the individual level because estimation of individual growth trajectories is based on all data provided by each individual as well as data obtained from the population as a whole. In other words, individuals without data for each of the 8 time points at the individual level were able to be retained in the analysis. Willett, Singer and Martin (1998) recommended using one more data point than there are unknown parameters in the individual growth model. Thus, participants were retained for analyses so long as they provided at least 4 data points necessary for the quadratic model.

HLM models are capable of estimating time-related variation in a single, Y, dependent variable for up to three levels. For the present study, HLM was used to estimate growth models wherein (1) change in the dependent variable (working alliance) over time (in session weeks) was estimated within individuals at level-1 and (2) individual rate of change in the dependent variable was predicted as a function of a higher-order group, such as treatment condition or initial social anxiety score. For each model, fixed and random effects were specified. Fixed effects estimate variation attributed to a specified variable that is assumed to be measured without error, such as time, and they produce parameters that are the same for all individuals in a group. Random effects estimate variability due to "error" including the impact of individual differences, measurement error, and the potential effect of variables not included in the study. In other words, random effects are parameter estimates that capture variability unique to each individual. Finally, standard error estimates were obtained for parameters at all levels and were used to determine the statistical significance of each parameter estimate. For the present study, analyses were performed with the HLM 6.05 program and SPSS 18.0.

For each hypothesis, as described by Willett, Singer and Martin (1998), an HLM model can be used to estimate the temporal dependence of individual status on time wherein the WAI score of participant *i* on occasion *t* is expressed as a linear (or quadratic) function of TIME. For each model, there are several key parameters that require interpretation.

First, a level-1 model is developed, and includes π_0 and π_1, which are individual growth parameters that estimate the trajectory of true individual change over time (Willett, Singer & Martin, 1998). Specifically, the estimated intercept for the Level-1 individual growth model or "within-person" model, π_0, reflects the true WAI score (dependent variable) for participant *i*. For the current study, due to grand mean centering, π_0 represents the true working alliance score for participant *i* when TIME = 25 weeks, the mid-point of treatment. Next, the slopes for the Level-1 model include: (1) π_1, which reflects the individual's true rate of linear change in WAI scores , and (2) π_2, which reflects the individual's true rate of quadratic change in WAI scores . The sign of the slope determines the direction of change such that a positive value for π_1 indicates that participant *i*'s rate of linear change increases over time whereas a positive value for π_2 indicates acceleration in participant *i*'s rate of quadratic change over time; negative signs are interpreted in the converse manner.

A key assumption of individual growth modeling is that the trajectory for each person in the population has the same functional form - linear or quadratic - but different individuals may have different values of the individual growth parameters (Willett, Singer &Martin, 1998). The authors further describe how the level-2 model was developed to allow researchers to ask questions about relationships between the individual growth parameters (for level-1) and variables representing individual (and

group) characteristics that are entered as level-2 variables. In the level-2 model, the ß coefficients summarize the population relationship between individual growth parameters and characteristics specified by level-2 predictor variables, and may be interpreted as regular regression coefficients (Willett, Singer & Martin, 1998). For example, if the working alliance ratings for participants that completed the EGT condition are expected to be higher than those for VRE participants, that is, if they have larger values of π_{oi} on average, then $ß_{01}$ will be negative because GRPID = 0 for EGT. Similarly, if the rate of linear and/or quadratic change in working alliance scores over time is anticipated to be higher for EGT compared to VRE participants, reflected by larger values of π_{1i} and/or π_{2i}, on average, then $ß_{11}$ and/or $ß_{21}$ will be negative. The parameters, π_{0i}, π_{1i}, and π_{2i}, vary across persons (between individuals) as a function of the overall linear or quadratic slope ($ß_{10}$ and $ß_{20}$) as well as two cross-level interactions involving the level-2 predictor variable and time, the level-1 predictor variable ($ß_{11}$ and $ß_{21}$).

Last, variance components are estimated for both levels of each model. Specifically, level-1 residual variance, e_{ti}, summarizes the population variability in an average person's outcome values around his/her own true change trajectory (Singer & Willett, 2003). Level-2 variance components (r_{0i}, r_{1i}, and r_{2i}) reflect residual between person variability in change trajectories, after controlling for predictor variables such as treatment condition and initial social anxiety scores.

To determine whether there was sufficient variability in the growth parameters to be predicted as the outcome variables at level-2, an unconditional model (Model 1) was estimated. An unconditional model is a model without any level-2 predictor variables, and was tested for hypothesis 1. Level-1 approximations of the variance components

indicated whether there was significant variability in the intercept (π_0) and/or slopes (π_1 and π_2), a necessary condition for conducting level-2 analyses. Without sufficient variability at level-1, all estimates would be expected to be similar thereby eliminating justification for adding level-2 predictors. For the present study, the unconditional model tested by hypothesis 1 provided verification of significant variability in parameter estimates of the intercept as well as linear and quadratic slopes (see Table 5), and enabled addition of level-2 predictors for models associated with the second and third hypotheses.

For all hypotheses, the outcome variable of interest was the working alliance (WAI) variable. However, hypotheses and their associated models differed in terms of predictor variables at level-2. The model for hypothesis 1 examined whether change in working alliance over treatment occurred in a linear and/or quadratic form. The TIME variable functioned as the level-1 predictor variable, and was measured in session weeks. As the unconditional model, no level-2 predictors were added. Across models, estimations of fixed effects have been reported with robust standard errors.

Level-1: Working alliance $= \pi_{0i} + \pi_{1i}\text{TIME}_{ti} + \pi_{2i}\text{TIME}^2_{ti} + e_{ti}$

Level-2: $\pi_{0i} = \beta_{00} + r_{0i}$

$\pi_{1i} = \beta_{10} + r_{1i}$

$\pi_{2i} = \beta_{20} + r_{2i}$

The model for hypothesis 2 investigated whether treatment type (GRPID variable) impacted change in working alliance scores over time. The GRPID variable was added at level-2 as it is a characteristic that is expected to vary between individuals and is expected to predict level-1 parameters. Cross-level interactions between the level-

1 and level-2 predictor variables, time and treatment group, and provided estimates of the effect of treatment group on the mean level of working alliance mid-treatment as well as on the linear and quadratic rates of change in working alliance over time.

Level-1: $WAI = \pi_{0i} + \pi_{1i}TIME_{ti} + \pi_{2i}TIME^2_{ti} + e_{ti}$

Level-2: $\pi_{0i} = \beta_{00} + \beta_{01}(GRPID) + r_{0i}$

$\pi_{1i} = \beta_{10} + \beta_{11}(GRPID) + r_{1i}$

$\pi_{2i} = \beta_{20} + \beta_{21}(GRPID) + r_{2i}$

The model for hypothesis 3 examined the extent to which differences between participants' initial social anxiety scores, reflected by scores for the FNE-B as well as LSAS – fear and avoidance scales, affected change in working alliance scores over time. Simultaneous inclusion of social anxiety variables at level-2 was necessary due to the high likelihood of shared variance as well as for parsimony. Again, cross-level interactions between time and initial social anxiety scores were included.

Level-1: $WAI = \pi_{0i} + \pi_{1i}TIME_{ti} + \pi_{2i}TIME^2_{ti} + e_{ti}$

Level-2: $\pi_{0i} = \beta_{00} + \beta_{01}(FNE\text{-}B) + \beta_{02}(LSASFE) + \beta_{03}(LSASAV) + r_{0i}$

$\pi_{1i} = \beta_{10} + \beta_{11}(FNE\text{-}B) + \beta_{12}(LSASFE) + \beta_{13}(LSASAV) + r_{1i}$

$\pi_{2i} = \beta_{20} + \beta_{21}(FNE\text{-}B) + \beta_{22}(LSASFE) + \beta_{23}(LSASAV) + r_{2i}$

4

RESULTS

Preliminary Analyses

Prior to testing hypotheses, preliminary analyses were conducted to determine whether demographic variables were related to WAI total and subscale scores. Age did not significantly correlate with the WAI total, bond, or task scores. In contrast, age was negatively correlated with the WAI goal score at session 3 (r = -0.326, $p < 0.05$) and session 7 (r = -0.271, $p < 0.05$). That is, for these two session time points, older ages were associated with higher client reports of agreement on treatment goals.

For dichotomous variables, independent samples t-tests were conducted. There were no differences for the WAI total and subscales at any time between participants who met criteria for the generalized subtype of social anxiety disorder (50.8%) and those who did not (49.2%), no significant difference between mean scores. Similarly, in general, significant differences in WAI total and subscale mean scores were not found for self-reported gender, which was 61.9% female. Two exceptions were observed at session 4. Specifically, for the WAI task subscale, females reported significantly higher mean scores (M = 27.18, SD = 1.49) compared to males (M = 25.5, SD = 2.21), $t(52)$ = -3.33, $p < 0.01$. Females (M = 79.95, SD = 5.37) also reported significantly higher mean scores for the WAI total scale compared to males (M = 75.36, SD = 6.05), $t(52)$ = -2.89, $p < 0.01$.

A series of one-factor analysis of variance tests were used to determine whether significant differences in WAI total and subscale scores were observed based on ethnicity, level of education, marital status, and income level. Regarding ethnicity, the variable included 6 levels to represent persons that identified as “African-American”

(28.57%), “European American” (53.97%), “Latino” (4.76%), “Asian American” (3.17%), and “Other” (9.52%). Significant differences were observed for the WAI task subscale for session 2, 3, 5, 7 and 8; for WAI goal at session 5 and 8; and for the WAI total score at session 5, 7, and 8. Of note is that the homogeneity of variance assumption was not satisfied for most instances when a statistically significant difference was observed, the exception was for the WAI goal and total scores at session 5. The Games-Howell test was used in post-hoc analyses to detect significant differences among groups assuming unequal variances. Results of these tests indicated no significant differences between groups based on ethnicity.

Next, differences in WAI scores based on level of education were observed. The education variable had 6 levels to represent participants who had completed high school (3.2%), 1-2 years of college (20.6%), 3 or more years of college (7.9%), a full college program (33.3%), some graduate school (17.5%), and a graduate school program (15.9%). One significant difference was noted for the WAI task subscale at session 4, $F(5, 48) = 2.58$, $p < .05$. Post-hoc analyses indicated that the difference was between participants with some graduate school ($M = 28$, $SD = 0$)and those who completed college ($M = 26.39$, $SD = 2.06$). Again, the homogeneity of variance assumption was not satisfied.

For marital status, 6 levels were contrasted to represent persons that were single (25.4%), married (50.8%), separated (1.6%), divorced (12.7%), living with someone (6.3%), and widowed (3.2%). At session 3, a significant difference between groups was observed for the WAI goal subscale score, $F(5,52) = 3.54$, $p < 0.01$. However, post-hoc analyses could not be completed as the “separated” category had only one individual. To permit adequate exploration of this variable, participants were divided into two

categories to represent whether they were involved in a committed relationship (56.9%) or single (43.1%). For session 3, a t-test indicated significantly higher WAI goal scores for participants in a relationship (M = 25.58, SD = 3.06) compared to participants who were single (M = 23.52, SD = 4.68), $t(46.28) = -2.26$, $p < 0.05$.

Finally, the income variable also had 6 levels to represent reported earnings of less than 5K (7.9%), 5-10K (1.6%), 10-20K (11.1%), 20-30K (14.3%), 30-50K (20.6%), and more than 50K a year (44.4%). Significant differences were observed for the WAI goal subscale score at session 1, $F(5, 47) = 5.95$, $p < 0.001$, and session 4, $F(5, 48) = 2.71$, $p < 0.05$. Of note is that the homogeneity of variance assumption was not satisfied for the test at session 1, but was met for session 4. However, in both instances, clarification of between group differences was not possible with post-hoc analyses as one category had a sample size of 1. To further explore this potential difference, the income variable was dichotomized so that participants who earned more than 50K (44.4%) were compared to those with a yearly income of less than 50K (55.6%). Results supported a significant difference in WAI goal scores at session 1, $t(43.56) = -2.46$, $p < 0.05$. Participants who earned 50K or more reported a higher mean WAI score (M = 26.08, SD = 2.10) than those who earned less than 50K a year (M = 23.79, SD = 4.06).

Prior to analyzing growth trajectories, t-tests were conducted to determine how WAI scores for the current sample compare to values reported in previous research. Data for the current sample indicate relatively high WAI scores compared to samples of non-clinical and SAD clients. For the present study, the mean initial WAI total score was 74.38, with a maximum score of 84. Previous research involving a sample of clients with SAD, indicated an average WAI total score of 70.69 (SD = 9.19), measured across treatment (Hayes, Hope, Van Dyke and Heimberg, 2007). Similarly, a mean WAI total

score of 72.23 (*SE* = 1.67) was observed for a voluntary sample of clients presenting with interpersonal difficulties at a mid-Western university counseling center (Kivlighan & Shaughnessy, 1995). Independent samples t-tests to compare means from past studies with that of the current study; unequal variances were assumed. Results indicated that the mean WAI total score (*M* = 77.70. *SE* = 0.68, *SD* = 6.74) for the present study is significantly higher than values reported by Hayes et al (2007); $t(23.40) = 2.98$, $p < 0.01$, as well as Kivlighan and Shaughnessy (1995), $t(22.63) = 14.52$, $p < 0.0001$.

Working alliance subscale scores were also high relative to general treatment seeking samples (i.e., not specific to social anxiety) of university students. Busseri and Tyler (2003) reported average single item scores for each of the WAI subscales following the 4th therapy session: 5.79 (*SD* = 0.96), 5.91 (*SD* = 0.98), and 5.91 (*SD* = 1.03) for the WAI task, goal, and bond subscales, respectively. For the present study, the average single item, post-fourth session scores were 6.64 (*SD* = 0.55), 6.36 (*SD* = 1.29), 6.57 (*SD* = 0.72), for the task, goal, and bond subscales. Independent sample t-tests again reveal higher WAI scores for the present study, as compared with Busseri and Tyler (2003) - $t(84.41) = 5.65$, $p < 0.0001$ (task); $t(98.89) = 2.04$, $p < 0.05$, (goal); $t(94.81) = 3.86$, $p < 0.001$ (bond). Of note, the working alliance variables were not normally distributed, which is an assumption required for use of *t*-tests. Therefore, results must be interpreted with caution.

Hypothesis 1

Results for hypothesis 1 are presented in Table 5 and Figures 2-4. First, significant parameters for both slopes confirmed that both the linear and quadratic terms were necessary for determining the mean growth trajectory for the total (i.e., full scale) working alliance as well as the bond and task subscale scores. For the present study, the significant negative quadratic term denoted that the rate of change in working alliance decelerated over the course of treatment. Furthermore, visual examination of growth trajectories demonstrated steeper increase in working alliance scores earlier in treatment compared to later sessions when the rate of change appears to decline, and eventually, plateau. It is plausible that this plateau was observed due to a ceiling effect for WAI scores, given their high start values. In the event of a significant quadratic term, the rate of linear change must be interpreted instantaneously; it is essentially the slope of a tangent to the curve when measured at a specific time point. For the present study, coefficients are interpreted at mid-treatment due to centering of the TIME variable.

Total working alliance ratings evidenced significant quadratic change over time (see Figure 2). Specifically, the rate of change in the WAI total score decelerated over time (β_{20} = -0.002, $p < 0.01$). Moreover, when measured mid-treatment, participants reported an average 0.23 unit increase in their ratings of total working alliance per week (or session) of treatment (β_{10} = 0.23, $p < 0.001$).

A similar pattern of findings was observed for the WAI subscales. For the WAI bond subscale score, as evident in Figure 3, significant deceleration in rate of quadratic change was observed over time (β_{20} = -0.0009, $p < 0.01$). At mid-treatment, the instantaneous rate of linear change was also significant (β_{10} = 0.09, $p < 0.001$),

indicating an average 0.09 unit increase in ratings of the working alliance bond score per week. The WAI task subscale scores also evidenced significant deceleration in rate of quadratic change over time (β_{20} = -0.001, $p < 0.001$); this can be viewed in Figure 4. Relatedly, significant linear increase in working alliance task scores was observed at treatment midpoint (β_{10} = 0.10, $p < 0.001$), such that an average 0.10 unit increase in ratings of task agreement was observed per week. Last, non-significant quadratic (β_{20} = -0.0003, $p > 0.05$) and instantaneous linear change at the treatment midpoint (β_{10} = 0.05, $p > 0.05$) were observed for the WAI goal subscale score.

Significant unexplained variability in scores mid-treatment (intercepts), as well as rates of change (slopes), was observed for most working alliance scale scores. Specifically, significant variability for the linear term was observed for the WAI total score ($\chi^2 = 118.3$, $p < 0.001$), WAI bond score ($\chi^2 = 165.95$, $p < 0.001$), and WAI task score ($\chi^2 = 159.3$, $p < 0.001$). Similarly, significant variability in the quadratic term was observed for the WAI total score ($\chi^2 = 81$, $p < 0.05$), WAI bond score ($\chi^2 = 120.33$, $p < 0.001$), and WAI task score ($\chi^2 = 113.32$, $p < 0.001$). In contrast, for the WAI goal score, the linear ($\chi^2 = 47.36$, $p > 0.50$) and quadratic ($\chi^2 = 38.87$, $p > 0.50$) terms were not significant; there was no further variability to be predicted for this subscale.

The proportion of variance in WAI explained by TIME, the level-1 predictor variable, was also computed. Specifically, average variability around individual growth trajectories explained 41.5% of the variance in WAI total scores as well as 46.79% in WAI bond, 10.59% in WAI goal, and 51.35% in WAI task subscale scores.

The proportion of variance in WAI scores attributed to differences between participants over time also was computed. Variability between participants explained 57.99% of the variance in WAI total scores as well as 65.85% in WAI bond, 31.56% in

WAI goal, and 59.86% in WAI task subscale scores. Thus, in general, differences noted between participants' trajectories explained slightly more variance in outcome scores than differences within participants.

Table 5

Model 1: Change in Working Alliance over Time

	WAITOT	WAIBOND	WAIGOAL	WAITASK
Fixed Effect		*Coefficient (SE)*		
Mean working alliance mid-tx, β_{00}	77.70 (0.68)***	25.89 (0.29)***	25.52 (0.27)***	26.28 (0.24)***
Mean linear growth rate, β_{10}	0.23 (0.05)***	0.09 (0.02)***	0.05 (0.03)	0.10 (0.02)***
Mean quadratic acceleration rate, β_{20}	-0.002 (0.0008)**	-0.0009 (0.0003)**	-0.0003 (0.0005)	-0.001 (0.0003)***
Random Effect		*Variance Component (SD)*		
Mid-tx status, r_{0i}	27.53 (5.25)***	5.31 (2.30)***	3.59 (1.90)***	3.46 (1.86)***
Growth rate, r_{1i}	0.08 (0.29)***	0.02 (0.13)***	0.005 (0.07)	0.01 (0.12)***
Acceleration, r_{2i}	0.00001 (0.004)*	<0.01 (0.002)***	<0.01 (0.0007)	<0.01 (0.002)***
Level-1 error, e_{ti}	11.29 (3.36)	1.41 (1.19)	6.67 (2.58)	1.08 (1.04)

Note: * = $p < .05$, ** = $p < .01$, *** = $p < .001$. WAITOT = Working Alliance Inventory, Total score. WAIBOND = Working Alliance Inventory, Bond subscale score. WAIGOAL = Working Alliance Inventory, Goal subscale score. WAITASK = Working Alliance Inventory, Task subscale score.

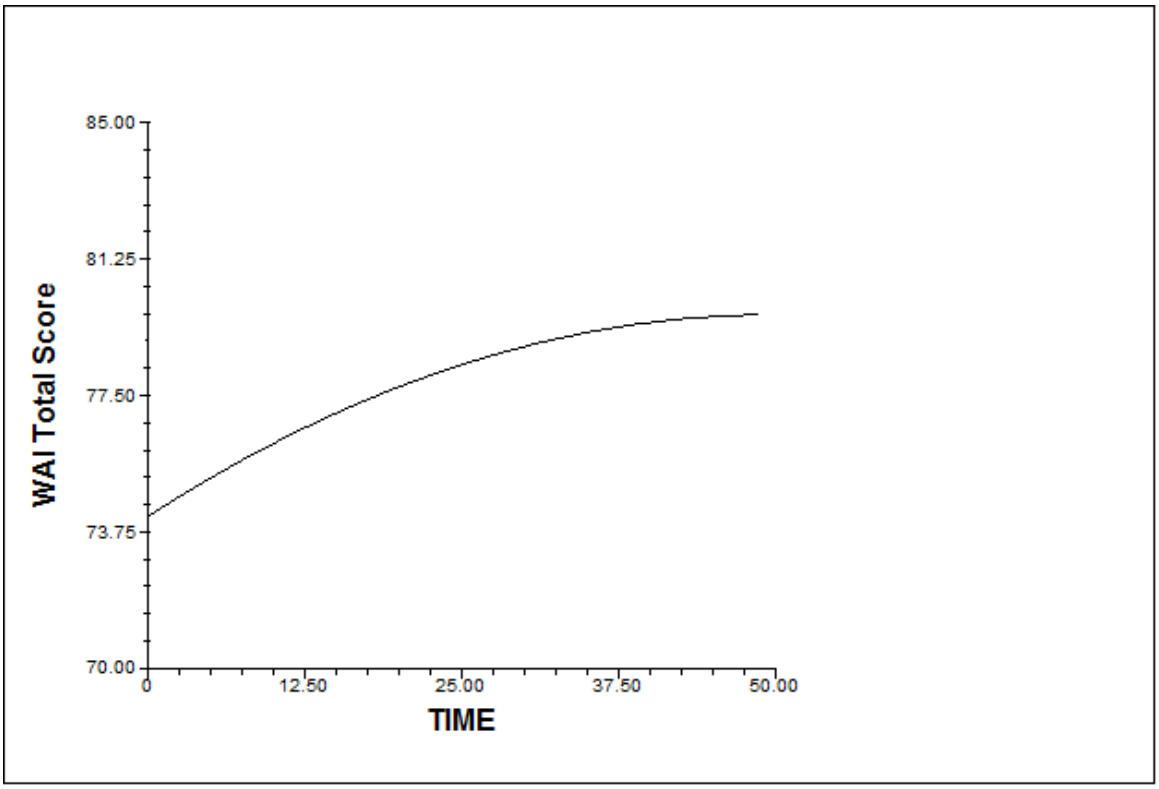

Figure 2. Impact of Time on Quadratic Change in WAI Total Score

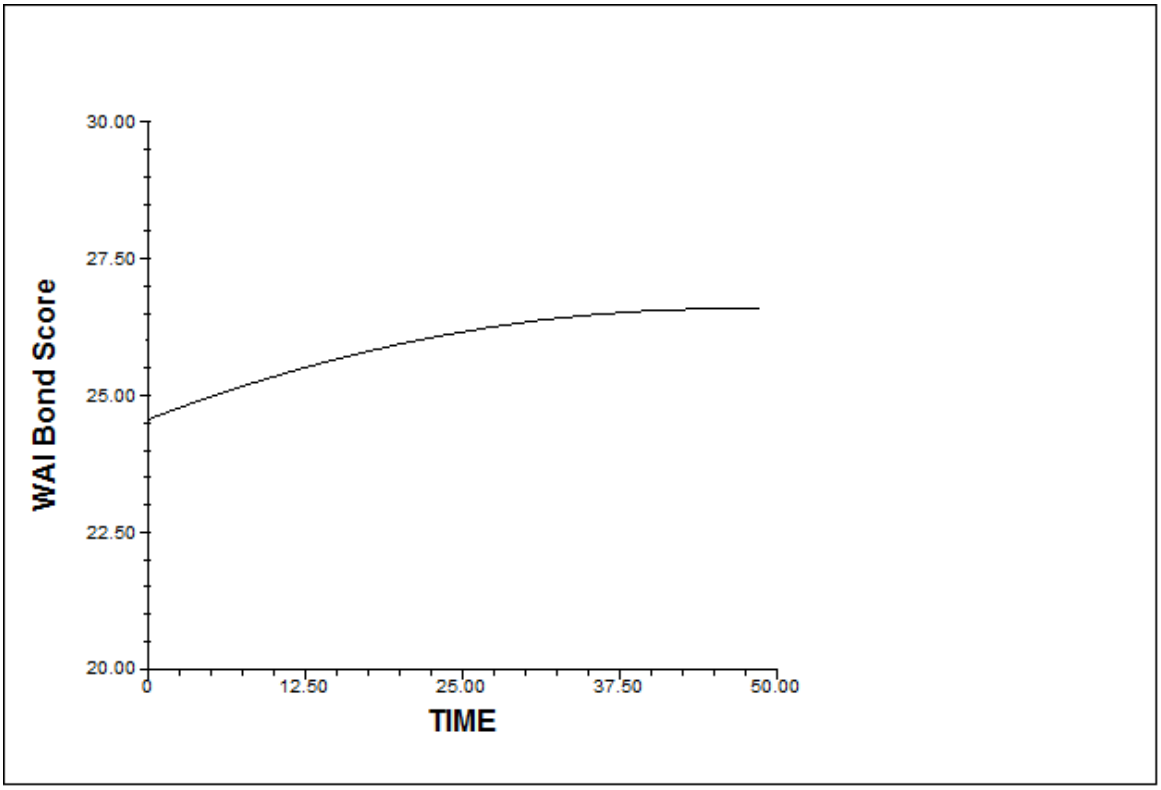

Figure 3. Impact of Time on Quadratic Change in WAI Bond Score

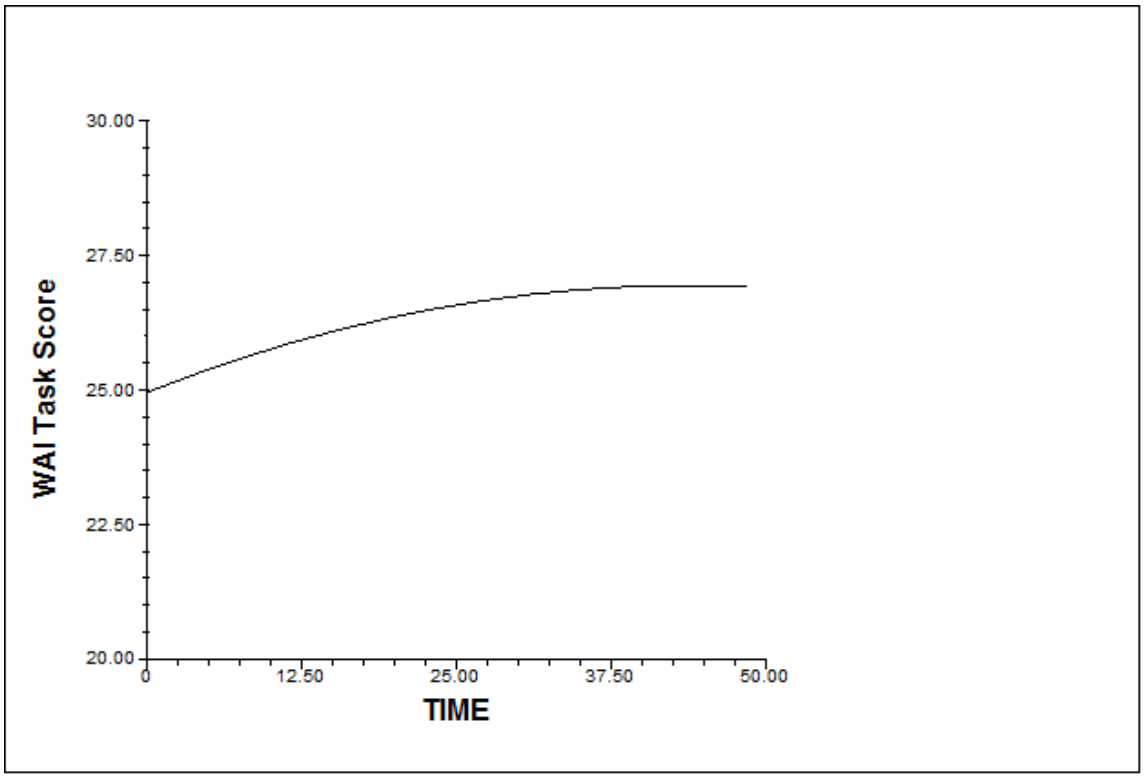

Figure 4. Impact of Time on Quadratic change in WAI Task Score

Hypothesis 2

Results of HLM analyses are displayed in Table 6 and Figures 5-7. Findings indicated that treatment condition did not yield a significant impact on mean scores mid-treatment. The exception was a pattern of higher average mid-treatment scores for VRE participants compared to EGT participants for the WAI goal subscale (β_{01} = 0.62, p < 0.05). Treatment condition also did not reveal significant between group differences in quadratic rate of change and instantaneous rate of change for the WAI total as well as bond and task scores. Examination of the graphs supports non-significant differences insomuch as deceleration in the rate of change in WAI scores seems similar for the two treatment conditions; that is, the curves appear similar in form and close in proximity throughout session weeks.

For the WAI total score, participants in the VRE treatment condition reported a mean mid-treatment WAI total score that was 0.01 units lower than the mean mid-treatment score for EGT participants; however, this difference was not significant (β_{01} = -0.01, p > 0.05). As exhibited in Figure 5, there was also no significant difference between the rates of quadratic change for the two treatment conditions (β_{21} = 0.002, p > 0.05). Instantaneous linear change also did not significantly differ between treatment conditions (β_{11} = -0.10, p > 0.05).

For the WAI bond subscale, participants in the VRE treatment condition reported an average mid-treatment score that was 0.11 units lower than EGT participants (β_{01} = -0.11, p > 0.05). This difference was not statistically significant. As reflected in Figure 6, the rate of quadratic change also did not significantly differ between groups (β_{21} =

0.00009, $p > 0.05$). Non-significant differences between treatment conditions was revealed for instantaneous linear change ($\beta_{11} = 0.003$, $p > 0.05$).

Similarly, for the WAI task subscale, there was a non-significant difference between the mean mid-treatment scores such that participants in the VRE treatment condition yielded an average score that was 0.21 units lower than participants in the EGT condition ($\beta_{01} = -0.21$, $p > 0.05$). Average rate of quadratic ($\beta_{21} = 0.0001$, $p > 0.05$) and instantaneous linear change ($\beta_{11} = -0.02$, $p > 0.05$) also did not significantly differ for participants in the VRE compared to the EGT condition (see Figure 7).

The level-2 variance components were examined to determine whether there was significant residual variability around estimates for linear and quadratic growth over time, controlling for the effect of treatment condition. Significant variability for the linear term was observed for the WAI total score ($\chi^2 = 116.68$ $p < 0.001$), WAI bond score ($\chi^2 = 165.55$, $p < 0.001$), and WAI task score ($\chi^2 = 159.48$, $p < 0.001$). Similarly, significant variability in the quadratic term was observed for the WAI total score ($\chi^2 = 79.68$, $p < 0.05$), WAI bond score ($\chi^2 = 120.11$, $p < 0.001$), and WAI task score ($\chi^2 = 113.46$, $p < 0.001$). As significant unexplained variability remained for most WAI outcome variables, it was anticipated that other unidentified factors may explain additional variability around trajectories of change in working alliance.

The proportion of variance explained by GRPID, the added level-2 predictor variable, was calculated. Commensurate with non-significant findings, effect sizes were small. Specifically, treatment condition explained 1.63% of the variance in WAI total scores as well as 1.69% in WAI bond and 1.44% in WAI task subscale scores.

Table 6

Model 2: Change in Working Alliance as Predicted by Treatment Condition

	WAITOT	WAIBOND	WAIGOAL	WAITASK
Fixed Effect		*Coefficient (SE)*		
Intercept				
Mean working alliance mid-tx, β_{00}	77.71 (0.96)***	25.94 (0.42)***	25.22 (0.44)***	26.38 (0.33)***
Mean difference for GRPID, β_{01}	-0.01 (1.36)	-0.11 (0.59)	0.62 (0.54)	-0.21 (0.48)
Linear rate of change				
Mean Linear, β_{10}	0.28 (0.08)***	0.09 (0.03)**		0.11 (0.03)***
GRPID, β_{11}	-0.10 (0.10)	0.003 (0.04)		-0.02 (0.04)
Quadratic rate of change				
Mean Quadratic, β_{20}	-0.003 (0.001)**	-0.001 (0.0005)*		-0.001 (0.0004)**
GRPID, β_{21}	0.002 (0.002)	0.00009 (0.0007)		0.0001 (0.0006)
Random Effect		*Variance Component*		
Mid-tx status, r_{0i}	27.98 (5.29)***	5.40 (2.32)***	3.60 (1.90)***	3.51 (1.87)***
Growth rate, r_{1i}	0.08 (0.29)***	0.02 (0.13)***		0.01 (0.12)***
Acceleration, r_{2i}	0.00001 (0.004)*	<0.01 (0.002)***		<0.01 (0.002)***
Level-1 error, e_{ti}	11.29 (3.36)	1.42 (1.19)	6.65 (2.58)	1.08 (1.04)

Note: * = $p < .05$, ** = $p < .01$, *** = $p < .001$. WAITOT = Working Alliance Inventory, Total score. WAIBOND = Working Alliance Inventory, Bond subscale score. WAIGOAL = Working Alliance Inventory, Goal subscale score. WAITASK = Working Alliance Inventory, Task subscale score.

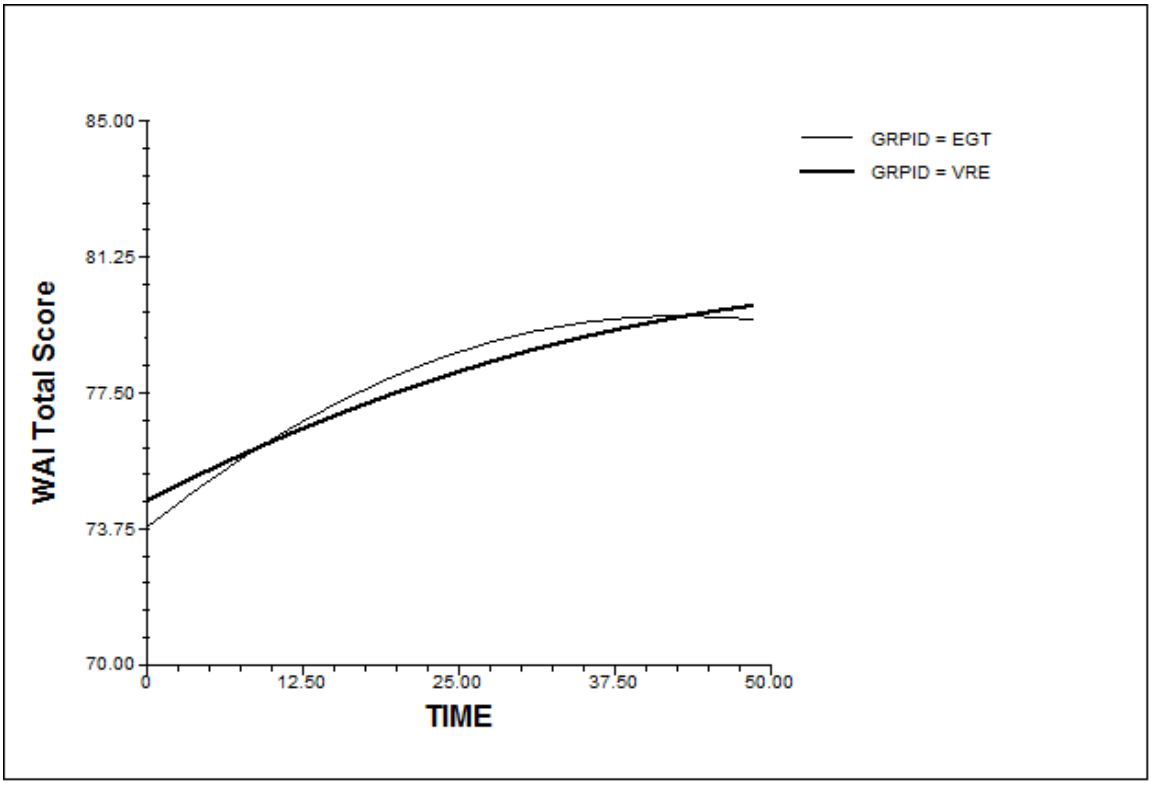

Figure 5. Impact of Time and Treatment Condition on Quadratic Change in WAI Total Score

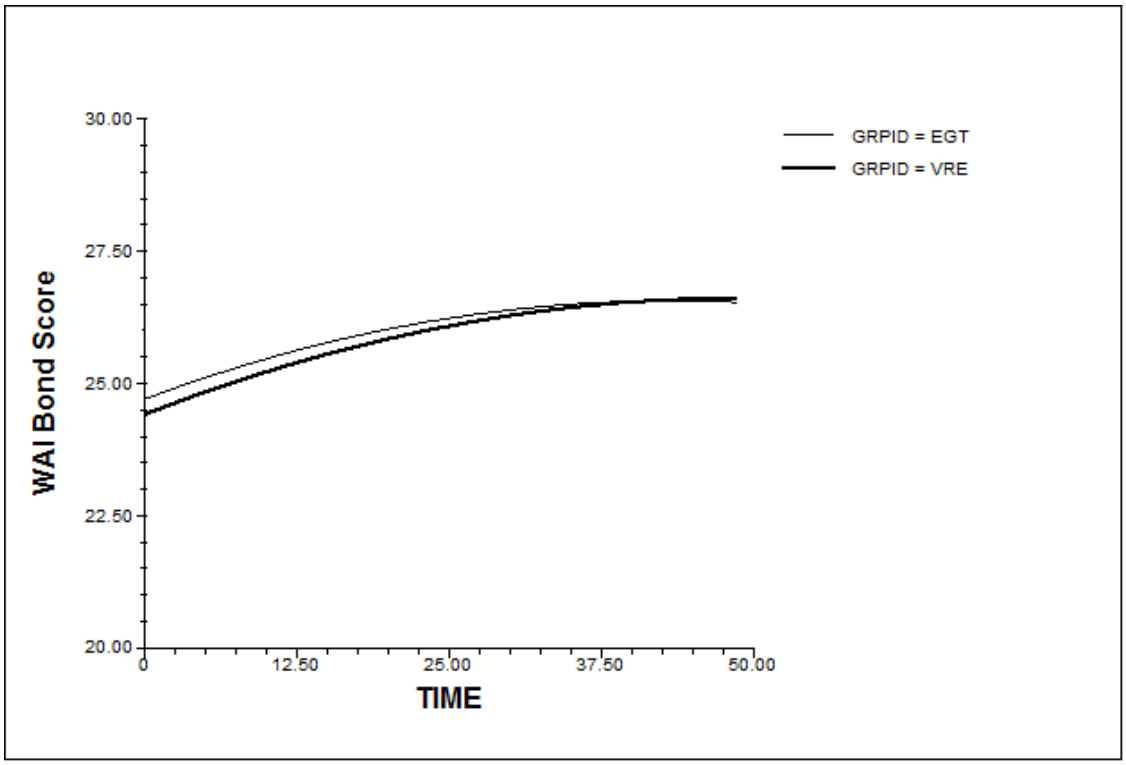

Figure 6. Impact of Time and Treatment Condition on Quadratic Change in WAI Bond Score

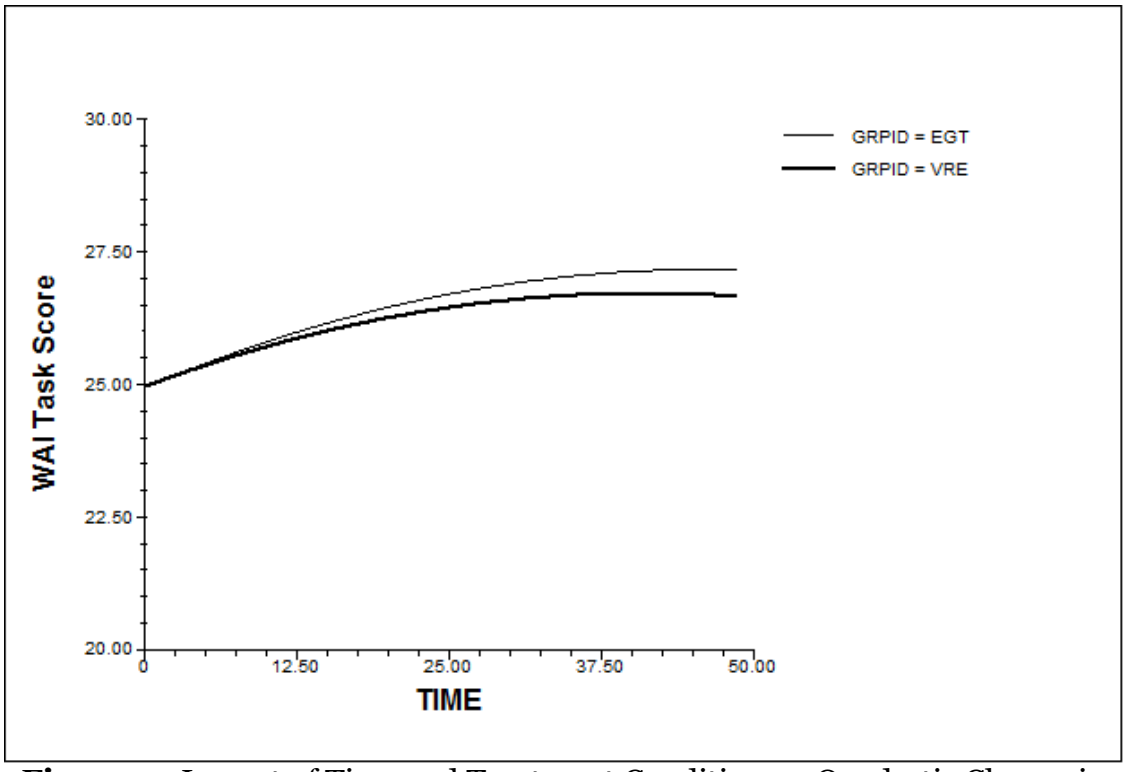

Figure 7. Impact of Time and Treatment Condition on Quadratic Change in WAI Task Score

Hypothesis 3

Table 7 and Figures 8-12 display the impact of time and initial social anxiety scores on total and subscale WAI scores.

First, pre-treatment social anxiety severity did not predict significant variance in mid-treatment working alliance scores for the FNE-B (β_{01} = 0.03, p > 0.05), LSASFE (β_{02} = 0.03, p > 0.05), or LSASAV (β_{03} = -0.10, p > 0.05). Initial FNE-B scores also did not predict significant acceleration (β_{21} = 0.00002, p > 0.05) or instantaneous linear growth at mid-treatment (β_{11} = 0.0002, p > 0.05). In contrast, LSAS fear scores significantly predicted acceleration rates for the WAI total score (β_{22} = 0.0004, p <0.01). That is, over time, the average quadratic rate of change in WAI total score increased by 0.0004 units per unit increase in the LSASFE score. Reviewing Figure 8, persons with relatively high LSASFE scores (75th percentile) showed a constant rate of increase in their working alliance scores throughout treatment (i.e., more acceleration) whereas participants with relatively low initial LSASFE ratings (25th percentile) evidenced seemingly greater acceleration (i.e., rise in scores) in about the first third of treatment with a leveling off and then decline in their rate of change that occurs after the mid-point of treatment (i.e., less acceleration). When measured mid-treatment, LSASFE subscale scores also significantly predicted instantaneous linear change in WAI total scores (β_{12} = -0.02, p < 0.05) such that a smaller linear slope was observed for individuals with higher initial LSASFE scores. In other words, when measured mid-treatment, participants who reported higher initial LSASFE scores evidenced less positive change in their working alliance scores compared to participants with relatively low initial LSASFE scores. Finally, the LSAS avoidance subscale score predicted deceleration such that quadratic change in the WAI total score was expected to decrease

by 0.0004 units for every unit increase in the LSASAV score (β_{23} = -0.0004, p <0.01). Figure 9 clearly demonstrates that participants with relatively low initial LSASAV ratings evidenced an apparent slight increase in their rate of change in scores over time (i.e., less deceleration) compared to participants with relatively high initial LSASAV scores whose data indicated initially steep increase followed by a decrease in rate of change after the mid-point of treatment (i.e., a progressive decrease in scores, more deceleration). Significant instantaneous increase in WAI total scores was evidenced mid-treatment such that a slightly higher linear slope was observed for persons with high initial LSASAV scores compared to participants with low initial LSASAV scores (β_{13} = 0.02, p <0.01).

Fewer significant effects were observed in investigating the impact of initial social anxiety on change in WAI bond subscale scores. None of the social anxiety measures predicted mean WAI bond scores mid-treatment with FNE-B (β_{01} = -0.02, p > 0.05), LSASFE (β_{02} = -0.02, p > 0.05), and LSASAV (β_{03} = 0.02, p > 0.05). Initial FNE-B scores did not predict significant quadratic change (β_{21} = -0.000001, p > 0.05) or instantaneous linear growth mid-treatment (β_{11} = 0.001, p > 0.05). Similarly, LSASFE scores did not significantly predict quadratic (β_{22} = 0.00009, p >0.05) or instantaneous linear change (when measured mid-treatment) in WAI bond scores (β_{12} = -0.005, p > 0.05). The LSASAV subscale was the only social anxiety variable that predicted significant deceleration in WAI bond scores such that, over time, average rate of quadratic change in the WAI bond score decreased by 0.0001 units for every unit increase in the LSAS avoidance score (β_{23} = -0.0001, p <0.05). Visual examination of Figure 10 suggests that participants with relatively low initial LSASAV ratings evidenced a relatively constant rate of increase in scores over time (i.e., less deceleration)

compared to participants with relatively high initial LSAS avoidance scores, whose data indicated a pattern of progressively increasing WAI ratings followed by a decrease in rate of change later in treatment (i.e., more deceleration). Significant instantaneous linear change in WAI bond scores was also seen mid-treatment such that individuals with high initial LSASAV scores evidenced a slightly steeper positive linear slope compared to participants with relatively lower initial LSASAV scores (β_{13} = 0.007, p <0.05).

The impact of initial social anxiety scores on change in WAI task scores, over time, yielded a few effects. Again, when measured mid-treatment, WAI task subscale scores were not significantly predicted by FNE-B (β_{01} = 0.02, p > 0.05), LSASFE (β_{02} = 0.03, p > 0.05), or LSASAV scores (β_{03} = -0.06, p > 0.05). However, FNE-B scores predicted significant acceleration in WAI task subscale scores (β_{21} = 0.00006, p < 0.05), whereby average rate of quadratic change in WAI task scores increased at a rate of 0.00006 units per unit increase in FNE-B scores. The graph displayed in Figure 11 indicates that participants with relatively low initial FNE-B scores evidenced an initially steeper rate of increase in WAI task scores followed by a slight decline in rate of acceleration later in treatment (i.e., less acceleration) compared to participants with relatively high initial FNE-B scores who evidenced more modest acceleration toward the start of treatment but with less decline in their rate of change over time (i.e., more acceleration). In contrast, instantaneous linear change for the WAI task subscale scores was not significant (β_{11} = -0.004, p > 0.05), indicating that slopes for individuals with relatively higher initial FNE-B scores did not significantly differ from those with lower FNE-B scores. Next, LSASFE scores did not significantly predict quadratic change for WAI task scores (β_{22} = 0.00005, p > 0.05). Similarly, instantaneous linear change in

WAI task scores (β_{12} = -0.003, p > 0.05) was not significant when measured mid-treatment. Finally, initial LSAS avoidance subscale scores predicted significant deceleration in WAI task subscale scores wherein average rate of quadratic change in WAI task scores decreased by 0.00009 units for every unit increase in the LSAS avoidance score (β_{23} = -0.00009, p <0.05). Figure 12 suggests that participants with relatively low initial LSASAV ratings evidenced a relatively constant and slight increase in their rate of change in scores for the bulk of treatment with a slight decline in their rate of change at the end of treatment (i.e., less deceleration). In contrast, data for participants with relatively high initial LSASAV scores indicated steep acceleration during earlier sessions followed by a period of little change in their rate of change, and finally, a slight decline in their rate of change later in treatment (i.e., more deceleration). Significant instantaneous linear change in WAI task subscale scores was also observed mid-treatment (β_{13} = 0.006, p < 0.05). That is, when examined at the mid-point of treatment, participants that reported relatively high initial avoidance scores evidenced a steeper session-to-session increase in working alliance ratings compared to participants that reported relatively lower initial avoidance.

The level-2 variance components were examined to determine whether there was significant residual variability around estimates for linear and quadratic growth over time, controlling for the impact of social anxiety predictor variables. Significant variability for the linear term was again noted for the WAI total (χ^2 = 107.09, p < 0.001), WAI bond (χ^2 = 151.89, p < 0.001), and WAI task scores (χ^2 = 148.12, p < 0.001). Moreover, significant variability in the quadratic term was observed for the WAI bond score (χ^2 = 111.93, p < 0.001) and WAI task score (χ^2 = 104.80, p < 0.001). In contrast, residual variability for the WAI total score (χ^2 = 70.97, p > 0.05) was no longer

significant. As unaccounted for variability was either rendered non-significant or reduced, the addition of the social anxiety variables seemed an appropriate addition in fitting a model to explain variance in WAI scores.

The proportion of variance explained by the addition of the social anxiety variables as predictors at level-2 were generally small when considered in absolute terms. In particular, initial ratings of social anxiety explained 3.78% of the variance in WAI total scores as well as 4.9% in WAI bond and 1.16% in WAI task subscale scores.

Table 7

Model 3: Change in Working Alliance as Predicted by Initial Social Anxiety Scores

	WAITOT	WAIBOND	WAITASK
Fixed Effect		*Coefficient (SE)*	
Intercept			
Mean Working Alliance Mid-tx, β_{00}	77.68 (0.68)***	25.89 (0.29)***	26.27 (0.24)***
FNE-B, β_{01}	0.03 (0.07)	-0.02 (0.03)	0.02 (0.02)
LSASFE, β_{02}	0.03 (0.10)	-0.02 (0.05)	0.03 (0.03)
LSASAV, β_{03}	-0.10 (0.09)	0.02 (0.05)	-0.06 (0.03)
Linear Component			
Mean rate of change, β_{10}	0.24 (0.05)***	0.09 (0.02)***	0.10 (0.02)***
FNE-B, β_{11}	0.0002 (0.005)	0.001 (0.002)	-0.004 (0.002)
LSASFE, β_{12}	-0.02 (0.007)*	-0.005 (0.003)	-0.003 (0.002)
LSASAV, β_{13}	0.02 (0.009)*	0.007 (0.003)*	0.006 (0.003)*
Quadratic Component			
Mean rate of change, β_{20}	-0.002 (0.0008)**	-0.001 (0.0003)**	-0.001 (0.0003)***
FNE-B, β_{21}	0.00002 (0.00009)	-0.000001 (0.00003)	0.00006 (0.00003)*
LSASFE, β_{22}	0.0004 (0.0001)**	0.00009 (0.00005)	0.00005 (0.00004)
LSASAV, β_{23}	-0.0004 (0.0001)**	-0.0001 (0.00005)*	-0.00009 (0.00004)*
Random Effect		*Variance Component*	
Mid-tx status, r_{0i}	28.57 (5.35)***	5.57 (2.36)***	3.50 (1.87)***
Growth rate, r_{1i}	0.08 (0.28)***	0.02 (0.13)***	0.01 (0.12)***
Acceleration, r_{2i}	0.00001 (0.003)	<0.01 (0.002)***	<0.01 (0.002)***
Level-1 error, e_{ti}	11.03 (3.32)	1.41 (1.19)	1.07 (1.03)

Note: * = $p < .05$, ** = $p < .01$, *** = $p < .001$. WAITOT = Working Alliance Inventory, Total score. WAIBOND = Working Alliance Inventory, Bond subscale score. WAITASK = Working Alliance Inventory, Task subscale score. FNE-B = Fear of Negative Events, Total score. LSASFE = Liebowitz Social Anxiety Scale, Fear subscale score. LSASAV = Liebowitz Social Anxiety Scale, Avoidance subscale score.

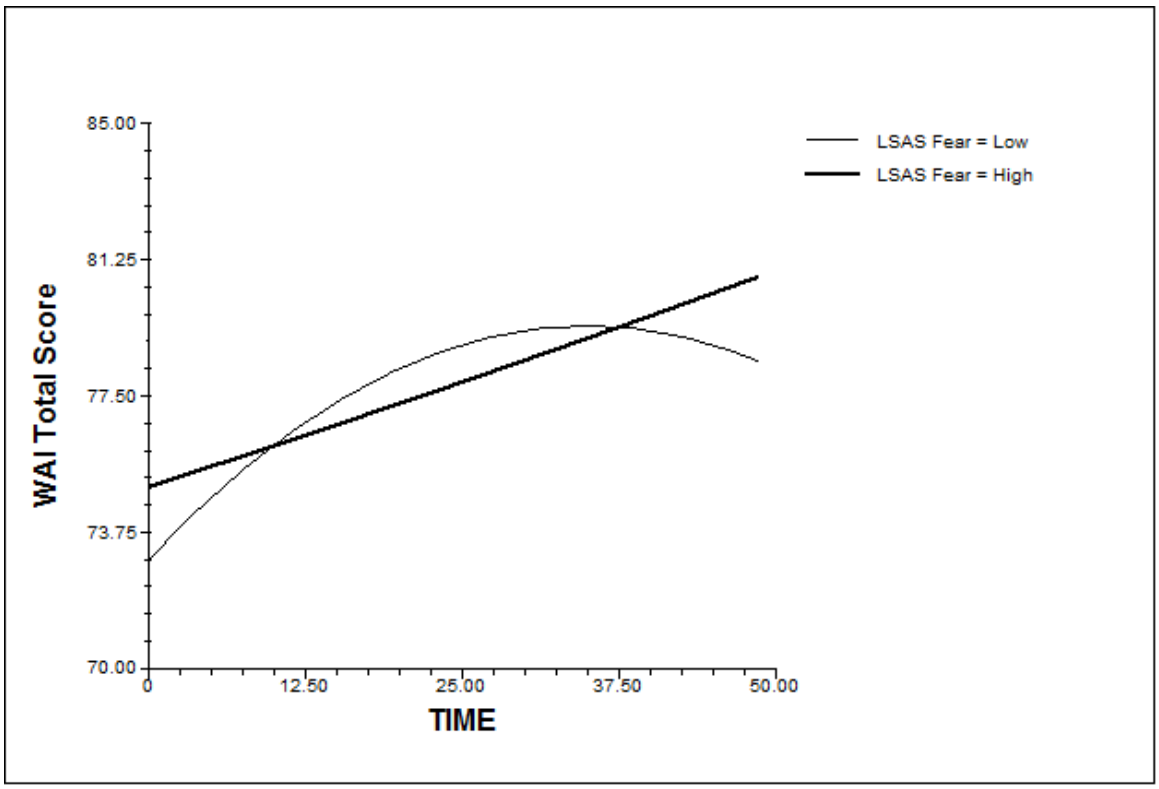

Figure 8. Impact of Time and LSAS - Fear on Quadratic Change in WAI Total Score

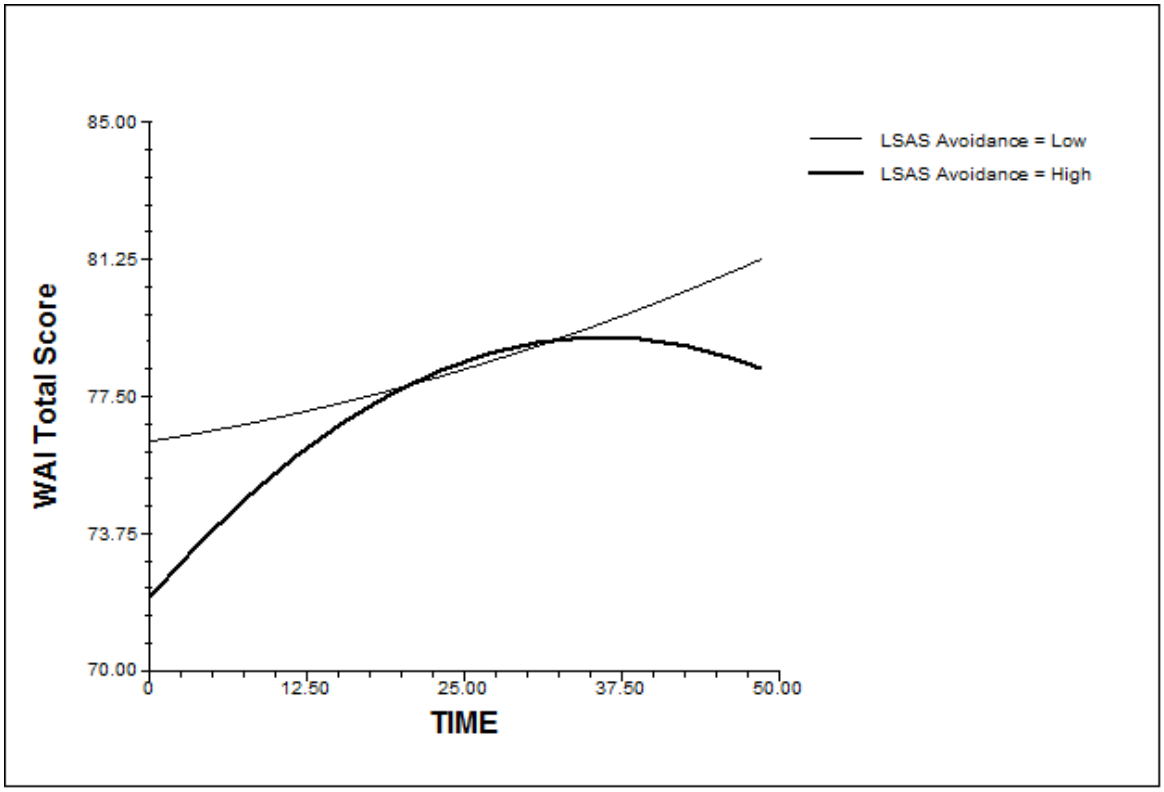

Figure 9. Impact of Time and LSAS - Avoidance on Quadratic Change in WAI Total Score

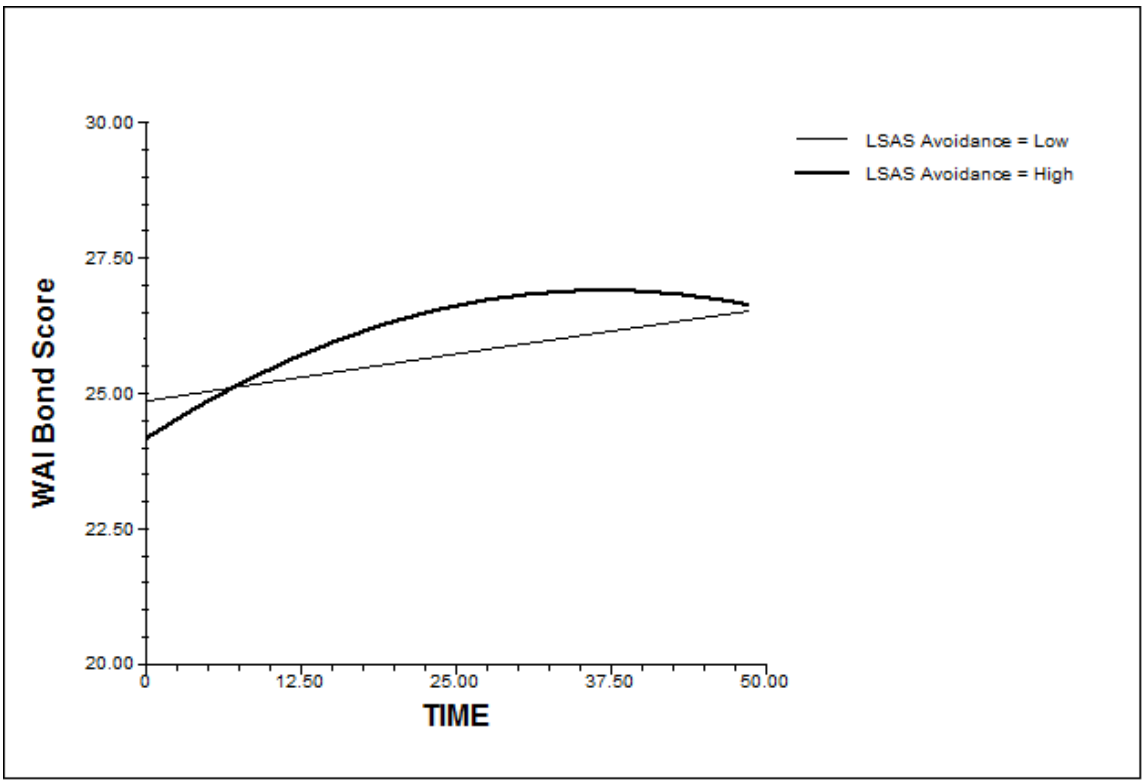

Figure 10. Impact of Time and LSAS- Avoidance on Quadratic Change in WAI Bond Score

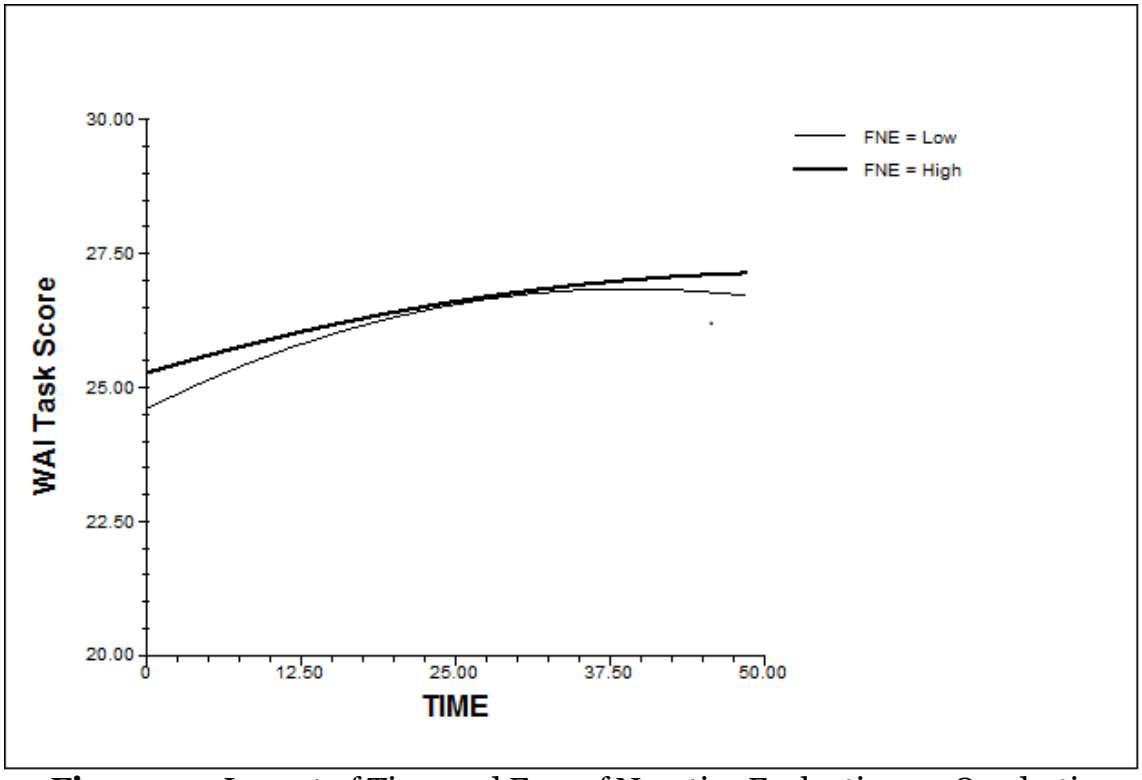

Figure 11. Impact of Time and Fear of Negative Evaluation on Quadratic Change in WAI Task Scores

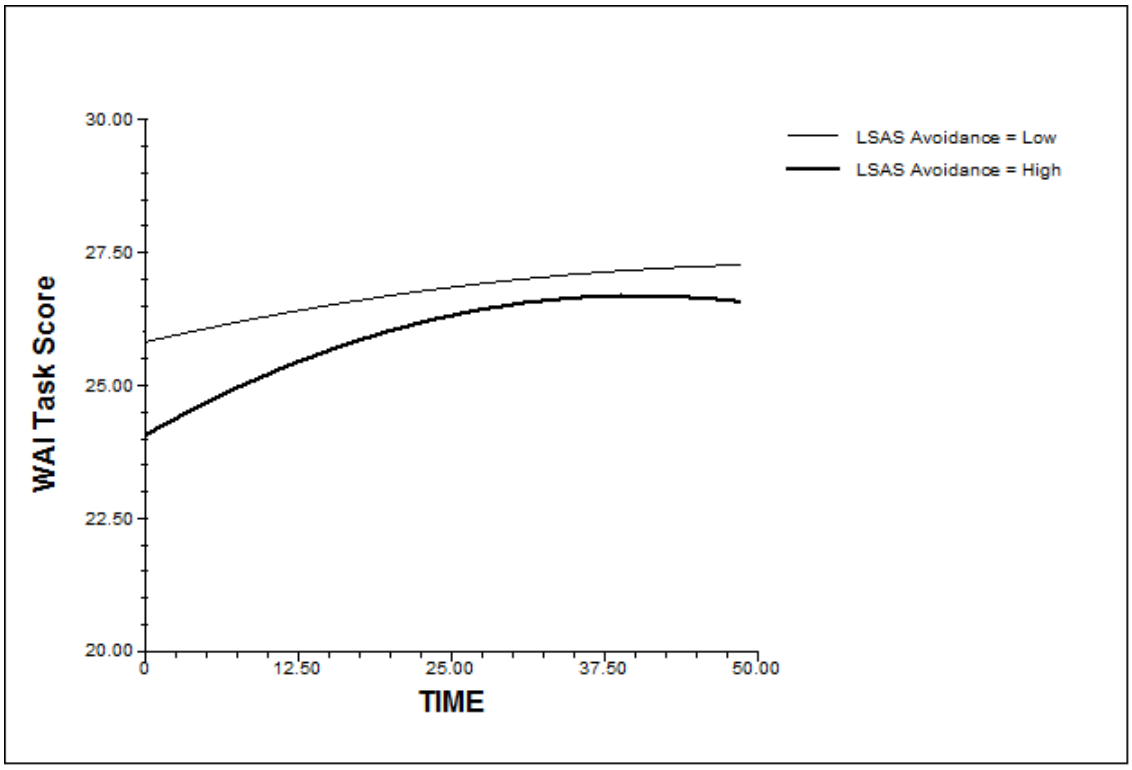

Figure 12. Impact of Time and LSAS - Avoidance on Quadratic Change in WAI Task Score

5

DISCUSSION

The current study examined the development of the working alliance, a "common factor" associated with a relatively large influence on treatment progress, for persons seeking treatment for social anxiety disorder. Although research on the working alliance is present, few studies have examined growth in the alliance among clients presenting with a primary diagnosis of social anxiety. Moreover, the present study compared the working alliance for two treatments, one of which has never been studied with a SAD population (i.e., VRE), as well as the impact of pre-treatment social anxiety severity on change in the working alliance.

Participants in this study reported high levels of working alliance across treatment, with total working alliance scores ranging from 73-80 across treatment sessions. Although there are no clinical cut-offs for the WAI, these scores seem quite high, as the maximum total score is 84. Preliminary analyses indicated that this sample of persons with social anxiety experienced relatively high working alliance compared to participants in previous research studies that examined the working alliance among people with SAD (Hayes et al., 2007), non-clinical samples with some level of interpersonal difficulty (Kivlighan & Shaughnessy, 1995), or a variety of psychological concerns (Busseri & Tyler, 2003). This result is somewhat unexpected, because fear of negative evaluation is a core feature of the disorder and is presumed to inhibit the development relationships with others (Alden & Taylor, 2004), which may extend to formation of a working alliance. Potential explanations for the relatively high scores reported by participants for the present study comprise the possibility that participants truly experienced a stronger sense of collaboration and attachment to study therapists,

other aspects of the sample indicated particular preparedness for developing an alliance (such variables are to be described later in this section), and the positive influence of specific elements of treatment (e.g., explicit instructions to form an alliance). In essence, results for the present study provide heartening evidence that clients with social anxiety disorder are capable of developing collaborative working relationships that are apparently stronger than those observed in previous research with an SAD population and non-clinical samples. Perhaps, the strength of the relationship was augmented by the use of manualized CBT programs that explicitly focus on development of the working relationship as well as instruction in specific skills for promoting treatment success. The expectation that treatment will be comfortable and helpful (Joyce & Piper, 1998) as well as actual session helpfulness (Hayes et al., 2007) have been noted to be positively associated with working alliance ratings, and may be enhanced by use of manualized CBT.

A primary aim of this study was to examine the trajectory of change in the working alliance over time. The working alliance was hypothesized to change in either a linear or quadratic form. Results showed significant quadratic change in WAI total as well as bond and task subscale scores. However, the form of the quadratic change was unexpected as it did not reflect the "U-shaped," "tear-and-repair" or "rupture/repair" patterns posited by Bordin (1979) and by Horvath and Luborsky (1993), and as evidenced by analyses completed by Kivlighan and Shaughnessy (2000). Rather, clients' overall ratings of working alliance, bond and task subscales were observed to generally increase during treatment, with rapid increase observed during earlier treatment sessions followed by a decline in rate of change over time. The lack of support for a "tear and repair" pattern in the current study is especially interesting given that the

high levels of WAI at the beginning of treatment leave plenty of "room" for an alliance rupture.

The divergence between the expected and observed working alliance trajectory warrants consideration of factors that might underlie this difference. First and foremost, results should be considered in light a potential ceiling effect for working alliance ratings. Tryon, Blackwell, and Hammel (2008) reviewed 63 articles published between 1990 and 2007 to examine rating patterns for measures of working alliance, and found that clients tend to use only the top 20% of rating points whereas therapists tended to only use the top 30%. Consistent with this literature, for the present study, initial mean ratings for all WAI scores were within the top 20% of the scale. Initially high ratings may have limited the degree and influenced the form of change observed in WAI scores over time. Specifically, it is possible that a larger slope or different curvature for rate of change would have been observed had the ratings spanned a broader range of scores. Moreover, observed deceleration in WAI scores may reflect limited room for further growth (i.e., a range of approximately 10 points for the WAI total scale and 3.5 for the WAI subscales).

The results of this study may also differ from previous findings due to aspects of the study design, such as the number of observations during treatment. Kivlighan and Shaughnessy (2000) only observed the working alliance at 4 time points whereas other evidence of the "tear-and-repair" cycle has come from limited data in case study research such as that of Golden and Robbins (1990). Willett, Singer and Martin (1998) indicated that "parameter estimation will always be improved if further waves of data are added" (p. 408). In particular, the authors argue that additional waves of data improve estimates at the individual level through improving the precision with which

change will ultimately be measured, and at the group level, by considering reliability of the change measurement. Therefore, it is possible that inclusion of additional data points (i.e., 8 time points) for the current study contributed to a more accurate estimate of change in working alliance scores; however, confirmation of whether it is the best fitting form (shape) will have to be further explored as other trajectories of change (e.g., cubic, quartic) were not tested.

One study has examined change in the working alliance for clients diagnosed with SAD and treated with CBT. In their study of change in working alliance for clients presenting with SAD, Woody and Adessky (2002) tested both a linear and curvilinear form, and only observed significant linear change in working alliance scores such that scores steadily increased over time. Moreover, for the WAI subscales, scores for bonds and goals increased over time, whereas tasks did not change; the authors indicated this was likely due to the use of clear task descriptions at treatment onset (Woody & Adessky, 2002). Given the shared CBT treatment orientation and primary presenting problem as well as similar sample size, sample characteristics (e.g., high education), and number of treatment sessions (i.e., 8-10) for the present study and that of Woody and Adessky (2002), there is no clear explanation for differences in the working alliance trajectories. Moreover, the magnitude of the quadratic change parameters observed for the present study was small. In summary, evidence of quadratic change in the working alliance observed for the current study is unique, and warrants future research to see if the findings are replicable.

The second hypothesis was that there would be differences between treatment conditions such that participants in the EGT condition were expected to demonstrate more positive change in their working alliance scores over time. Greater acceleration

was anticipated for the EGT condition due to the potential negative impact of VRE equipment on engagement with the therapist and treatment process as a whole. Specifically, as suggested by Meyerbroker and Emmelkamp (2008), the HMD precludes eye contact and creates a physical barrier between client and therapist, both of which were expected to inhibit the development of the working alliance, especially the bond aspect. Moreover, participation in the group condition was anticipated to enhance development of the working alliance as prior research has indicated that group cohesiveness increases clients' confidence for active involvement in treatment (Hand, Lamontagne, & Marks, 1974), which may, in turn, enhance development of the working alliance by improving group member contributions and overall morale. Contrary to expectations, treatment condition did not predict differences in working alliance ratings measured mid-treatment or in the trajectory of change for any of the working alliance scales.

There are a few potential explanations for the lack of significant differences observed between growth trajectories for VRE and EGT. First, both conditions used treatment manuals that included similar treatment elements, such as psychoeducation about social anxiety disorder, targeting cognitive biases associated with SAD, addressing self-focused attention, exposure, and relapse prevention. Furthermore, the overarching CBT orientation of the VRE and EGT conditions specifies the need for clients and therapists to form a collaborative working relationship during the initial phase of treatment. Combining the impetus for collaboration with the manualized aspect of treatment, the general goals and specific tasks of both EGT and of VRE were well-defined and comparable across treatment conditions. The only difference between

conditions was the format of the exposure (VR vs with live group members), and individual versus group therapy.

Work by Woody and Adessky (2002) also bears on this issue. They measured change in group cohesion as a parallel process to change in the working alliance during group-based CBT for social phobia. The authors found that group cohesion was static over time, and suggested that CBGT was more akin to individual therapy provided in a group format rather than a process oriented group therapy. Furthermore, in their comparison of various CBT programs, Rodebaugh, Holaway and Heimberg (2004) stated, "all forms of CBT work reasonably well" and "may produce similar effects because they effect the same change through different means" (p. 892). Thus, it is perhaps not surprising that two CBT treatments show similar levels and trajectories of working alliance. In particular, the results of the current study indicate that VRE equipment does not significantly inhibit formation of a working alliance in the context of a CBT program.

The final hypothesis was that higher initial symptom severity for SAD would have a negative impact on the working alliance trajectory, and results were not uniformly supportive. Interestingly, the manner in which initial fear and avoidance impacted change in the working alliance differed. In particular, fear of various social situations predicted acceleration in quadratic rate of change in WAI total scores such that participants with relatively high initial ratings of fear evidenced steady rates of increase in working alliance over time compared to participants with low initial fear who demonstrated steeper rates of increase in working alliance early in treatment followed by a decline in rate of change past the mid-point of treatment. Similarly, but to a lesser extent, fear of negative evaluation predicted acceleration in WAI task scores such that

participants with high initial FNE-B scores evidenced a seemingly constant increase in their rates of change in WAI scores throughout treatment compared to those with low initial FNE-B scores whose scores appeared to rise at a moderately high rate early in treatment with little change mid-treatment and a slight decline in the rate of change late in treatment. In contrast, the avoidance scale of the LSAS predicted deceleration in working alliance wherein participants with higher levels of avoidance showed more deceleration. Specifically, participants with relatively high initial avoidance ratings exhibited more rapid increase in their rates of change in working alliance for approximately the first half of treatment followed by more slowing in the rate of change in their working alliance scores later in treatment compared to participants with relatively low initial avoidance whose data indicated a moderate increase in their rate of change over time.

Findings for the current study indicate a complex pattern of change in the working alliance based on pre-treatment symptom severity that differs according whether one is measuring fear (LSAS-FE, FNE-B) or avoidance (LSAS-AV). For fear-based measures, and contrary to what might be clinically expected, the trajectory for participants with high pre-treatment fear suggested continuous growth over time, whereas persons with low fear exhibited rapid initial increase in their rate of change followed by a decline. Perhaps, the pattern of growth in the working alliance for persons with relatively high initial fear may be a sign of the effectiveness of early treatment efforts that primarily target maladaptive social schema (i.e., beliefs about self and others in social situations) that perpetuate the fear and avoidance cycle, which in turn, bolsters engagement and the working alliance for the duration of treatment. Also, the presence of a consistent, supportive therapist may contribute to the steady increase in working

alliance among those who have relatively high levels of fears. For example, items on the FNE-B query whether clients fear disapproval, judgment, and "doing the wrong thing," but therapists are instructed to demonstrate warmth and empathy that may indirectly restructure these beliefs. In contrast, participants with low pre-treatment fear might exhibit steeper initial growth because they were likely less to be intimated by the notion of forming a relationship with the therapist, and potentially other group members. Yet, the leveling off, and then decline of working alliance scores during the later part of treatment may be a result of these individuals reaching the maximum benefit of the treatment components that target fear as well as possible anxiety related to maintaining gains post treatment termination. Concerning avoidance, relatively high initial avoidance seemed to promote formation of a working alliance albeit with a declining rate of improvement over time. It is plausible that persons with relatively high initial avoidance must surmount enough of their anxiety to initiate treatment, but enter treatment with a sense of wariness that is captured in their relatively lower initial WAI scores. Nevertheless, having successfully overcome enough avoidance to enter treatment, their motivation and associated efforts at developing an alliance, for instance, by exhibiting warmth and interest, may be higher than that of participants with less pre-treatment avoidance, which may explain early steep increases in working alliance. Later decline may reflect the aforementioned ceiling effect for the WAI or perhaps, a drop off in the novelty of conquering one's avoidance to engage in treatment. In contrast, participants with relatively low initial avoidance ratings may demonstrate relatively higher initial WAI scores as well as steady rates of increase in their scores over time because they are less encumbered by the need to overcome a strong proclivity for avoidance. Given limited available research, interpretation of findings is necessarily

speculative. Yet, despite distinct patterns of change for persons with relatively high or low pre-treatment social anxiety, overall WAI scores remained high throughout treatment. Finally, the contribution of symptom severity in explaining the trajectory of the working alliance explained a small (but significant) portion of variance. What is more, the combination of relatively high fear and low avoidance seems best suited to promoting stable rates of growth in the working alliance over time. That is, high initial fear may provide the impetus for understanding and activating treatment-related change processes whereas low avoidance might heighten the chance that participants will tolerate discomfort associated with interpersonal demands and the exposure process during treatment.

It must be noted that the WAI goal subscale was excluded from analyses involving any level-2 predictor variables due to insufficient variability in linear or quadratic change in scores over time. It is possible that the use of manualized treatment for all clients, prevented significant variability in WAI goal scores as identification of treatment goals occurred at the onset of treatment and client perceptions of goals were unlikely to change over time. In contrast, treatment tasks changed over the course of sessions as per the structure of the treatment manuals. For example, initial session tasks focused on psychoeducation whereas exposure-based treatment commenced later in treatment, at second session for VRE and at the fifth session for EGT. It is possible that differences in task demands over time also afforded more variability and room for change in WAI task ratings over time. Last, the bond aspect of the working alliance may naturally be expected to change as it represents the relational nature of the working alliance, and relationships generally change over time.

Contributions of the Current Study

The present study may add to existing research in several ways. First, as of the completion of this paper, it represents the only study that focuses on development of the working alliance for persons with SAD who were treated with VRE therapy. Only one other study has explored the potential impact of VRE on the working alliance in treatment of specific phobia. Meyerbroker and Emmelkamp (2008) found that the experience of "presence" (spatial presence, involvement, and realness of the environment) in VRE treatment was not related to alliance, and alliance scores predicted treatment outcomes. The current study found no difference between VRE and EGT, which suggests that VRE does not significantly interfere with development of the working alliance. Yet, Meyerbroker and Emmelkamp (2008) encouraged future researchers to examine and adapt items in the working alliance inventory to better suit conditions in this environment, and possibly, improve measurement of alliance for this treatment format. The results of the current study are the first to compare alliance between VRE and another treatment, and show that there are no differences between the two groups. The VRE treatment manual used in the current study explicitly incorporates the cultivation of the working alliance as a part of treatment – and this seemed successful.

Next, the current study is one of three that highlights development of the working alliance for persons presenting with a primary diagnosis of social anxiety. It provides evidence that, despite the social difficulties that characterize social anxiety disorder, symptoms do not constitute an insurmountable barrier to forming a working alliance. As previously discussed, the collaborative nature of CBT and use of a manualized treatment approach may have facilitated development of the alliance and assuaged

potential anxiety regarding expectations for client participation in treatment. Moreover, the specificity of CBT may be a primary factor in explaining differences observed between the trajectory of change for the current study and the "tear-and-repair" pattern that has been observed in studies using primarily psychodynamic or eclectic treatments, which typically do not expressly stipulate the need for a strong working alliance and are generally less structured. Horvath, Gaston and Luborsky, (1993) posited that the content (i.e., information imparted) and process (i.e., working alliance) factors in therapy are interdependent. Furthermore, the authors outlined how each aspect of the working alliance, such as the bond as well as mutually agreed upon goals and tasks may interact with treatment itself. Horvath et al. (1993) described how the clients' attachments are partially based on their in-therapy experience of the relevance and effectiveness of interventions, and encouraged therapists to communicate the links between specific strategies and associated goals as well as to maintain awareness of client commitment to treatment activities so as to intervene when resistance occurs. The authors also discussed how "part of the therapist's task is to negotiate short- and medium-term expectations," establish a link with long-term goals, and ensure that clients actively consent to strategies for pursuing these goals (p. 253). Last, Horvath et al. (1993) state, "Cognitive (i.e., evaluation of treatment elements, collaboration) and affective (i.e., perceptions of therapist sensitivity, empathy, helpfulness), components of the alliance, in turn, are influenced by and influence the client's ability to forge strong personal bonds with the therapist" (p. 254). The process of mutually establishing short, medium, and long-term goals as well as strategies for pursuing these goals is stipulated in CBT programs, but not necessarily in other therapies. Moreover, the use of regular in-session practice and between session homework may have an added benefit of

fostering client understanding of the treatment rationale as well as perceptions of treatment effectiveness. In fact, Raue, Goldfried and Barkham (1997) contrasted the impact of CBT or psychodynamic-interpersonal therapy on the working alliance (measured with the WAI) in a sample of clients with depression, and found significantly greater alliance scores for CBT. Furthermore, in a comparison of cognitive therapy and interpersonal therapy for SAD, cognitive therapists reported a significantly higher frequency of work on coping skills, greater use of resource activation, as well as more of a focus on increasing the client's understanding of her/his problems and personal goals than interpersonal therapists (Stangier, Von Consbruch, Schramm & Heidenreich, 2010). Taken together, during CBT, participants with social anxiety may experience less anxiety and more hope when they are both specifically instructed and have input into what will be expected of them as well as the therapist throughout the treatment process, whereas the focus on working through interpersonal challenges in the client-therapist relationship during psychodynamic-interpersonal therapy may prove emotionally overwhelming and insufficiently structured for clients with social anxiety.

Finally, results may provide a stepping-stone for future development of theoretical hypotheses regarding the working alliance trajectory within a CBT framework. For instance, future clinical researchers might investigate why certain levels of pre-treatment fear and avoidance seem to predict an increase in working alliance scores during the early part of treatment followed by a decline in the rate of change in working alliance scores later in treatment. Potential explanations include that the nature of the working alliance changes with the demands over the course of therapy (e.g., exposure therapy), or perhaps, initially high ratings of working alliance prohibit a further rise in scores.

Study Limitations and Future Directions

The current investigation has multiple limitations that should be considering prior to future use of study findings. Primary concerns are statistical in nature. For instance, data for the WAI outcome variable did not conform to a normal distribution. Multiple methods of transformation were attempted to normalize the data, but without success. As described by Raudenbush and Bryk (2002), potential reasons for non-normality include the impact of outliers or model misspecification. Next, based on HLM analyses, the homogeneity of variance assumption was not satisfied. Raudenbush and Bryk (2002) indicated that violation of the homogeneity of variance assumption may contribute to both inaccurate coefficients as well as biased standard error estimates, but also noted that this is a "not a serious problem per se" so long as researchers take care to prevent model misspecification by failure to include relevant predictor variables at level-1. Additionally, given some remaining, unexplained variance, it is possible that that there may have been one or more variables that should have been included in the study; this constitutes model misspecification. Thus, results for the present study must be interpreted with caution, and findings should be replicated in future research efforts so as to confirm the form and direction of observed working alliance trajectories.

Future use of a larger sample would likely lend greater confidence that the pattern of observed results accurately and appropriately represented patterns of change in the working alliance for a SAD population. The relatively small sample size is of concern as it limited statistical power to observe potential effects. In particular, the sample size was smaller than was necessary to detect quadratic change. Significant quadratic terms obtained for this study may indicate that a quadratic term was particularly fitting for this data and/or the size of the true effect was large. Accuracy of

estimated parameters and effect sizes are typically improved with larger samples that better represent unknown population distributions, and standard errors are also reduced. Finally, the ability to investigate additional level-2 predictor variables, such as SAD subtype (general vs. public speaking) and level-3 predictor variables, such as differences between groups within the EGT condition, may also become possible with a larger sample size.

The demographic characteristics of the sample for the current study comprised both strengths and limitations. Compared to most studies involving clients with SAD, the present sample was relatively diverse in terms of both racial and ethnic characteristics albeit not to the extent of the larger U.S. population, and certainly not abroad. Moreover, the sample was unique in that co-morbidity was lower than would be expected for a sample of participants with SAD. It is possible that working alliance ratings measured at specific time points would have been lower, and that the form of change over time may have differed, if a greater proportion of participants with more than one disorder comprised the sample. The sample was also uncommon in that a relatively high proportion of participants met moderate to high socio-economic criteria (e.g., income, level of education) and identified as married. Previous research has indicated that individuals with social phobia are less educated, less likely to be married, and are of a lower socioeconomic status (Schneier, Johnson, Hornig, Liebowitz & Weissman, 1992). Thus, the high education level of the current sample may have influenced participant ability to understand the theoretical underpinnings of treatment and to enact resources to facilitate improvement during manualized treatment, and indirectly, increased perceptions of working alliance strength. Approximately half of the sample reported being involved in a committed relationship. Partner status may also

have impacted initial working alliance and change over time as the capacity to form mature relationships appears to be an important determinant of the working alliance (Joyce & Piper, 1998). In summary, the relatively high educational achievement, coupled with the relatively high financial and interpersonal resources of the current sample may have contributed to high observed working alliance scores. Future researchers may seek to determine whether participants that present with less education, occupational achievement, and indicators of positive external social functioning might evidence a different working alliance trajectory including lower initial scores and less rapid increase in scores related to difficulty with understanding and engaging with treatment requirements.

For the present study, no demographic variables were controlled for in HLM analyses, as preliminary analyses did not conclusively indicate that any variable had a systematic impact on working alliance variables across multiple time points. Preliminary analyses for the current study only seemed to suggest potential effects for ethnicity. However, samples with larger proportions of participants within each group are necessary to adequately conduct future analyses regarding this relationship. Moreover, for the t-tests and ANOVAs, given that the homogeneity of variance assumption was often violated when a significant effect was observed, it is unclear whether findings were due to a true difference or differences in variance. This will also require future study for verification.

Recent research has turned toward examination of prevalence rates and clinical presentation of social anxiety symptoms with specific ethnic populations and age groups, which are factors that may further influence characterization of the working alliance trajectory. In a study exploring the impact of race/ethnicity on change in

working alliance during CBT for intimate partner violence, Walling, Suvak, Howard, Taft and Murphy (2011) found different patterns of change depending on racial/ethnic identity. Specifically, Caucasian clients reported a significant increase in working alliance over time whereas participants that identified with any racial/ethnic minority group (50% of sample) did not report a consistent pattern of change. Within this study, another finding of interest was that therapist working alliance ratings did not evidence significant growth over time. In addition to differences in patterns of change, use of more diverse sample may help us to better understand how cultural identity contributes to variability in the manifestation and effect of SAD symptoms, and indirectly, formation of and change in the working alliance. For example, using data from the National Latino and Asian American Study and National Comorbity Survey, Latinos indicated lower lifetime and 12-month prevalence and a later age of onset for SAD compared to non-Latino White Americans. However, Latino individuals with 12-month SAD reported higher impairment across home, work, and relationship domains. Next, in a study of clients aged 60 years and older, Chou (2009) reported current and lifetime prevalence rates for SAD were 1.83% and 3.5% respectively; lower than average rates for younger individuals. The author attributed this lower rate to the finding that recent stressful life events were significantly associated with development of SAD, but not aversive childhood experiences that contribute to earlier SAD onset. Future research is necessary to clarify how diverse person-related variables influence initial symptom presentation as well as how these factors may independently and interactively contribute to formation and change in the working alliance over time. In the interim, therapist attunement to and communication regarding perceived demographic

similarities and/or differences between clients and themselves may provide additional avenues for collaboration and forming an interpersonal bond.

Another limitation for the present study is that working alliance was evaluated using a measure with several potential shortcomings. For instance, Hatcher and Gillaspy (2006) developed an alternate short form of the WAI (WAI-S) that better differentiated between the subscales compared to the version used for this study. The authors distinguished between items with positive or negative wording, which loaded differently in the factor structures. Additionally, the WAI was designed to evaluate the working alliance at a single time point, and not necessarily to distinguish changes in the alliance over time, which has been recommended as a need for future studies (Willett, Singer & Martin, 1998). Next, as previously mentioned, client's penchant for using only the top 20% of ratings likely contributed to a ceiling effect for overall scores and growth over time. Finally, the WAI only assessed the working alliance from the client's perspective, and research has indicated differences in client and therapist perceptions of this relationship. For example, Horvath and Marx (1990) reported that the only significant observed correlation between client and therapist ratings was for the WAI bond subscale (r = 0.58), whereas correlations for the WAI total, goal, and task scales were weak, ranging from r = 0 to 0.30. Future researchers may benefit from using multiple WAI measures (i.e., client, therapist, observer) and/or qualitative instruments to obtain a more nuanced and accurate understanding of the interaction between time and change in the working alliance, and more importantly, to potentially influence the potency of the collaborative working relationship.

It is also possible that there are other variables, not measured in the current study that may have partly explained results. For example, Mallinckrodt (1996)

indicated that working alliance scores and external social support seem to be related such that changes in social support mediate the impact of the working alliance in facilitating symptom change. In other words, during treatment, the therapeutic relationship provides the "corrective emotional experience" necessary to facilitate external improve in social relationships, which may then impact working alliance in treatment. Furthermore, Hoffart, Borge, Sexton, Clark and Wampold (2012) also recently reported that cognitive processes (e.g., estimated social cost) mediate the effect of the working alliance on treatment. Future researchers are encouraged to continue identification, examination, and intervention with factors that may influence the potency of the working alliance. This is especially salient given that many of these processes may be directly addressed in treatment. For instance, a series of therapeutic homework assignments may involve identifying potential support persons and/or seeking contact with social support persons thereby increasing opportunities for external "corrective emotional experiences," which may then improve the alliance, general engagement in treatment, and positive treatment outcome.

The current study did not investigate whether persons with SAD possess personality characteristics related to their disorder that may impact the working alliance. Specifically, clients presenting with symptoms of SAD combined with personality characteristics that impede interpersonal relations, may be anticipated to have a different working alliance trajectory than those without co-morbid personality pathology. For example, individuals seeking group based treatment for SAD demonstrated more anger and poorer anger expression skills (i.e., anger suppression) than their non-anxious counterparts, and this was related to either early treatment termination or less favorable response to treatment (Erwin, Heimberg, Schneier &

Liebowitz, 2003). This is consistent with other research indicating that persons with SAD who exhibit a hostile interpersonal demeanor benefit less from treatment than persons with a friendly-submissive interpersonal style (Kachin, Newman & Pincus, 2001). Finally, findings were mixed with regard to the impact of a cold/detached interpersonal style with a negative impact noted for early working alliance rating but with observed improvement in working alliance over time. Hersoug, Hoglend, Havik, Von Der Lippe and Monsen (2009) posited a possible interaction between a cold/detached interpersonal style and client attachment. Future researchers are encouraged to evaluate the separate and combined impact of SAD symptoms and personality characteristic and/or interpersonal styles on working alliance trajectories.

Future clinical researchers may also focus on evaluating the presence and potential impact of early life factors on development of the working alliance. Simon et al (2009) reported a 70% rate of childhood abuse or neglect, which was in turn related to greater symptom severity, poorer functioning, and less resilience. Moreover, in a study of persons presenting primarily with SAD, Alden, Taylor, Laposa, and Mellings (2006) indicated that early social factors such as parental abuse negatively impacted formation of the working alliance as reflected in lower therapist ratings on the WAI and was related to a more negative client-therapist relationship. Specifically, therapists described clients with abuse histories as more interpersonally irritable and resistant, and less likely to agree to treatment tasks and goals. Relatedly, Hersoug et al. (2009) investigated the impact of pretreatment client characteristics and their impact on development of the working alliance in long-term psychotherapy for a variety of presenting problems. The authors' found that client report of "good maternal care" until adolescence was associated with positive ratings of working alliance at the onset of

treatment and over time. Finally, Satterfield and Lyddon (1995) found that a "depend" style of attachment, which involves a capacity to depend on the availability and reliability of others, including the therapist, was salient in permitting formation of the working alliance. In general, the interaction between early life experiences that inform attachment and interpersonal styles seems to be a growing edge in research, particularly given evidence indicating higher rates of early disturbance (e.g., child maltreatment) that are likely to impact pre-treatment symptom severity and therapy dynamics both of which shape the working alliance. Thus, future clinical efforts may involve pre-treatment assessment of early life experiences as well as measures of current attachment and interpersonal functioning as both seem pertinent in their potential impact on the working alliance throughout therapy and eventual treatment outcome.

There has been limited research in the potential contribution of therapist factors on change in the working alliance. For example, Sauer, Lopez and Gormley (2003) found that anxiously attached therapists had a positive impact on initial development of working alliance but a negative impact in change over time. Additionally, Horvath and Bedi (2002) noted that the therapist's "capacity to express sensitivity to the client's needs," "ability to generate a sense of hope," "ability to maintain open and clear communication," and communication of empathy are salient aspects in contributing to "the alliance in general, and the interpersonal bonds between therapist and client in particular." In contrast, "a take charge attitude" during the early phases of treatment, client perception that the therapist is "cold," therapist's premature interpretation, and therapist irritability have been noted to negatively affect the working alliance (Horvath & Bedi, 2002). As the working alliance is founded on the interaction between the client and therapist who continuously influence each other during treatment, further research

efforts should incorporate evaluation and consideration of therapist characteristics in predicting change in the working alliance. In the interim, therapists may engage in informal introspection and voluntary supervision to monitor and receive feedback regarding their impact on clients, which fortunately, the therapist may have better control over changing.

Conclusion

In summary, the present study shows that persons with social anxiety disorder are capable of developing working alliances that generally increase over time. As suggested by Woody and Adessky (2002), it is possible that overall improvement in working alliance ratings indicated positive client response to the therapist's leadership in strongly directive treatment such as CBT. It is hoped that with ever increasing research involving diverse and large samples of SAD clients as well as an array of factors that may influence client and therapist capacity for developing working relationships, future clinicians will be able to use specific techniques to bolster initial formation and growth in the working alliance over time. Furthermore, as mentioned by Meyerbroker and Emmelkamp (2008), the question of causality between the working alliance and treatment change should also be explored. For example, as clients engage in treatment, their symptoms and interpersonal styles may evidence change, which may then impact the working alliance, and consequently, further change experienced in treatment. To date, there is some evidence that improvement in client symptoms earlier in treatment predicts positive alliance in later sessions (DeRubeis & Feeley, 1990). With the advent of increasingly sophisticated statistical techniques, this "chicken and egg" question may eventually be attempted by future researchers with the hope of providing additional

avenues for advancing both development of the working alliance, and ultimately, treatment success as perceived by both clients and therapists.

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