An Examination of Therapeutic Alliance During Prolonged Exposure in the Treatment of a Comorbid PTSD and SUD Population

Annelisa Pedersen

The Graduate Center, City University of New York

Recommended Citation
Pedersen, Annelisa, 'An Examination of Therapeutic Alliance During Prolonged Exposure in the Treatment of a Comorbid PTSD and SUD Population' (2017), CUNY Academic Works.
https://academicworks.cuny.edu/gc_etds/2192

How does access to this work benefit you? Let us know!
Follow this and additional works at: https://academicworks.cuny.edu/gc_etds
Part of the Clinical Psychology Commons

This Dissertation is brought to you by CUNY Academic Works. It has been accepted for inclusion in All Dissertations, Theses, and Capstone Projects by an authorized administrator of CUNY Academic Works. For more information, please contact deposit@gc.cuny.edu.
An Examination of Therapeutic Alliance During Prolonged Exposure in the Treatment of a Comorbid PTSD and SUD Population

By

Annelisa Helene Pedersen

A dissertation submitted to the Graduate Faculty in Psychology in partial fulfillment of the requirement for the degree of Doctor of Philosophy The City University of New York

2017
This manuscript has been read and accepted by the Graduate Faculty in Psychology in satisfaction of the dissertation requirement for the degree of Doctor of Philosophy.

________________________________________
Date
Eric Fertuck, Ph.D.
Chair of Examining Committee

________________________________________
Date
Richard Bodnar, Ph.D.
Acting Executive Officer, Psychology

________________________________________
Denise Hien, Ph.D.

________________________________________
Paul Wachtel, Ph.D.

________________________________________
Lesia Ruglass, Ph.D.

________________________________________
Teresa López-Castro, PhD

THE CITY UNIVERSITY OF NEW YORK
ABSTRACT
AN EXAMINATION OF THERAPEUTIC ALLIANCE DURING PROLONGED EXPOSURE IN THE TREATMENT OF A COMORBID PTSD AND SUD POPULATION

By
Annelisa Helene Pedersen

Adviser: Denise Hien, Ph.D.

Prolonged exposure has emerged as a highly effective method of treating PTSD (Foa, Hembree, & Rothbaum, 2007; Ruzek et al., 2014), yet for some individuals it has proven to be anxiety-arousing to the point of being contraindicated (Morris, 2015). As a treatment, prolonged exposure can be a challenging procedure to implement given the high levels of avoidance, fear, and resistance that often accompany a diagnosis of PTSD (Arntz, Tiesema, & Kindt, 2007; Hoffart et al., 2013; McLaughlin et al., 2014). When it is used to treat individuals who carry an additional diagnosis of SUD, further complications may arise with respect to avoidance and tolerating the temporarily anxiety-provoking nature of the treatment. To date, few studies have considered how the use of prolonged exposure in treating PTSD may impact the strength of the therapeutic alliance, and therefore additionally impact treatment outcomes. No studies have examined how prolonged exposure may be related to therapeutic alliance among comorbid substance use with PTSD. As a secondary analysis, this dissertation drew upon data from a randomized clinical trial conducted by Hien and colleagues assessing the relative efficacy of two active treatment conditions for individuals with substance dependence who additionally meet criteria for DSM-IV PTSD. This study explored the predictive capacity of early therapeutic alliance on treatment outcomes, changes in therapeutic alliance over the course of treatment and on the intra-session level when imaginal exposures were introduced, and the moderating impact of baseline PTSD and SUD severity on alliance as a predictor of treatment outcomes. Results:
Multiple linear regression identified no relationship between early therapeutic alliance and treatment outcomes across measures of both PTSD and SUD. Parametric and non-parametric analyses demonstrated a significant change in the strength of therapeutic alliance from the middle phase of treatment to the end phase of treatment. Paired samples t-tests and Wilcoxon signed-rank tests identified a significant strengthening of alliance following the introduction of imaginal exposure in both the middle and end phases of treatment. Correlational analyses demonstrated that changes in alliance did not correlate with concurrent self-reported symptom changes, and regression analyses revealed baseline symptomatology did not moderate the impact of early alliance on treatment outcomes. Altogether, this study offers a valuable contribution to the literature exploring the relationship between therapeutic alliance and prolonged exposure in the comorbid PTSD and SUD population, offering findings suggesting that rather than harming the alliance, prolonged exposure techniques strengthen the alliance instead.

**Keywords:** posttraumatic stress disorder, substance use disorder, therapeutic alliance, prolonged exposure
PREFACE

To begin, I am compelled to quote a passage from *The Evil Hours*, a memoir authored by David Morris, a retired Marine, who describes in detail his experience of a treatment he received at the San Diego VA for alcohol abuse and post-traumatic stress disorder. The treatment engaged evidence-based prolonged exposure techniques, used for the purpose of helping Morris overcome the fear and avoidance associated with his traumatic memories in combat. He writes:

I began to think of the treatment not as therapy so much as punishment. Penance. It went on like this for weeks. I would show up with some things I wanted to talk about . . . and after hearing me out, Scott would invariably direct me back to the imaginals. At one point, I went in and out of the cul-de-sac in Saydia eleven times in one afternoon. I say “I” went in and out of the cul-de-sac because I always felt like I was alone in this activity. It soon became clear to me that this was not ‘therapy’ in the sense that one traditionally thinks of it, as a conversation between therapist and patient where issues are raised and worked through, insights achieved. This, I saw, was a far more controlled form of treatment. Scripted even. Stage-managed. I had a role to play. (2015, p. 181)

Morris portrays his experience of prolonged exposure as unenviable. I highlight it here not just to provide a first person account of the kind of experience that provoked my initial motivation to pursue this topic, but to speak to the way in which prolonged exposure as a technique may create a particularly vulnerable dynamic between the patient and therapist who engage it. Of course, many other former patients who have received prolonged exposure would no doubt portray it in a far more positive, healing light, and would likely convey their therapists with a greater sense of aptitude. Further research into the relationships between patients and therapists while undergoing prolonged exposure may shed light on the differences between those who are able to tolerate it and those who are not. Further research may also illuminate how, especially when prolonged exposure is administered in the context of a short-term treatment like the one Morris was assigned to, developing a relationship that is sufficiently trusting and safe for such an arousing intervention with patients presenting with many vulnerabilities may be too difficult a
task to reliably achieve. The following study contributes to the questions that remain about the nature of the therapeutic relationship during prolonged exposure for individuals with comorbid PTSD and SUD.
ACKNOWLEDGMENTS

I am indebted to many individuals who have inspired and supported me along the long road of writing a dissertation. First and foremost, I am grateful to my advisor, Dr. Denise Hien. Denise, I remember discovering your work in 2010 when I was just beginning to consider seriously the idea of applying to programs in clinical psychology. Seven years later, I feel so grateful to have had you as inspiring role model as a teacher, researcher, and clinician. You have pushed me gently towards doing things I never imagined I could. Thank you for being a steady, calm hand beside me, and for offering me direction, confidence, and reassurance.

Thank you also to my mentors from the Trauma and Addiction Project. Dr. Lesia Ruglass, you introduced me to our studies, trained me in research fidelity, and have shared a wealth of knowledge about the therapeutic alliance literature that has been invaluable in this project. Dr. Teresa López-Castro, thank you for offering your support when the years of graduate training were wearing on me, for normalizing my experiences and reassuring me that yes, it would get better. I am also grateful to my first supervisor at TAP, Dr. Stephen Anen, who demonstrated the professionalism and caring I have sought to emulate throughout my training.

I also want to thank Dr. Paul Wachtel, whom I often feel is responsible for the twist of fate that enabled me to study at CCNY. You left such an impression on me in my interview in February 2011 that I knew without reservation that coming to CCNY was the right choice. As each year of my training has unfolded I feel increasingly lucky to have studied with you, both in your seminar, in working on my second doctoral exam, and in our fledgling research team. Thank you for your contributions to this project and for introducing me to the world of psychotherapy process research that I so hope to continue to be a part of. Thank you also to Dr. Eric Fertuck for your creative insights about how to make the most of my data set, and for
modeling how to be a cutting-edge researcher engaging dynamic concepts, and for encouraging your students to do the same.

This project would not have been possible without Laura Eidlitz, my co-captain in the endurance sport of learning and then training coding with the SWAI-O. Just as instrumental were Ron Nicholson and Emma Forester—thank you for the time and patience you contributed to coding, and for not giving up. Dr. Max Owens, thank you for teaching me that statistics can be intuitive and straight-forward. Somehow you make it look easy, and I have felt so comforted knowing you were on my team. Thank you also Dr. Zach Kahn for brainstorming with me about the study design, and for generously sharing your insights. I am also indebted to the 28 men and women who comprised the study sample. Thank you for volunteering to share your stories, your distress, and for embracing the opportunity to take the risk of change.

My parents, Moira Keller and Daniel Pedersen, thank you for always encouraging me to pursue work I care about, even if it doesn’t come with the highest financial reward. You have modeled a life committed to shaking up the status quo in some of our societies most fallible institutions. Beyond that, you have supported me through what has at times felt too much like an extended adolescence in graduate school, never making me question this was the right thing to do. Nick Pedersen, you will always be the older brother I look up to and adore.

And finally, Peter Lemons, where would I be without you? I never thought I would meet my husband on the 7th floor of the North Academic Center. It goes without saying how instrumental you have been with every stage of this process, from conceptualizing my questions to educating me in the literature of PTSD to guiding me through my analyses to formatting the final document. Beyond all that, thank you for keeping me grounded, for calming my nerves, and for making me feel so excited and grateful for the life we have ahead.
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>List of Figures</td>
<td>xiii</td>
</tr>
<tr>
<td>List of Tables</td>
<td>xiv</td>
</tr>
<tr>
<td>Chapter 1: Introduction</td>
<td>1</td>
</tr>
<tr>
<td>1.1 Rationale</td>
<td>1</td>
</tr>
<tr>
<td>1.2 Study Aims</td>
<td>3</td>
</tr>
<tr>
<td>Chapter 2: Review of the Literature</td>
<td>5</td>
</tr>
<tr>
<td>2.1 Therapeutic Alliance</td>
<td>5</td>
</tr>
<tr>
<td>History and Development of the Concept of Therapeutic Alliance</td>
<td>5</td>
</tr>
<tr>
<td>The Mechanisms and Measurement of Therapeutic Alliance</td>
<td>9</td>
</tr>
<tr>
<td>Therapeutic Alliance in the Treatment of PTSD</td>
<td>14</td>
</tr>
<tr>
<td>Therapeutic Alliance in the Treatment of SUD</td>
<td>16</td>
</tr>
<tr>
<td>Therapeutic Alliance in the Treatment of Comorbid PTSD &amp; SUD</td>
<td>19</td>
</tr>
<tr>
<td>2.2 Prolonged Exposure</td>
<td>21</td>
</tr>
<tr>
<td>The Mechanisms of Prolonged Exposure</td>
<td>21</td>
</tr>
<tr>
<td>Prolonged Exposure for PTSD</td>
<td>22</td>
</tr>
<tr>
<td>Prolonged Exposure with SUD</td>
<td>23</td>
</tr>
<tr>
<td>Challenges in Conducting Prolonged Exposure</td>
<td>24</td>
</tr>
<tr>
<td>2.3 Study Aims &amp; Hypotheses</td>
<td>26</td>
</tr>
<tr>
<td>Chapter 3: Methods</td>
<td>29</td>
</tr>
<tr>
<td>3.1 Study Design</td>
<td>29</td>
</tr>
<tr>
<td>3.2 Procedure</td>
<td>30</td>
</tr>
<tr>
<td>Participants</td>
<td>30</td>
</tr>
</tbody>
</table>
**Therapeutic Intervention**  
3.3 Measurement

**Measurements of Trauma and Traumatic Symptoms**  
**Measurements of Substance Use**  
**Measurement of Therapeutic Alliance**

**The Data**

**Coding Alliance**

3.4 Data Analyses

**Chapter 4: Results**

4.1 Baseline Characteristics

4.2 Descriptive Statistics

4.3 Missing Data

4.4 Hypothesis I Analysis

4.5 Hypothesis II Analysis

4.6 Hypothesis III Analysis

4.7 Case Study: Exp521

**Chapter 5: Discussion**

5.1 Summary of Main Findings

**Early Alliance Predicting Outcomes**

**Changes in Alliance Over Treatment**

**Impact of Imaginal Exposures on Alliance**

**Changes in Therapeutic Alliance and Concurrent Symptom Self-Report**
LIST OF FIGURES

Figure Number

1. Progression of Mean Therapeutic Alliance Scores Over Treatment Course 54
2. Mean Therapeutic Alliance Scores Before and After Imaginal Exposure, Session 5 56
3. Mean Therapeutic Alliance Scores Before and After Imaginal Exposure, Session 11 57
LIST OF TABLES

Table Number

1. Participant Characteristics of Group Randomized to COPE (n = 42) 43
2. Descriptive Statistics (N = 28) 45
3. Correlation coefficients of primary variables 46
4. Percent Missingness of Primary Variables (N = 28) 47
5. Regression Analysis of Early Therapeutic Alliance Variables Prediction of CAPS Severity at Follow-up (N = 28) 49
6. Regression Analysis of Early Therapeutic Alliance Variables Prediction of MPSS-SR Severity at Follow-up (N = 28) 50
7. Regression Analysis of Early Therapeutic Alliance Variables Prediction of Days of Primary Substance Use in Past Month at Follow-up (N = 28) 51
8. Regression Analysis of Early Therapeutic Alliance Variables Prediction of Days of Primary Substance Use in Past Week at Follow-up (N = 28) 52
9. Spearman's rank-order correlation for changes in therapeutic alliance and concurrent symptoms from beginning to middle of treatment (N = 28) 58
10. Spearman's rank-order correlation for changes in therapeutic alliance and concurrent symptoms from middle to end of treatment (N = 28) 59
11. Moderated Multiple Regression Analysis of Baseline PTSD Severity on Effect of Early Therapeutic Alliance on PTSD Severity at Follow-up (N = 28) 60
12. Moderated Multiple Regression Analysis of Baseline SUD Severity on Effect of Early Therapeutic Alliance on SUD Severity at Follow-up (N = 28) 61
13. Raw Therapeutic Alliance Coding Values for Exp521 65
CHAPTER 1: INTRODUCTION

1.1 Rationale

Post-traumatic stress disorder (PTSD) remains a significant public health problem, with 7.8% of people at risk for developing PTSD over the course of their lives (Gradus, 2013). Furthermore, PTSD and substance use disorders (SUD) frequently co-occur, with rates of PTSD among substance users ranging between 14% and 60% (Hien et al., 2005). The population of individuals with comorbid PTSD and SUD has proven to be a particularly challenging one to treat given the high levels of avoidance, fear, and resistance typically demonstrated among individuals with this combination of diagnoses (Brady et al., 1998). Because the treatment trajectories of individuals in this population are often particularly vulnerable, with high rates of drop out and non-adherence (López-Castro, 2015; Ruglass et al., 2012), the strength of the therapeutic relationship may be even more critical for helping to keep patients in treatment long enough to benefit from the active ingredients that will help mitigate their symptoms.

Recently, treatments for individuals who meet both sets of diagnostic criteria have been developed that aim to treat both the symptoms and the sources of distress: they teach skills for supporting a person’s goals of reducing or eliminating substance use, and they also aim, using prolonged exposure therapy, to help individuals become less afraid of the traumatic aspects of their past, such that the memories have less power over their daily lives. Yet, as well-designed and conceived as these treatments may be, accumulating evidence suggests that even these treatments are subject to the same high rates of drop-out and non-adherence as more traditional substance use treatments. There is an added worry, shared by many clinicians, that—even for patients diagnosed solely with PTSD—using prolonged exposure techniques to help patients confront their traumatic memories may actually harm certain patients more than it helps, and for
those with established substance use problems, it could place them at risk of relapse (Becker et al., 2004). While these concerns are as of yet unfounded in the research literature surrounding the use of prolonged exposure (Hagenaars, 2010; Van Minnen et al., 2012), the level of hesitation many share in regards to its use for some more vulnerable patients suggests that further investigation is warranted for understanding how the process of prolonged exposure techniques interact with treatment response and psychotherapy process factors, such as therapeutic alliance.

Therapeutic Alliance is conceptualized as the combination of a number of factors, including a patient’s attachment to his/her therapist as well as the patient’s investment in the specific tasks of the process of therapy (Bordin, 1994; Horvath, Re, Flückiger, & Symonds, 2011). Because therapeutic alliance is known to be a reliable predictor of positive treatment outcomes (Horvath et al., 2011), it is an important factor to consider when understanding treatment efficacy, especially in the context of working with a population known to demonstrate fragile adherence. It has been well-established in the literature that patients presenting with substance use disorders can be challenging individuals to develop a bond with therapeutically. For some, this can be explained by an underlying mistrust of others stemming from abuse suffered in childhood (Gaiton, 2004), and for some, by challenges relating to years of substance use that impact a person’s ability to relate with others (Uekermann & Daum, 2008). Individuals presenting with PTSD can also be difficult to develop a therapeutic bond with, in part because of the lack of trust patients often demonstrate in close relationships. When the disorders are experienced co-morbidly, for some the difficulty establishing a therapeutic connection can be made even more challenging. This lack of underlying trust and confidence in the relationship and
the treatment can threaten to derail the good intentions and motivations that both patient and therapist may bring to the treatment relationship.

Therefore it is critical to explore further how therapeutic alliance may function in the treatment of this particular population in order to ascertain how using prolonged exposure may be related to changes in the therapeutic alliance over the course of treatment as well as to treatment outcomes.

1.2 Study Aims

There are three primary goals of the present study. The first aim is to understand if there is a relationship between alliance established early in the therapeutic relationship and changes in PTSD and SUD symptoms at the end of the treatment. The second aim has three components: 1) to understand whether the strength of the alliance changes over the course of treatment, especially after the beginning of imaginal exposures midway through, 2) to understand if the onset of imaginal exposures impacts the therapeutic alliance within the sessions that engage it, and 3) to understand if any changes in the therapeutic alliance are further related to changes in PTSD and SUD symptoms reported by participants as they proceed with treatment. The third and final aim is to understand whether baseline symptom severity (trauma symptoms and substance use symptoms) moderates the effect of early therapeutic alliance on treatment outcomes. These goals will help illustrate whether or not, with this particularly vulnerable population, therapeutic alliance is related not only to treatment outcomes, but to the phase of treatment, and will help distinguish patients who are better able to form an alliance and therefore tolerate the anxiety-arousing nature of the treatment.

The following encompasses a literature review of the relevant theoretical and research-based findings pertaining to therapeutic alliance and prolonged exposure for individuals with
PTSD and SUD, the methodology that was used in pursuing the research questions, followed by the results and a discussion of the findings.
CHAPTER 2: REVIEW OF THE LITERATURE

This section reviews the relevant academic literature, covering the history and conceptualization of the therapeutic alliance, and studies of alliance with both PTSD and SUD-affected populations, and it will also review the literature about the mechanisms underlying prolonged exposure and how effective these methods have been in studies with individuals not only with PTSD, but with SUD as well. Finally, the review will address the literature pertaining to the relationship between therapeutic alliance and severity of PTSD (high vs. low), and severity of substance use (high vs. low).

2.1 Therapeutic Alliance

**History and Development of the Concept of Therapeutic Alliance.** Over the course of the 20th century, as a subject, therapeutic alliance has inspired many periods of theoretical and empirical investigation. The concept of therapeutic alliance dates back to Freud, who developed the notion of transference in psychotherapy as an integral component of successful treatments. Freud’s explanation of transference was that it was the result of unconsciously displacing affects held for one person onto a different person. Affects associated originally with a parent were often, Freud found, transferred onto the analyst. Safran and Muran (2000) write about how the importance of “friendliness and affection” (2000, p. 7) was not lost on Freud, who described these attributes in the analyst as “the vehicle of success in psychoanalysis” (Freud, 1912). Freud elaborated on how a positive transference helped to bind the patient and therapist, thereby supporting the patient through treatment in spite of the anxiety it induced (Freud, 1914).

Another originator of ideas that would give way to the concept of the therapeutic alliance was Sándor Ferenczi. He was the first to argue the importance of patients reliving aspects of problematic previous relationships in the context of the therapeutic relationship (1932, cited in
Safran & Muran, 2000). Ferenczi also wrote extensively about how the analyst’s own personality and set of experiences can influence the process of treatment. He was the first to emphasize the importance of authenticity in the therapeutic relationship (1932), another factor that would later bear upon the development of the therapeutic alliance concept.

Zetzel first introduced the term “alliance” (Horvath, 2011), and she was also the first writer to suggest that alliance was central to any therapeutic intervention (1956, 1966). Safran and Muran summarize Zetzel’s argument that:

The alliance is dependent on the patient’s fundamental capacity to form a stable trusting relationship, which in turn is rooted in his or her early developmental experiences. She believed that when this capacity does not exist at the outset, it is critical for the therapist to provide a supportive relationship that facilitates the development of an alliance, in the same way that a mother needs to provide the appropriate maternal environment to facilitate the development of a fundamental sense of trust. (2000, p. 8)

In emphasizing the maternal qualities a therapist emanates in establishing alliance, Zetzel’s ideas bear resemblance to Friedman’s model for alliance that focuses on hope and rapport (1969), as well as with Winnicott’s conception of therapy as a “holding environment” (1965, cited in Safran & Muran, 2000) and Klein’s perspective on “containment” in the therapeutic relationship (Bion, 1962, cited in Safran & Muran, 2000). For Zetzel the idea of the “alliance” captures the interpersonal glue that keeps a therapist and client bonded together.

Writing in the tradition of the ego analysts, Greenson (1971) directed attention towards reality-oriented aspects of the therapeutic relationship, focusing on the actual interaction between analyst and patient rather than on transferential dimensions that emerge in treatment. Greenson elaborated how the therapeutic relationship consisted of both “a transference configuration” as well as “a real relationship,” the real relationship being “the mutual human response of the
patient and therapist to each other, including undistorted perceptions and authentic liking, trust, and respect for each other” (Safran & Muran, 2000, p. 9).

Throughout the history of scholarship about the therapeutic alliance, there has been a tension between the extent to which unconscious transference elements and conscious, reality-based aspects of the patient-therapist relationship influence the therapeutic bond. Some, including Handy, Lacan, and Brenner argued that the concept of the therapeutic alliance risked focusing on reality-based aspects of the relationship to the detriment of the transference, neglecting the full range of interpretations and insight an in depth exploration of the transference could yield (Safran & Muran, 2000).

Luborsky (1976) was also highly influential in this area, introducing the concept of “helping alliance,” and how it unfolds in two primary phases: 1) the first phase when the therapist creates a supportive and caring relationship with the client, who in turn begins to perceive the therapist as a person with the power to help him change; 2) and the second phase when the client demonstrates an investment in the therapeutic process, showing a shared ownership for the therapy and a commitment to the exploration (Horvath, 2011).

Safran & Muran suggest that the relational turn in psychoanalytic thought has ushered in new ways of thinking about the alliance, pointing out influences from feminist theory and the idea of intersubjectivity (Aron, 1996). They address the reason why alliance has received less attention in recent years in psychoanalytic circles:

Relational thinking opposes the rigid demarcation between subject and object, between observer and observed, with its emphasis on reason and rationality. What is real or unreal, true or untrue, is replaced by the recognition that there are multiple truths and that these truths are socially constructed. The distinction between transference and real aspects of the relationship thus becomes meaningless. (p. 10)
Meanwhile however, the alliance has maintained central value in the experiential tradition, where the emphasis is on maintaining empathy in the relationship while engaging more directive techniques (Safran & Muran, 2000, citing Rogers, 1951 and Greenberg, Rice, & Elliott, 1993). The alliance eventually assumed a more visible role in contemporary cognitive-behavioral thinking (Newman, 1998) as well as in family therapy (Rait, 1998).

The alliance now holds a position of value across therapeutic traditions, making it a uniquely integrative variable, and one of immense value in psychotherapy research. This interest can be attributed to, as Safran & Muran write, “the search for understanding change across treatments, given that no particular treatment has been shown to be consistently more effective than any other” (2000, p. 11).

Perhaps most influential of all the voices advancing research using the concept of therapeutic alliance in the 20th Century was Bordin. When Bordin (1976) introduced the concept of “working alliance,” he shifted the discussion around alliance even further away from its largely psychodynamic origins and towards a more collaborative, conscious way of conceptualizing alliance. He argued that a strong alliance was necessary for change across orientations within psychotherapy (Safran & Muran, 2000). For Bordin, working alliance was composed of three major processes: 1) agreement between therapist and patient on the therapeutic goals of treatment, which he conceptualized as the general objectives the treatment is aimed at achieving for the patient; 2) agreement on the tasks that comprise treatment, which consist of the specific activities the patient (and therapist) must practice or pursue in order for the patient to experience therapeutic gains; and finally, 3) the development of a bond within the dyad, which can be understood as the affective nature within the dyad that includes factors such as confidence, trust, and acceptance (Horvath, 2011; Bordin 1976, 1979, 1980, 1989; Horvath &
Luborsky, 1993). Within Bordin’s framework, these three dimensions are highly interrelated and mutually influential, and highlight the dynamic nature of the alliance and how it is dependent upon the unique combination of patient, therapist, and therapeutic modality, and how it is a combination of both therapy-specific and nonspecific components (Safran, 1993).

The Mechanisms and Measurement of Therapeutic Alliance. Increasingly in the 20th Century, the concept of therapeutic alliance was appropriated for research, yielding a flourish of instruments developed specifically to measure the multifaceted nature of the concept. These include the Pennsylvania Scales (Alexander and Luborsky, 1986), the Vanderbilt Scales (Suh et al., 1986; Hartley & Strupp, 1983), the Toronto Scales (Marziali et al., 1981; Marziali 1984), the Working Alliance Inventory (WAI; Horvath & Greenberg, 1986), the California Scales (Marmar et al., 1989a; Marmar et al., 1989b), and the Therapeutic Bond Scales (TBS; Saunders et al., 1989; Martin et al., 2000). While alliance is most often evaluated from the perspective of the patient, reliable measures have also been developed for use by both therapists and observers. Surprisingly, outcome evaluations measured from these three different perspectives yield limited amounts of overlap (Horvath & Symonds, 1991), perhaps because they offer distinct, possibly irreconcilable standpoints (Horvath, Marx, & Kamann, 1990). Horvath and Symonds’ 1991 meta-analysis revealed that clients’ ratings of the alliance generally have the strongest predictive relationship with outcomes, but that observers’ reports of alliance are typically stronger predictors of outcome than therapist’s ratings. A meta-analysis conducted by Martin and colleagues (2000) compared results of studies of therapeutic alliance taken from all three perspectives, and tentatively concluded that patients typically perceive alliance with their therapists as stable over time, while observers and therapists generally indicate more variation in strength of alliance over the course of treatment. Furthermore, Martin (2000) recommends the
WAI as an effective measure of alliance for most research projects given that it is structured to generate an overall alliance score, as well as specific assessment scores for the two central elements of alliance as put forward by Horvath and Luborsky (1993): the affective attachment within the therapeutic dyad, and the willingness and investment put into the therapeutic process.

The most notable finding over the decades is the following: that therapeutic alliance has been documented time and again as having a strong relationship with psychotherapy outcomes (Norcross, 2011). A meta-analysis conducted by Horvath et al. (2011) indicated that among the nearly 200 alliance-outcome studies assessed there was an aggregate correlation of .275, designating a moderate-to-large effect. The underlying mechanism enabling the connection between alliance and outcome, however, has often been disputed (Martin et al., 2000; Crits-Christoph et al., 2013), and remains a point of theoretical speculation.

One theory, put forward by authors including Rogers (1957) and Henry et al. (1994), posits that a patient will experience his bond with the therapist as therapeutic if a healthy alliance is established, irrespective of specific tasks. This standpoint is supported by meta-analyses that find a moderate alliance-outcome correlation ($r = .22$), and furthermore find that type of treatment, whether cognitive, behavioral, or psychodynamic, does not influence the strength of the alliance-outcome relationship in either direction (Martin et al., 2000). This particular meta-analysis also yielded results suggesting that type of outcome measure, time of alliance assessment, and type of alliance rater also do not moderate the alliance-outcome relationship, further supporting the position that if alliance is strong enough, the patient is likely to experience the relationship as therapeutic regardless of the other myriad possible therapeutic ingredients. These findings agree with Rogers’ assertion that the relationship provided by the therapist is a

Others, including psychoanalytic authors such as Greenson (1965), support the idea that a proper alliance is a prerequisite that allows the specific treatment interventions to be effective—in a sense that alliance is the vehicle through which the therapeutic ingredients can be safely delivered (Gaston, 1990). Some (Feeley et al., 1999; Strunk et al., 2010) have speculated that a healthy alliance could in fact be the outcome of in-treatment changes the patient experiences, that enable him to perceive the relationship with his therapist as helpful and therefore therapeutic.

An alternative and perhaps more nuanced position suggests that instead of functioning predictably across different patient populations and treatment types, therapeutic alliance may in fact interact with specific treatment approaches (Martin et al., 2000; Gaston, 1990), functioning differently with different types of patients depending on the treatment engaged. For example, Zetzel (1956) argued that a “supportive strategy” (in contrast with an exploratory strategy) should be engaged with patients who have more difficulty engaging and developing a connection, acknowledging how patients who struggle to trust others will need more supportive interventions to develop a secure attachment within the treatment relationship. A study conducted by Gaston, Ring, and Marmar (1989) that investigated differences in alliance across treatment responders and non-responders in brief dynamic therapy offers some support for this position, finding that exploratory strategies were effective in the context of a stronger alliance and resulted in patient improvement, whereas non-responders in the same study did not benefit from the same exploratory strategies and demonstrated comparatively weaker alliances. This
study offers some evidence suggesting that there may be an interaction between type of intervention (exploratory vs. supportive) and strength of alliance in predicting outcome.

Even so, while a stronger therapeutic alliance is known to be related to superior outcomes across a wide range of mental disorders and therapeutic approaches (Flückiger, Del Re, Wampold, Symonds, & Horvath, 2012), it is possible that alliance may function differently depending upon the nature of the disorder being treated and the treatment approach in use (Hoffart et al., 2013, Ulvenes et al., 2012). Patients presenting with major depressive disorder may struggle to develop an alliance more than others, likely as a result of the limited positive emotions exhibited during treatment, and because of the low engagement and motivation patients with MDD often bring to treatment (McLaughlin et al., 2013). Evidence from a trial by Levin and colleagues (2012) suggests that therapists reported a stronger alliance with those patients presenting with anxiety alone in comparison to those presenting with co-occurring depression. Furthermore, individuals with a history of childhood abuse as well as those with impaired interpersonal functioning in social, family, intimate, and work relationships may also struggle disproportionately to develop a healthy therapeutic alliance during treatment (Elz, Shirk, & Sarlin, 1995).

Though the alliance-outcome relationship is upheld regardless of type of treatment and use of disorder-specific manuals (Flückiger et al., 2012), there is some evidence suggesting that the specific aspects of alliance (e.g. task, bond) may function differently across therapeutic approaches. For example, Webb and colleagues researched the alliance-outcome relationship in cognitive therapy for depression, and found that agreement surrounding goals and tasks was related to subsequent improvement, and that the strength of the bond was unrelated to outcomes (2011). Ulvenes et al. (2012) compared the relationship between therapeutic bond and treatment
outcomes across short-term dynamic psychotherapy and cognitive therapy for cluster C patients (those with anxious, fearful traits who carry a diagnosis of Avoidant, Dependent, or Obsessive-Compulsive personality disorder), and found that bond functioned differently across the two treatments, with a focus on affect supporting the benefits of the dynamic therapy but hindering the benefits of cognitive therapy.

The past several decades have also given rise to research about how changes in alliance over the course of treatment are related to therapeutic gains. Gelso and Carter were among the first to theorize in this area. They proposed the idea that a “U-shape” is optimal for therapeutic alliance over the course of a short-term therapeutic intervention, meaning that those patterns of alliance that begin strong, and then drop as the work of therapy proceeds and challenging topics are explored, and then finally regain strength as treatment concludes lead to optimal outcomes (1994). This theory gained empirical validation with investigations conducted by Safran et al. (2001) and Kivlighan and Shaughnessy (2000), whose study collected data suggesting that a U-shape was superior to “linear alliance growth” and “stable” alliance patterns in terms of treatment outcomes. Safran and Muran (2000) have extended the exploration of how changes in therapeutic alliance over the course of treatment may relate to outcomes by examining how “ruptures” in treatment, moments when the quality of the alliance is suddenly threatened due to therapist missteps or breaks in attunement, and how “rupture-repairs”—times when a rupture is attended to and resolved—may impact a patient’s ability to benefit from treatment. There is a growing body of evidence suggesting that treatments that experience repaired ruptures may in fact have more favorable treatment outcomes than treatments that do not (McLaughlin et al., 2014; Strauss et al., 2006; Stiles et al., 2004).
Next, the review of the literature turns to exploring the research into how investigations of therapeutic alliance have been applied in treatments involving individuals with PTSD and SUD, both separately and together.

**Therapeutic Alliance in the Treatment of PTSD.** Symptoms associated with PTSD may lead to unique challenges in forming a strong therapeutic alliance. Investigators Chemtob, Novaco, Hamada, and Gross (1997) gathered evidence to suggest that anger related to PTSD directly compromised the therapeutic relationship, thereby negatively impacting the treatment outcome and also putting clients at risk of terminating treatment prematurely. Other investigators link the long-term results of trauma exposure, such as difficulty in sustaining interpersonal relationships and challenges with emotion regulation, as factors that may threaten the formation of a strong therapeutic alliance during treatment (Price, Hilsenroth, Petretic-Jackson, & Bonge, 2001).

Several groups of investigators have explored the factors influencing the therapeutic alliance specifically when using prolonged exposure for the treatment of PTSD. Cloitre and colleagues (2004) investigated how therapeutic alliance and mood regulation contributed to the two-phase treatment of child abuse-related PTSD drawing upon skill-building techniques in the first phase and imaginal exposure to traumatic memories in the second. Their results suggested that the strength of the therapeutic alliance formed during the first phase of treatment predicted a decline in PTSD symptoms at posttreatment (2004). More recently, other teams have also been investigating how therapeutic alliance may be related to the treatment of PTSD using prolonged exposure. McLaughlin and colleagues (2014) examined patterns and shifts in alliance by exploring rupture-repair episodes in a group of predominantly white, female, individuals receiving prolonged exposure for PTSD, and found that ruptures in alliance were common, with
almost 50% of participants experiencing a rupture over the course of treatment, and also finding that unrepaired ruptures predicted worse treatment outcome \((\text{Beta} = .44, p = .001)\). Hoffart and colleagues (2013) investigated within-person processes relating to alliance and outcome in a study that treated individuals in a residential treatment clinic in Norway with PTSD with two different imagery procedures: imaginal exposure and imagery rescripting. The investigators found that a weaker relationship between agreement about the tasks of therapy and bond predicted more severe subsequent PTSD symptoms, and found that this negative relationship was stronger for individuals who received imaginal exposure. All the above studies provide evidence for the importance of attending to alliance in the context of treating PTSD with prolonged exposure techniques, and suggest that alliance may be uniquely threatened by the use of such therapeutic interventions, especially when ruptures are not adequately repaired.

There is also a body of evidence suggesting that practitioners are consistently reluctant to use exposure therapy to treat PTSD (Morris, 2015; van Minnen et al., 2015; van Minnen et al. 2012), and that as a result prolonged exposure for PTSD has been under-engaged in clinical settings (Becker et al., 2004). Becker and colleagues surveyed 852 psychologists to ascertain the factors that make them reluctant to use prolonged exposure with patients suffering from PTSD (2004). In this study, respondents indicated that features such as dissociation and comorbid diagnoses would make them consider prolonged exposure as contraindicated, and they also expressed concern that imaginal exposures in particular could place patients at risk of experiencing heightened suicidality or more severe substance use. Becker et al. elaborate how participants worried that using imaginal exposure would lead their patients to terminate therapy prematurely (2004). Furthermore, the investigators observed that these perceptions “did not vary according to training, familiarity, comfort, or theoretical orientation” (2004, p. 289), and
comment how imaginal exposure presents a unique set of barriers to therapists in clinical practice—even to those who are thoroughly trained in behavioral interventions for PTSD.

And indeed, conducting therapy with trauma survivors is rarely straightforward. A whole field of inquiry has developed looking into secondary trauma (or “vicarious trauma”). Figley defines secondary trauma as “the natural consequent behaviors and emotions resulting from knowing about a traumatizing event experienced by a significant other—the stress resulting from helping or wanting to help the traumatized or suffering person” (1993, p. 7). Hesse writes in her exploration of secondary trauma, citing Herman (1992) and Edelwich & Brodsky (1980): “most agree that working with clients who have been traumatized has inevitable, long-lasting, and often detrimental effects on therapists, and that these reactions may occur regardless of race, gender, age, or level of training” (2002, p. 296). She goes on to comment on how natural reactions experienced by the therapist can often impact the therapeutic relationship, explaining that “even well-trained and skilled therapists may not be able to remain empathic towards clients if they are suffering from secondary trauma,” further cautioning that “clients can actually be harmed or possibly even re-traumatized by such reactions” when they manifest in the therapeutic interaction as distancing or numbness (2002, p. 301). Given the difficulty of the content and intersubjective experiences that emerge in working with trauma survivors, therapists must maintain a high level of awareness about their own reactions to the treatment. Because analysis of alliance necessarily involves the contribution of the therapist, it is all the more important to understand how a therapist could be uniquely challenged in her work when treating a patient with a trauma history.

Therapeutic alliance in the Treatment of SUD. Given the high levels of substance use among trauma survivors, with lifetime prevalence of SUD ranging from 22% to 43% among persons with PTSD (Kessler et al., 1995; Breslau et al., 1991), it is also important to consider the
dynamics that emerge in the alliance when treating individuals with substance use disorders. Establishing a healthy alliance with individuals with a history of substance use can be challenged by many factors. The following explores the literature concerning alliance in psychotherapy studies with substance users.

Studies looking into the therapeutic alliance in the treatment of substance use have yielded mixed results. DeWeert-Van Oene et al. (1999) collected data suggesting that there was a positive relationship between the patient’s rating of alliance and retention rates for substance use treatment. In addition, stronger alliance and client engagement has been shown to correlate with a reduction of drug-use during treatment (Meier et al., 2005b). In contrast, a study conducted by Barber et al. (2001) using data from the National Institute on Drug Abuse Collaborative Cocaine Treatment Study (CCTS) demonstrated that among their sample, comprised of individuals with cocaine dependence in outpatient treatment, self-reported assessments of alliance were found to relate to retention as a function of treatment type, but did not relate to cocaine use outcomes. Similar findings were established in a meta-analysis conducted by Meier, Barrowclough, and Donmall (2005) that reviewed two decades worth of alliance-outcome studies among substance users, and found that while early alliance consistently predicted treatment retention, it failed to consistently predict substance use outcomes posttreatment.

In the case of treating individuals with substance use disorders, weaker alliance-outcome relationships have been documented in comparison with other diagnoses (Flüückiger et al., 2013; Horvath & Bedi, 2002). In part, the weakened strength of alliance can be attributed to the impact that alcohol and other substances have on social skills, including reading facial expressions, understanding humor, and demonstrating theory of mind (Uekermann & Daum, 2008). The
various social, interpersonal, and psychological challenges that are associated with chronic alcohol and other substance use disorders (Bates, Bowden, and Barry, 2002) have the potential to hinder the ability of substance-using clients to develop strong bonds with their therapists, and therefore, to benefit from treatment.

Another study investigated factors that predict alliance formation during drug treatment, and found that demographic factors including age, ethnicity, gender, employment and marital status were found to be unrelated to the strength of the therapeutic relationship (Meier et al., 2005b). This suggests that it may be difficult to anticipate which kinds of substance-using patients are likely to form a stronger alliance and consequently experience the full benefit of treatment interventions. However, Meier et al.’s 2005 review of therapeutic alliance in the treatment of substance misuse also indicates that further research is merited looking into possible interactions between psychiatric severity and formation of therapeutic alliance. While several studies failed to show any relationship between severity of substance use and formation of early therapeutic alliance (among alcohol users [Connors et al., 2000] and drug users [Barber et al., 1999] alike), the authors presented some evidence from a study published by Petry & Bickel (1999) that found that for clients with opioid dependence who presented with fewer psychiatric concerns, therapeutic alliance was unrelated to the completion of treatment, but for clients with more severe psychopathology the strength of the alliance significantly predicted the completion of treatment. Such a finding encourages further investigation, especially among individuals with comorbid diagnoses, regarding how the severity of symptoms may predict the formation of a healthy alliance.

A more promising line of research in terms of understanding therapeutic alliance within the substance use literature has been in the area of understanding social relationships among
substance users. Bell et al. found that many substance users reported having a history of diminished ties in social relationships and with family members, as well as unsatisfactory relationships as adults (1996; Meier et al., 2005a). Healthy social networks during and after treatment for substance use have consistently been related to long-term reductions in substance use after treatment has ended (Meier et al., 2005a; Hser et al., 1999; Broome et al., 2002). These findings are consistent with prior research that individuals who are at ease in emotionally close relationships and who enjoy a secure attachment style are better able to develop a stronger alliance during treatment (Eames & Roth, 2000; Meier et al., 2005a).

Still, the question of how to best measure alliance in studies with substance users remains unanswered. Few studies have examined alliance at several time points over the course of treatment, as most studies of alliance choose one time point, usually early in the treatment, in order to understand the relationship between early alliance and treatment outcomes (Meier et al. 2005a). In addition, investigators disagree about which rater perspective has the most predictive value in studies with substance users, though there is some evidence to suggest that observer ratings, more so than client and therapist ratings, predict treatment retention most reliably (Fenton et al. 2001; Meier et al., 2005a).

**Therapeutic Alliance in the Treatment of Comorbid PTSD and SUD.** The research investigating the nature of therapeutic alliance in treatments for comorbid PTSD and SUD is concerningy scarce. Ruglass et al. (2012) are among the few to have looked into this area, in particular investigating the association between therapeutic alliance and treatment outcomes among women with PTSD and SUD receiving group treatments for trauma and addictions. They found that those participants randomized into a treatment designed specifically to treat trauma and addiction (Seeking Safety [Najavits, 2002]) endorsed higher outcome ratings in comparison
with those participants randomized to a psychoeducational control group. Furthermore, Ruglass et al. found that alliance was associated with significant decreases in PTSD symptoms and treatment adherence across both interventions, and that alliance did not have a relationship with substance use outcomes (2012). Individuals with co-occurring PTSD and SUD often have more extremely impaired presentations than those individuals with just one or the other disorder (Brady, Back, & Coffey, 2004), making it both more difficult and perhaps even more important to develop a strong therapeutic alliance. Ruglass et al. point to the importance of additional investigation into the severity of trauma as it relates to the relationship between therapeutic alliance and treatment outcomes for this comorbid population (2012). This is especially important given the relative lack of research to date that distinguishes between partial and full PTSD as predictors of outcome, a trend that is reflected in the literature pertaining directly to therapeutic alliance in the context of PTSD. It is possible that further exploration in this arena would demonstrate similar outcomes to studies investigating the connection between PTSD symptom severity and social network characteristics. One recent analysis identified inverse correlations between PTSD symptom severity and aspects of participants’ evaluation of their perceived social support among a sample of individuals with comorbid PTSD and alcohol use disorders (Eidlitz & Pedersen, 2014).

This review demonstrates the critical importance of further investigation into the nature of therapeutic alliance in studies with individuals living with both PTSD and SUD. Given that symptoms relating to PTSD and symptoms relating to SUD are known to interfere with the formation of a strong alliance, when these symptom clusters present in combination, the therapist-patient relationship may be especially fragile. Past research also demonstrates the need for investigations that examine how therapeutic alliance may change over the course of
treatment, and whether or not such changes are related to symptom reduction and/or treatment adherence. The research also demonstrates how alliance has historically been treated as a predictive (independent) and outcome (dependent) variable, which will be consistent with the questions proposed in the present study. Now, this review turns to understanding prolonged exposure therapy, the treatment engaged to treat individuals with comorbid PTSD and SUD in the following analyses.

2.2 Prolonged Exposure

Prolonged exposure has been established as a treatment with a compelling evidence base supporting its efficacy in diverse populations. It has emerged as one of the leading non-pharmacological treatments for PTSD among victims of sexual assault, combat veterans, and active military personnel (Ruzek et al., 2014; Tuerk et al. 2011; Powers et al., 2010). More recently it has also been engaged in treating individuals suffering from comorbid PTSD and SUD. And yet, it has also developed a reputation as a difficult treatment that some practitioners and treatment-seekers alike are reluctant to pursue. The following section explores the origins of prolonged exposure, its efficacy in treating PTSD as well as comorbid PTSD and SUD, and further examines some of the challenges that emerge in the application of prolonged exposure in these vulnerable populations.

The Mechanisms of Prolonged Exposure. The origins of exposure therapy derive from Wolpe’s systematic desensitization experiments conducted in the 1950s on fear learning and unlearning in cats. After developing a theory of desensitization through studying animals, Wolpe transferred his findings to clinical work with human subjects. He utilized imaginal exercises by having patients bring to mind “brief, anxiety-provoking scenes” (McNally, 2007, p. 751), functioning as a conditioned stimulus (CS), that would be overridden by the sense of calm
engendered by the patient’s previously initiated deep muscle relaxation. He theorized that the relaxation “response” disrupted, or weakened, the conditioned fear response (CR) (McNally, 2007) that patient would have experienced without the benefits of deep muscle relaxation. Wolpe and his behaviorally oriented followers were able to demonstrate the clinical utility of this exposure-based technique, but it was not until cognitive investigators sought to understand the mechanisms underlying exposure therapy that a sense of the active ingredients enabling positive clinical outcomes emerged (McNally, 2007).

Edna Foa and Michael Kozak pioneered the investigation into the cognitive mechanisms supporting exposure therapy. Drawing on the work of Lang (1977), they developed the theory of emotional processing (1986), defined as “the modification of memory structures that underlie emotions,” and explain how the “emotional processing of a fear structure,” as seen in successful exposure therapy, must involve “cognitive representations of the stimulus characteristic of the fear situation, the individual’s responses within it, and aspects of its meaning for the individual” (1986, p. 20). After the fearful memories have been activated within the patient as a result of his imaginal re-experiencing and re-telling, Foa and Kozak write how “information made available must include elements that are incompatible with some of those that exist in the fear structure, so that a new memory can be formed” (1986, p. 22). For emotional change to come about, this new information, “which is at once cognitive and affective” and that is typically provided by the therapist, must be integrated into the “evoked information structure” (p. 22).

**Prolonged Exposure for PTSD.** Studies consistently demonstrate medium to large effect sizes relating to the efficacy of prolonged exposure to address the symptoms of PTSD. In their meta-analysis, Powers and colleagues (2010) compared the efficacy of prolonged exposure for PTSD to alternative treatments for trauma, including EMDR and cognitive processing therapy
(CPT) and to control samples that had been waitlisted or that had received psychological placebo treatments. While prolonged exposure was demonstrated to be just as effective as alternative trauma-focused therapies, the investigators found, as hypothesized, that prolonged exposure outperformed control conditions when considering measures of PTSD at both post-treatment (g = 1.08) and at follow-up (g = 0.68). Investigators also found that prolonged exposure was related to superior outcomes on ancillary measures of depression at post-treatment (g = 0.77) and follow-up (g = 0.41) (Powers et al., 2010). No significant association was found between dose (the number of sessions) and effect size, although the range of sessions of all but four of the studies included was narrow, between 8 and 17. Furthermore, the findings across studies were found to have a strong effect size to the extent that, when trying to account for the “file drawer problem” (Rosenthal, 1991), the authors calculated that 446 studies—published presently or in the future—with an effect size of 0 would be required to lower the effect size of the primary hypotheses regarding efficacy down into a non-significant range (Powers, 2010). Powerful effect sizes have been demonstrated in both civilian and veteran populations, among women victims of rape (Resick et al., 2002), women victims of assault (Foa et al., 1999), and combat veterans (Cooper & Clum, 1989). Powers et al. conclude their meta-analysis stating that “a therapist can expect that his/her average prolonged exposure treated patient will fare better than 86% of patients treated with supportive counseling and similar unstructured talk therapies” (2010, p. 640).

**Prolonged Exposure with SUD.** The literature investigating the efficacy of prolonged exposure for individuals with comorbid PTSD and substance use, however, is somewhat less encouraging. A group of investigators have started integrating prolonged exposure techniques into treatment for substance users who also endorse PTSD symptoms, and results to date have
been mixed. Most recently, a study conducted by Mills and colleagues (2012) in Sydney concluded that Concurrent Treatment of PTSD and Substance Use Disorders using Prolonged Exposure (COPE)—the same treatment engaged in the study this dissertation is based upon—effectively reduced trauma symptoms, even in a population long considered to be too risky to treat with prolonged exposure techniques. However, the investigators also found that substance use symptoms were not reduced. From one perspective these results are encouraging given the commonly held fear that using prolonged exposure with this particularly vulnerable population would in fact exacerbate substance use. The authors also reported a high drop-out rate, with median levels of sessions attended among participants at 5 out of 13 sessions offered, and encouraged future research to incorporate treatment retention interventions to address this well-established challenge. Even so, the high drop-out rate suggests that many participants had a difficult time tolerating the treatment, choosing to remove themselves from the study just after the difficult work of the imaginal exposures began.

Earlier studies also support the use of combined exposure plus substance use treatments with this comorbid population. Coffey and colleagues published results from a 2005 study examining the efficacy of CTPCD, a concurrent treatment of PTSD and cocaine dependence that integrates exposure, and conclude that “exposure-based techniques are well tolerated by clients” with combined PTSD and SUD. However it seems this conclusion must be received with caution because 75% of the study sample had dropped out of treatment before the exposure sessions began, potentially indicating that participants removed themselves from treatment in anticipation of the sessions involving exposure.

**Challenges in Conducting Prolonged Exposure.** In practice, prolonged exposure often proves to be a challenging treatment to engage for both the patient and therapist. In the context
of imaginal exposures, the patient is required to remember in vivid detail memories of a traumatic event that often results in experiencing arousal and at times, emotional distress. On the receiving end of these descriptions, the therapist is also tasked with confronting these memories collaboratively with the patient, and may experience her own distressing emotional responses, possibly resulting in feelings of powerlessness (Arntz, Tiesema, & Kindt, 2007). Accordingly, some clinicians hesitate to treat their patients with a course of prolonged exposure therapy. Becker and Zayfert (2001) write how in their view, exposure therapy is not indicated for patients exhibiting “dissociation, impulsivity, and self-destructive behaviors” (p. 107). In acknowledging the high drop-out and nonresponse rates in studies of exposure therapy, Cook, Schnurr, and Foa agree that prolonged exposure techniques must be undertaken with care, and that factors including a supportive therapeutic alliance and empathy must be fully engaged (2004). Despite the insight from clinical practitioners, the research literature in many ways still has yet to support these positions with empirical findings. For example, a study by Hagenaars (2010) that directly examined whether clients with dissociative profiles might stand to benefit less from prolonged exposure therapy led to findings suggesting that dissociation did not predict poor outcome in exposure therapy.

As noted above, it is also possible that the challenges inherent in prolonged exposure may threaten the patient’s desire to continue engaging in treatment (Hoffart et al., 2013; McLaughlin et al., 2014). Yet there is a dearth of research identifying predictors of dropout. A study that examined predictors of treatment adherence and outcome across two different samples of participants receiving Prolonged Exposure for PTSD (van Minnen et al., 2002) found that use of alcohol and use of benzodiazepines were related to dropout, but that a range of demographic variables, symptoms of depression and anxiety, personality factors, characteristics of traumatic
events, and feelings of shame and anger were not in fact related to either outcomes or dropout. These results contrast with previous studies that suggest that unemployment was predictive of dropout (Foa et al., 1999). Despite lacking supporting evidence, Van Minnen and her colleagues speculate that factors such as the relationship between the patient and therapist relates to treatment outcome, and encourage research in this arena (2002). In a subsequent meta-analysis, van Minnen and colleagues (2012) investigated potential contraindications for treating PTSD with prolonged exposure, and found that research did not support excluding patients with frequently occurring comorbidities (such as borderline personality disorder, suicidal behavior, non-suicidal self-injury, substance use disorders, major depression, and dissociation) from prolonged exposure treatment specifically for PTSD, finding that such patients were able to “safely and effectively” (2012) engage in prolonged exposure, in general experiencing a reduction in PTSD symptoms as well as with their comorbid condition.

In evaluating the evidence published specifically in the arena of PTSD and SUD comorbidities, van Minnen writes, “while SUD may complicate PTSD treatment, it should not preclude it” (2012, p. 13). Such conclusions are further bolstered by another literature review conducted by van Minnen et al. (2015) that specifically investigated evidence addressing changes in comorbid conditions following prolonged exposure for PTSD. The authors resolve that clinically, the studies reviewed demonstrate that fears about exacerbation of comorbid features as a result of prolonged exposure are unfounded and therefore should not be excluded from trauma-oriented treatments.

### 2.3 Study Aims & Hypotheses

The first aim of the study is to examine how therapeutic alliance (assessed with the Segmented Working Alliance Inventory-Observer, S-WAI-O; Burk et al., 2013) developed early
in treatment (as measured during Session 2) predicts treatment outcome, as measured by changes in PTSD symptoms and substance use frequency and severity reported by participants post-treatment. It is hypothesized that a stronger early alliance will predict greater levels of symptom reduction post-treatment across measures of both PTSD and SUD. This is consistent with decades worth of findings that establish a relationship between therapeutic alliance and treatment outcomes regardless of therapeutic modality, demographic factors, or type or severity of psychopathology (Horvath, 2001; Horvath et al., 2011; Horvath & Symonds, 1991; Martin, Garske, & Davis, 2000).

The second aim has three components: 1) to understand whether the strength of the alliance changes over the course of treatment, especially after the beginning of imaginal exposures midway through, 2) to understand if the onset of imaginal exposures impacts the therapeutic alliance at the intra-session level, and 3) to understand if any changes are further related to changes in PTSD and SUD symptoms reported by participants as they proceed with treatment. This aim has the potential to ascertain changes in alliance over the course of treatment, to uncover how, if at all, prolonged exposure techniques influence alliance, and to elucidate the bidirectional nature of therapeutic alliance and symptom change over the course of the COPE treatment. Alliance will be measured for Sessions 2, 5, and 11, and will be compared with symptoms reported in Sessions 3, 6, and 12. This will help determine how changes in alliance over time may further relate to symptoms reported by participants as they proceed through the treatment. Consistent with both Gelso and Carter’s theory and Safran and Muran’s (2000) rupture-repair model, it is hypothesized that, on an intraindividual level, that there will be a weakening of the quality of the alliance from the early stage of treatment to the middle stage of treatment after the imaginal exposure sessions have begun, that will be followed by a re-
strengthening of the alliance by the end of treatment. It is further hypothesized that on the intra- 
session level, the introduction of prolonged exposure will initially (during Session 5) weaken the 
alliance in the minutes following the imaginal exposure, but that this alliance weakening will no 
longer occur by Session 11 when the patient has grown accustomed to the imaginal exposure 
exercise. It is also hypothesized that changes in the alliance will be reflected in symptoms 
reported the following week, such that if the alliance suffers, the participant will endorse higher 
levels of PTSD symptoms and increased substance use in comparison in the week prior.

The third and final aim of the study is to further examine how specific substance-use and 
trauma-related variables may act as moderators affecting the strength of the relationship between 
therapeutic alliance and treatment outcomes. In particular, variables including level of substance 
use (high vs. low), and severity of PTSD (high vs. low) will be explored as potential moderators. 
Such a question is valuable to ask because it may help illuminate which types of patients in the 
comorbid PTSD and SUD population are more likely to develop an alliance that supports their 
adherence and ability to experience the full benefits of treatment. It is hypothesized that those 
participants demonstrating lower levels of substance use and a lower severity of PTSD will 
demonstrate stronger early alliance ratings, as well as superior treatment outcomes in comparison 
with those demonstrating heavier levels of use and more severe PTSD. This hypothesis is 
consistent with evidence suggesting that baseline symptom severity is often associated 
significantly with outcome analyses in treatment studies, and furthermore that baseline severity 
is a critical factor to account for in detecting possible baseline-by-treatment interactions (Nunes 
et al., 2011).
CHAPTER 3: METHOD

3.1 Study Design

This investigation is a secondary analysis conducted on data from a clinical trial funded by NIDA with a randomized, controlled, repeated measures design that tested the efficacy of two psychotherapy interventions: Concurrent Treatment of PTSD and Substance Use Disorders using Prolonged Exposure (COPE) and Relapse Prevention Therapy (RPT). Both psychotherapy interventions were compared to a delayed-treatment control group. After screening and further evaluation to determine eligibility (see inclusion and exclusion criteria below), participants were assigned randomly to one of three groups: 1) COPE, 2) RPT, or 3) delayed treatment control. Repeated outcome measures were used at baseline, post-treatment, and at 1, 2, and 3 months post-treatment. Therapists all had at least a Master’s degree at the time of administration, and were trained on using the COPE and RPT interventions with individuals for weekly 60-90 minute sessions over the course of twelve weeks.

This particular investigation focuses on studying the therapeutic alliance in the COPE treatment by using an observer-rated measure of therapeutic alliance, the S-WAI-O (see below). Video sessions of each therapy session were recorded and stored electronically. This analysis coded the alliance at three time-points over the course of the 12-week COPE intervention: at Session 2, Session 5, and Session 11. Session 2 was chosen because it is a prime session in which to measure early alliance—when the patient and therapist are still getting familiar but no longer strangers. Measuring early alliance at Session 2 is also consistent with the literature addressing early alliance (Crits-Christoph et al., 2013). Session 5 was chosen as a timepoint roughly halfway through treatment at which point imaginal exposures were first introduced. Session 11 was chosen as the point at which late alliance will be measured, one session before
the termination session, and the last session during which imaginal exposure is engaged. Five-minute segments were rated for therapeutic alliance using the SWAI-O and averaged by two coders, who demonstrated an inter-rater reliability of at least .7, calculated using intraclass correlation coefficient (ICC). For Session 2 segments were chosen from the middle fifteen minutes of the session, and for Sessions 2 and 6, two ten minute segments were measured before and after the imaginal exposures were carried out. The use of an observer-rater measure of therapeutic alliance was indicated for several reasons: first, this being a secondary analysis, neither patient-rated nor therapist-rated measures of therapeutic alliance were a part of the original study, mandating that an observer-rated measure be used. Second, using an observer-rated measure enabled external raters to measure the quality of the therapy dyad while also avoiding the confounds that often accompany ratings of alliance completed by therapists and patients directly, such as the prior expectations patients carry about session usefulness (Constantino, Arnow, Blasey, & Agras, 2005; Elvins & Green, 2008).

3.2 Procedure

Participants. The participant pool was comprised of 42 men and women who voluntarily enrolled in the treatment trial described above at The City College of New York and who were randomly assigned to the active treatment wing involving a combined treatment for PTSD and SUD involving prolonged exposure and relapse prevention therapy as specified in the COPE manual (Back et al., 2015). Thirty-six percent of the participants were women, and 53% of participants identified as African-American, 20% as Caucasian, 22% as Hispanic, and 4% as mixed-race or other. The participants ranged in age from 23-58, with a median age of 42. Inclusion criteria for the study included meeting diagnostic criteria for full or sub-threshold PTSD according to the Diagnostic and Statistical Manual of Mental Disorders (4th ed. – text
revision; American Psychiatric Association, 2000) within the pat 30 days as determined by the
Clinician-Administered PTSD Scale (CAPS). “Subthreshold PTSD” is defined by Grubaugh et al. (2005) —in a way that parallels a clinical presentation now detailed in the DSM-5’s revised
criteria for PTSD—as a PTSD presentation where an individual meets Criterion A, Criterion B
(re-experiencing symptoms), and either Criterion C (avoidance symptoms) or Criterion D
(hyperarousal symptoms), but not both. Participants were required to be between 18 and 65 years
of age, to understand English, to have some alcohol or substance use behavior within the past 30
days, and to also meet criteria for current or past substance dependence according to DSM-IV-
TR.

Exclusion criteria for participation in the study included demonstrating impairments in
mental cognition as determined by a score on the Mini-Mental Status Exam of 21 or less
(Folstein, Folstein, & McHugh, 1975); being at significant risk of suicide or homicide as
determined by the Psychiatric Research Interview for Substance and Mental Disorders (Hasin,
Trautman, & Endicott, 1998) within the past six months; being actively involved in a relationship
with ongoing domestic violence concerns; a history of or current symptoms of psychotic-
spectrum or bipolar spectrum diagnoses as assessed by the Structured Clinical Interview for
DSM-IV Disorders, Clinical Trials Version (SCID-CT; First et al., 2007). Those individuals
who were currently involved in trauma-specific psychotherapy or who were actively taking
mood stabilizing or antidepressant medication, or who were involved in methadone maintenance
were also excluded from the study. For these excluded individuals, appropriate referrals for
alternative clinical services were made.

Participant recruitment began in June of 2009 and continued through June of 2014.
Potential participants responded to recruitment advertisements placed in local NYC newspapers,
on Craigslis, and from referral sources at the Addiction Institute of New York and the Women’s Health Project Treatment Center at St. Luke’s-Roosevelt Hospital. A phone screen was the first step in assessing eligibility (N=1,612), which was followed by a more thorough assessment in a baseline interview (N=505). Of these individuals 153 were determined to be eligible, 104 of whom then attended additional sessions that involved covering treatment consent, randomization, as well as a structured motivational interviewing session (Miller & Rollnick, 2012). Next, participants were randomized into one of three wings of the study: Concurrent Treatment of PTSD and Substance Dependence (COPE), Relapse Prevention therapy (RPT), or a delayed treatment control group. At the completion of a twelve-week intervention, participants in the delayed control group were reassessed and if still eligible, were further randomized into either the COPE or RPT treatment wings. All participants—in both the active and delayed treatment groups—completed weekly self-report assessments for PTSD and SUD symptoms and also engaged in weekly urine toxicology and breathalyzer test assessments. Follow-up assessments were completed at the end of one-month, two-months, and three-months after the 12-week treatment interventions had been completed.

**Therapeutic Intervention.**

**Concurrent Treatment of PTSD and Substance Use Disorders Using Prolonged Exposure (COPE)** – Developed as a unique integrated therapy using both cognitive behavioral strategies and prolonged exposure techniques, “COPE” (Concurrent Treatment of PTSD and Substance Use Disorders using Prolonged Exposure) targets the symptoms of both PTSD and SUDs at once. Organized into a manualized, 12-week intervention, COPE is a multifaceted intervention consisting of the following: psychoeducation in regards to the principles of cognitive and exposure-based therapies and in regards to the relationship between PTSD and substance use;
teaching of relapse prevention techniques and coping skills along with cognitive restructuring that aims to diminish substance use patterns; and in-vivo and imaginal exposure techniques that target the symptoms of PTSD (Back et al., 2012). The first four sessions of COPE provide psychoeducation about the nature of PTSD and substance use, and teach skills for coping with cravings, managing thoughts around substance use, and developing refusal skills and learning about in-vivo exposure exercises. The next seven sessions comprise the imaginal exposures along with further cognitive-behavioral interventions around planning for emergencies, handling seemingly irrelevant decisions, problem solving, managing anger, and assertiveness. The twelfth and final session provides an opportunity to review the experience of treatment and for the therapist and patient to say goodbye to one another (Back et al., 2015).

In the COPE manual, the authors emphasize the importance of maintaining a collaborative stance with clients, who are used to feeling a lack of control in their lives. The authors write how “it is important to convey from the very beginning that you and the client will be working on this treatment together as a team in order to help the client establish a greater sense of control in life” (Back et al., 2012, p. 5). The authors also highlight how it is critical for therapist to “adopt a nonjudgmental attitude” in working with individuals who are likely to have experienced continual judgment on account of their trauma and substance use histories, and also to “praise” clients “for having courage” to work on their PTSD and substance-related concerns. Back and colleagues address the importance of bringing up the tendency to avoid with this population, which can interfere with treatment, and also the necessity of communicating a sense of comfort with patients as they describe their trauma histories. The authors write:

The client needs to know that the therapist can be told anything and everything about what happened, and that he or she can handle it. When listening to the trauma history, therapists are encouraged to demonstrate respect and admiration
for the client’s strength in having made it through the trauma and for their courage in seeking treatment at this time. (2012, p. 6)

Back and colleagues also address the problem of attrition with this population head-on in their manual, emphasizing how important it is to “anticipate potential obstacles to successful treatment” (p. 6) early on.

3.3 Measurement

Measurements of Trauma and Traumatic Symptoms.

Life Events Checklist (LEC; Gray et al., 2004) and Clinician-Administered PTSD Scale (CAPS; Blake et al., 1995) – The Life Events Checklist (LEC) measures exposure to potentially traumatic events and is used in tandem with the Clinician-Administered PTSD Scale (CAPS) to diagnose PTSD (Gray et al., 2004). The CAPS is a structured clinical interview that assesses the presence, frequency, and severity of PTSD symptoms. Standard prompts and rating scales are utilized to help participants reflect upon their own experiences and provide examples of the presence of symptoms relating to PTSD. CAPS scores range from 0-136, with higher scores indicating greater severity. The CAPS is organized according to the DSM-IV-TR diagnostic criteria for PTSD, and also encompasses associated symptoms of PTSD that have since been integrated into the DSM-5 PTSD diagnosis. In addition, the CAPS assesses for impaired social and occupational functioning, as well as overall response validity. The CAPS demonstrates strong concurrent validity with the PTSD Symptom Scale-Interview (PSS-I) total score (r=.87) as well as strong convergent validity with the Structured Clinical Interview for DSM-IV (SCID)-PTSD module (r=.83) (Foa & Tonlin, 2000, p. 189). The CAPS demonstrates powerful psychometric properties, with a test-retest reliability ranging from .77 to .96 across the three symptom clusters and from .90 to .98 for the 17-item core symptom scale (Blake et al., 1995).
In the analyses of the third hypothesis, presented below, participants were grouped into two categories, “high” vs. “low”. “Low” PTSD was defined as participants with “mild/subthreshold” and “moderate/threshold” PTSD (CAPS scores ranging from 20-59) at baseline, and “high” PTSD was defined as participants with “severe” and “extreme” PTSD (CAPS scores of 60 and higher) at baseline, according to the categories established for use by the CAPS (Weathers et al., 2001).

**Modified PTSD Symptom Scale – Self-Report (MPSS-SR; Falsetti, Resnick, Resick, & Kilpatrick, 1993)** – The MPSS-SR is a self-report questionnaire including items assessing each of the 17 PTSD symptoms in terms of both frequency and severity. Ratings are made using a Likert-type scale, ranging from 0 (representing the least severe or frequent, not at all or only once) to 3 (representing the most severe or frequent, almost always or five or more times per week). The items are added together to create three subscales addressing re-experiencing, arousal, and avoidance, and can also be added into a total score, ranging from 0 – 51. A total score above 29 suggests that a PTSD diagnosis is likely, with the measure yielding a sensitivity rate of 89%, a specificity rate of 77%, and an overall classification rate of 80% at this level (Ruglass et al., 2014). The MPSS-SR was filled out at each of the once-weekly therapy sessions as well as at baseline and each of the three follow-up assessments.

**Measurements of Substance Use.**

**Substance Use Inventory (SUI; Sobell & Sobell, 1992)** – The SUI is a self-report measure comprised of questions about quantity, based on dollars spent per day, frequency, and craving intensity of different substances used in the previous week. Specific substances assessed include alcohol, marijuana, cocaine, opiates, amphetamines, sedatives, PCP, and prescription medications. The SUI is an adaptation of the Time-Line Followback Assessment Method
developed by Sobell and Sobell (1992). The SUI was filled out during each of the once-weekly sessions between the baseline and termination therapy session.

**Addiction Severity Index (ASI; McLellan et al., 1992)** – The ASI is a semi-structured interview designed to evaluate patients with substance-abusing behaviors, specifically in the setting of clinical research. It is designed to be administered by trained interviewers, and includes assessment of demographic factors as well as the follow seven domains of functioning: medical, employment, drug use, alcohol se, legal, family/social, and psychological. The ASI assesses both lifetime and current functioning in each of these areas (Cacciola et al., 1997), with assessments for current functioning yielding composite scores used as indicators of change tracking questions pertaining to events in the past 30 days. In the present study, the ASI was completed at baseline and follow-up interviews. The item used in the analyses presented below was the item addressing the number of days of use of primary substance in the past 30 days.

In the analyses for the third hypothesis, participants were groups again into two categories, “high” vs. “low”, based on their baseline report of recent substance use. “Low” SUD was assigned to participants who reported having used between 0-15 days in the past 30, and “high” was assigned to participants who reported having used between 16-30 days in the past 30.

**Measurement of Therapeutic Alliance.**

**Segmented Working Alliance Inventory-Observer (S-WAI-O; Burk et al., 2013)** – The S-WAI-O is a 12-item tool that measures changes in the quality of the therapeutic alliance throughout segments of individual therapy sessions. Each five-minute segment is coded separately, using videotaped sessions. Six of the items attend to agreement between patient and therapist regarding the tasks of therapy, and the other six pertain to the emotional and personal bond within the dyad. A seven-point Likert scale is used to rate each item (range of scores 1-7,
with higher scores reflecting higher alliance, Burk et al., 2013). The S-WAI-O is originally based upon the fourth version of the Working Alliance Inventory-Observer form (WAI-O; Darchuck et al., 2000), which was established as a desirable measure because of its transtheoretical flexibility, and because of its high degree of interrater agreement, internal consistency, and strong correlation with alternative measures of therapeutic alliance (Tichenor & Hill, 1989). The text of the items and anchors was borrowed from Darchuck et al.’s measure (2000), with some adjustments made to suit the S-WAI-O coding system. The S-WAI-O differs from alternative versions of the WAI-O in its ability to discern changes in the working alliance over the course of individual therapy sessions given the segment-by-segment nature of assessment and scoring (Burk et al., 2013). Moreover, the S-WAI-O does not include items traditionally used to measure goals because of the historically limited variation in goal ratings yielded by the WAI-O and because of the very high correlations that were demonstrated between goal and task items (Burk et al., 2013).

3.4 The Data

The data that were analyzed for this study included scores of therapeutic alliance as coded from segments of audio recordings of therapy sessions conducted with participants in the COPE treatment condition of the study. Measures of early alliance were taken from recordings of Session 2. Session 2 was sufficiently early in the treatment to get a sense of the initial alliance established between therapist and participant, and is the session that introduces information and skills around identifying and managing cravings and urges. Mid-treatment measures of alliance were based upon ratings from Session 5, the session when imaginal exposures begin. Late-stage measures of alliance were based upon recordings from Session 11, the penultimate session of the treatment during which the participant and therapist conduct the final imaginal exposure, and
also discuss assertiveness skills and awareness of negative thought patterns. In addition, data included MPSS-SR, CAPS, ASI, and SUI scores for each of the participants whose audio recordings were scored.

3.5 Coding Alliance

The process of achieving reliability in order to conduct the relevant analyses with the S-WAI-O involved several stages. First, two doctoral-level clinical psychology graduate students achieved reliability (at the ICC > 0.75 level) using the S-WAI-O on a set of recordings from the Brief Psychotherapy Project at Beth Israel Hospital. The recordings were comprised of both CBT sessions and therapy sessions using a brief relational framework. Next, these two individuals trained a group of three additional coders (also at the ICC > 0.75 level) on a data set similar to the data designated for coding. Segments used in training were taken from sessions not to be included in data analyses (for example, segments of session #3, session #4, and session #6 were used, in addition to sessions from another trauma-focused study conducted in the same laboratory on a similar population, the Safe Steps study [Morgan-Lopez et al., 2013]). Following training, one coder withdrew her participation. One of the remaining two additional coders was also a doctoral-level graduate student, and the other was a research assistant currently working in a clinical research setting with several years experience conducting psychological research. Altogether, the coding group consisted of three women and one man. Training began by distributing the S-WAI-O manual to coders to study and then meeting for a 4-hour training session in which the coders were first educated about the history and structure of the measure and to listen to and score as a group segments of therapy sessions with varying degrees of strength of therapeutic alliance. The process of training the team of coders to become reliable proceeded over a 4 month period and involved regular meetings. The four coders achieved
reliability on independently rating 5 sessions at the ICC > 0.75 level on the similar data set. Additional discussions were conducted to address scoring disagreements as needed throughout the coding process.

The plan for training and coding was consistent with previous studies that have drawn upon observer ratings of the therapeutic alliance. A study conducted by Shelef et al. trained 10 undergraduate behavioral science students over the course of six months to the ICC > .85 level using the VTAS-R (2015). In a study comparing therapeutic alliance across psychodynamic and cognitive-behavioral therapy conducted by Raue and colleagues (1997), six doctoral-level clinical psychology students trained for one month to “adequate reliability” at the ICC > 0.60 level before coding commenced. In addition, a study conducted by Morgan et al. that drew upon the Penn Helping Alliance rating method enlisted the help of two raters, who were experienced psychoanalysts and who received a training session to teach them the method on unrelated materials (1982). Interrater reliability was assessed after each ten segments (ICC not reported).

3.6 Data Analyses

Multiple linear regression was used to test the first hypothesis, examining the relationship between early stage therapeutic alliance and posttreatment PTSD and SUD symptomatology. To test part a) of the second hypothesis, one-way repeated measures ANOVA and a Friedman’s test were used to measure changes in therapeutic alliance across three different sessions at the beginning, middle, and end of treatment. To test part b) of the second hypothesis, paired samples t-tests and Wilcoxon signed-rank tests were used to determine changes in alliance, within sessions, following imaginal exposures. Part c) of the second hypothesis was tested using Spearman’s rank-order correlations analyses. The third and final hypothesis was tested using
hierarchical multiple regression. A system for imputing missing data was developed using linear interpolation and series mean replacement.
CHAPTER 4: RESULTS

The following chapter presents summaries of the baseline characteristics of the study sample, descriptive statistics of the primary variables engaged, relevant descriptions of how missing data were analyzed and addressed, and results of the statistical analyses that followed from each of the three hypotheses. In addition, a qualitative presentation of the progression of case Exp521 through the study is presented as an individual example of the group-level patterns demonstrated in the data.

4.1 Baseline Characteristics

Table 1 presents the demographic characteristics of the total sample randomized to COPE (n = 42) and the sub-sample included in the analyses of the present study (n = 28). The sub-sample is comprised of participants for whom therapeutic alliance ratings were possible due to availability of therapy session recordings. In addition, Table 1 presented relevant variables relating to baseline levels of substance use and PTSD symptoms. Of the 14 participants not included in the analyses, 9 dropped out of the study before attending the second session, which was designated as the session at which early therapeutic alliance would be evaluated. Audio recordings of therapy sessions relevant for analyses were not available for the other 5 participants.

Of the 28 participants included in the analyses, 50.0% identified as African-American, 21.4% as Latino, 21.4% as Caucasian, and 7.1% as mixed race and Native American. The average age of participants was 42.0 (SD=9.7). On average, participants had completed 13.3 years of education (SD=3.4). At baseline, 75% were employed in full-time or part-time work. Of the 28 participants, 42.9% reported using alcohol alone as their primary substance, 17.9% reported primary use of cocaine, and 7.1% reported primary marijuana use. In addition, 17.9%
reported a primary use pattern of alcohol and cocaine, 10.7% use of alcohol and cannabis, and 3.6% use of cannabis and cocaine. Participants reported an average of 18.2 days (SD=11.1) of use of their primary substance in the past 30 days, and were determined to have an average baseline CAPS score of 55.6 (SD=18.2), indicating a severe level of posttraumatic symptoms. Fifty-seven point one percent of participants met criteria for DSM-IV PTSD, and 42.9% presented with symptoms consistent with Subthreshold PTSD. There were no statistically significant differences between the COPE-randomized groups and the study sample across demographic variables.
Table 1  Participant Characteristics of Group Randomized to COPE (n = 42)*

<table>
<thead>
<tr>
<th>Variable</th>
<th>COPE-randomized (n = 42)</th>
<th>Study Sample (n = 28)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (M/SD)</td>
<td>42.4 (9.5)</td>
<td>42.0 (9.7)</td>
</tr>
<tr>
<td>Gender (% male)</td>
<td>67</td>
<td>67.9</td>
</tr>
<tr>
<td>Race/ethnicity (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>African American/Black</td>
<td>54.8</td>
<td>50</td>
</tr>
<tr>
<td>Caucasian</td>
<td>19</td>
<td>21.4</td>
</tr>
<tr>
<td>Latino</td>
<td>21.4</td>
<td>21.4</td>
</tr>
<tr>
<td>Other</td>
<td>4.8</td>
<td>7.1</td>
</tr>
<tr>
<td>Years of education (M/SD)</td>
<td>13.2 (3.0)</td>
<td>13.3 (3.4)</td>
</tr>
<tr>
<td>Employment (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employed</td>
<td>73.8</td>
<td>75</td>
</tr>
<tr>
<td>Unemployed</td>
<td>14.3</td>
<td>17.9</td>
</tr>
<tr>
<td>Student/retired/disabled</td>
<td>11.9</td>
<td>7.1</td>
</tr>
<tr>
<td>Primary Substance (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cocaine</td>
<td>16.7</td>
<td>17.9</td>
</tr>
<tr>
<td>Cannabis</td>
<td>9.5</td>
<td>7.1</td>
</tr>
<tr>
<td>Alcohol</td>
<td>45.2</td>
<td>42.9</td>
</tr>
<tr>
<td>Alcohol &amp; Stimulant</td>
<td>19</td>
<td>17.9</td>
</tr>
<tr>
<td>Alcohol &amp; Cannabis</td>
<td>7.1</td>
<td>10.7</td>
</tr>
<tr>
<td>Cannabis &amp; Stimulant</td>
<td>2.4</td>
<td>3.6</td>
</tr>
<tr>
<td>Current alcohol dependence (%)</td>
<td>73.8</td>
<td>71.4</td>
</tr>
<tr>
<td>Current other subs. dependence (%)</td>
<td>66.7</td>
<td>71.4</td>
</tr>
<tr>
<td>PTSD diagnosis (% Full)</td>
<td>59.5</td>
<td>57.1</td>
</tr>
<tr>
<td>CAPS severity, total (M/SD)</td>
<td>54.0 (16.4)</td>
<td>55.6 (18.2)</td>
</tr>
<tr>
<td>Primary substance use days in last 30 (M/SD)</td>
<td>18.7 (10.5)</td>
<td>18.2 (11.1)</td>
</tr>
</tbody>
</table>

*Differences between groups along demographic lines, including sex, race (Chi-squared) and age (independent t-test) not significant (p<.05).
4.2 Descriptive Statistics

Table 2 presents descriptive statistics of the variables used in analyses. CAPS, ASI (primary substance use days), and MPSSSR (self-report of PTSD symptoms) variables all possessed skewness and kurtosis values within the acceptable range (+/- 2.0). In contrast, several of the variables measuring therapeutic alliance possessed kurtosis values above 2 (Week 2 Total, Week 5 Post-exposure, Week 11 Total, Week 11 Pre-exposure, & Week 11 Post-exposure), indicating that these particular scales were leptokurtic. To adjust for the leptokurtic natures of these scales, transformations (including logarithmic and square-root) were engaged as necessary in analyses.

Correlational analyses exploring the possibility of relationships between variables are presented in Table 3.
Table 2 Descriptive Statistics (N = 28)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>SD</th>
<th>Min</th>
<th>Max</th>
<th>Skew</th>
<th>Kurtosis</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CAPS Severity</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline</td>
<td>55.6</td>
<td>18.1</td>
<td>26</td>
<td>91</td>
<td>0.4</td>
<td>-0.6</td>
</tr>
<tr>
<td>Follow-up</td>
<td>36.1</td>
<td>20.6</td>
<td>0</td>
<td>86.1</td>
<td>0.7</td>
<td>0.8</td>
</tr>
<tr>
<td><strong>Primary Sub Days, Past Month (ASI)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline</td>
<td>17.7</td>
<td>10.8</td>
<td>0</td>
<td>30</td>
<td>-0.3</td>
<td>-1.2</td>
</tr>
<tr>
<td>Follow-up</td>
<td>9.1</td>
<td>9.8</td>
<td>0</td>
<td>30</td>
<td>0.9</td>
<td>-0.2</td>
</tr>
<tr>
<td><strong>MPSSSR Severity</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline</td>
<td>55.1</td>
<td>27.3</td>
<td>12</td>
<td>105</td>
<td>0.1</td>
<td>-1.1</td>
</tr>
<tr>
<td>Week 3</td>
<td>43.9</td>
<td>31.1</td>
<td>0</td>
<td>119</td>
<td>0.7</td>
<td>0</td>
</tr>
<tr>
<td>Week 6</td>
<td>43.2</td>
<td>30</td>
<td>0</td>
<td>119</td>
<td>0.8</td>
<td>0.3</td>
</tr>
<tr>
<td>Week 12</td>
<td>30.4</td>
<td>22.2</td>
<td>0</td>
<td>75.5</td>
<td>0.5</td>
<td>-0.5</td>
</tr>
<tr>
<td>Follow-up</td>
<td>34</td>
<td>25.7</td>
<td>0</td>
<td>93</td>
<td>0.6</td>
<td>-0.5</td>
</tr>
<tr>
<td><strong>Primary Sub Days, Past Week (SUI)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline</td>
<td>3.9</td>
<td>2.6</td>
<td>0</td>
<td>7</td>
<td>-0.2</td>
<td>-1.6</td>
</tr>
<tr>
<td>Week 3</td>
<td>2.3</td>
<td>2.3</td>
<td>0</td>
<td>7</td>
<td>.9</td>
<td>-0.2</td>
</tr>
<tr>
<td>Week 6</td>
<td>2.1</td>
<td>2.4</td>
<td>0</td>
<td>7</td>
<td>1.0</td>
<td>-0.1</td>
</tr>
<tr>
<td>Week 12</td>
<td>1.3</td>
<td>1.9</td>
<td>0</td>
<td>7</td>
<td>1.9</td>
<td>3.1</td>
</tr>
<tr>
<td>Follow-up</td>
<td>1.4</td>
<td>2.1</td>
<td>0</td>
<td>7</td>
<td>1.9</td>
<td>2.8</td>
</tr>
<tr>
<td><strong>Therapeutic Alliance (SWAI-O)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Week 2, Total</td>
<td>4.8</td>
<td>0.7</td>
<td>2.7</td>
<td>5.6</td>
<td>-1.7</td>
<td>3.2</td>
</tr>
<tr>
<td>Week 5, Total</td>
<td>4.7</td>
<td>0.6</td>
<td>3.2</td>
<td>5.8</td>
<td>-0.8</td>
<td>1.3</td>
</tr>
<tr>
<td>Week 5, Pre-exposure</td>
<td>4.6</td>
<td>.6</td>
<td>3</td>
<td>5.8</td>
<td>-0.7</td>
<td>-.7</td>
</tr>
<tr>
<td>Week 5, Post-exposure</td>
<td>4.9</td>
<td>0.6</td>
<td>2.9</td>
<td>5.8</td>
<td>-1.6</td>
<td>4</td>
</tr>
<tr>
<td>Week 11, Total</td>
<td>5.1</td>
<td>0.2</td>
<td>4.5</td>
<td>5.7</td>
<td>0.3</td>
<td>3.4</td>
</tr>
<tr>
<td>Week 11, Pre-exposure</td>
<td>4.9</td>
<td>0.3</td>
<td>4.1</td>
<td>5.6</td>
<td>-0.2</td>
<td>3</td>
</tr>
<tr>
<td>Week 11, Post-exposure</td>
<td>5.2</td>
<td>0.2</td>
<td>4.58</td>
<td>5.77</td>
<td>-0.8</td>
<td>4.6</td>
</tr>
<tr>
<td># Sessions Attended</td>
<td>9</td>
<td>3.5</td>
<td>2</td>
<td>12</td>
<td>-0.8</td>
<td>-0.8</td>
</tr>
</tbody>
</table>

CAPS = Clinician Administered PTSD Scale, range 0-136. MPSSSR = Modified PTSD Symptom Scale-Self Report, range 0-51. ASI = Addiction Severity Index, range on item 0-30. SUI = Substance Use Inventory, range on item 0-7. SWAI-O = Segmented Working Alliance Inventory-Observer, range 1-7.
**Table 3** Correlation coefficients of primary variables

<table>
<thead>
<tr>
<th>Scale</th>
<th>BL CAPS</th>
<th>BL MPSSSR</th>
<th>BL SUI</th>
<th>BL ASI</th>
<th>TA_2</th>
<th>TA_5</th>
<th>TA_11</th>
<th>PT CAPS</th>
<th>PT MPSSSR</th>
<th>PT SUI</th>
<th>PT ASI</th>
</tr>
</thead>
<tbody>
<tr>
<td>BL CAPS</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BL MPSSSR</td>
<td>.727**</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BL SUI</td>
<td>0.024</td>
<td>0.097</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BL ASI</td>
<td>0.356</td>
<td>.435*</td>
<td>.600**</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TA_2</td>
<td>0.251</td>
<td>-0.018</td>
<td>-0.249</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TA_5</td>
<td>.120</td>
<td>0.034</td>
<td>-.515**</td>
<td>-.062</td>
<td>-.013</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TA_11</td>
<td>0.008</td>
<td>0.085</td>
<td>0.049</td>
<td>0.023</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.119</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.119</td>
<td>0.077</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.077</td>
</tr>
<tr>
<td>PT CAPS</td>
<td>.547**</td>
<td>.388*</td>
<td>0.081</td>
<td>0.261</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>PT MPSSSR</td>
<td>0.355</td>
<td>.475*</td>
<td>0.08</td>
<td>0.284</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>PT SUI</td>
<td>0.083</td>
<td>0.195</td>
<td>0.298</td>
<td>0.319</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>PT ASI</td>
<td>0.196</td>
<td>0.297</td>
<td>.449*</td>
<td>.440*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-0.242</td>
<td>0.266</td>
<td>0.012</td>
<td>0.324</td>
<td>0.321</td>
<td>.888**</td>
<td></td>
</tr>
</tbody>
</table>

**p < 0.01, * p < 0.05**

Note: BL=Baseline, PT=Post-treatment, TA=Therapeutic Alliance, SUI=Substance Use Inventory, ASI=Addiction Severity Index
4.3 Missing Data

Analysis of missing data revealed 31.7% missing data across the variables required for analyses. Portion of data missing due to participant absence versus errors in collection are presented in Table 4. Little’s missing completely at random test was conducted to determine patterns of missingness, which were found to be insignificant, $\chi^2(410) = 16.821, p = 1.000$. Due to the high level of missingness, it was determined that multiple imputation would be ill advised, and an exploration of expectation maximization (EM) also demonstrated this option was not viable due to the smaller sample size. In the end, linear interpolation and series mean replacement were utilized as a viable although less robust alternative (SPSS, 2011) to generate estimations for missing values. All analyses were conducted using the collected data along with estimated values generated through linear interpolation and series mean replacement.

<table>
<thead>
<tr>
<th></th>
<th>% Collected (n)</th>
<th>% Missing due to absence (n)</th>
<th>% Missing due to data collection challenges (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline Symptoms</td>
<td>100 (28)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>TA Session 2</td>
<td>89.3 (25)</td>
<td>0</td>
<td>10.7 (3)</td>
</tr>
<tr>
<td>Week 3 Symptoms</td>
<td>89.3 (25)</td>
<td>10.7 (3)</td>
<td>0</td>
</tr>
<tr>
<td>TA Session 5</td>
<td>64.3 (18)</td>
<td>14.3 (4)</td>
<td>21.4 (6)</td>
</tr>
<tr>
<td>Week 6 Symptoms</td>
<td>78.6 (22)</td>
<td>21.4 (6)</td>
<td>0</td>
</tr>
<tr>
<td>TA Session 11</td>
<td>32.1 (9)</td>
<td>50 (14)</td>
<td>17.9 (5)</td>
</tr>
<tr>
<td>Week 12 Symptoms</td>
<td>39.3 (11)</td>
<td>60.7 (17)</td>
<td>0</td>
</tr>
<tr>
<td>Post-treatment Symptoms</td>
<td>53.6 (15)</td>
<td>46.4 (13)</td>
<td>0</td>
</tr>
</tbody>
</table>

4.4 Hypothesis 1 Analysis

The first hypothesis posited that a stronger baseline alliance would predict greater levels of symptom reduction post-treatment along measures of both PTSD and SUD.
Variables that revealed a skewed distribution (i.e., greater than an absolute value of 1.96) were transformed using square root or logarithmic transformations. Analyses were run using a variable that measured early therapeutic alliance, which even after undergoing a logarithmic transformation, possessed a skew of greater than an absolute value of 1.96. The case with the lowest value of the early alliance variable was removed from analyses as an extreme outlier, which corrected the problem. Analyses were run with both versions of the variable, and did not markedly impact the results of the analyses.

**Early Therapeutic Alliance Predicting PTSD Symptom Reduction Post-treatment.**

*As measured by CAPS scores:* A multiple linear regression was run to predict the effect of early therapeutic alliance on symptoms of PTSD, as measured by the CAPS interview, at follow-up. There was independence of residuals, as assessed by a Durbin-Watson statistic of 1.947. There was homoscedasticity, as assessed by visual inspection of a plot of standardized residuals versus standardized predicted values. Residuals were normally distributed as assessed by visual inspection of a normal probability plot. The multiple regression model statistically significantly predicted CAPS values at follow-up, $F(5, 21) = 2.690, p = .050$, adj. $R^2 = .245$. However, only the measure of CAPS values at baseline, which was included to control for baseline added statistically significantly to the prediction, $p < .05$; the measure of early therapeutic alliance did not ($p = .64$), suggesting that early therapeutic alliance was found to have no association with PTSD symptom reduction post-treatment, using the CAPS. Regression coefficients and standard errors are presented in Table 5.
Table 5 Regression Analysis of Early Therapeutic Alliance Variables Prediction of CAPS Severity at Follow-up (N = 28)

<table>
<thead>
<tr>
<th>Step</th>
<th>Predictor</th>
<th>Coefficients</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>B</td>
<td>SEB</td>
<td>β</td>
<td>t</td>
<td>p</td>
</tr>
<tr>
<td>Step 1</td>
<td>Age</td>
<td>-0.67</td>
<td>0.44</td>
<td>-0.30</td>
<td>-1.53</td>
<td>0.14</td>
</tr>
<tr>
<td></td>
<td>Sex</td>
<td>6.92</td>
<td>8.16</td>
<td>0.16</td>
<td>0.85</td>
<td>0.41</td>
</tr>
<tr>
<td></td>
<td>Ethnicity</td>
<td>-0.97</td>
<td>3.71</td>
<td>-0.05</td>
<td>-0.26</td>
<td>0.80</td>
</tr>
<tr>
<td>Step 2</td>
<td>CAPS Severity, Baseline</td>
<td>0.57</td>
<td>0.21</td>
<td>0.50</td>
<td>2.77</td>
<td>0.01</td>
</tr>
<tr>
<td></td>
<td>Therapeutic Alliance, Week 2</td>
<td>26.3</td>
<td>55.16</td>
<td>0.09</td>
<td>0.48</td>
<td>0.64</td>
</tr>
</tbody>
</table>

Note: CAPS = Clinician Administered PTSD Scale; Therapeutic Alliance scores were measured with SWAI-O.

*R* change = .245, F (5, 21) = 2.690, *p* = .050

*B* = unstandardized regression coefficient; *SEB* = Standard error of the coefficient; *β* = standardized coefficient

*As measured by MPSSSR scores:* A multiple regression was run to predict the effect of early therapeutic alliance on symptoms of PTSD, as measured by the MPSSSR, at follow-up. There was independence of residuals, as assessed by a Durbin-Watson statistic of 1.731. There was homoscedasticity, as assessed by visual inspection of a plot of standardized residuals versus standardized predicted values. Residuals were normally distributed as assessed by visual inspection of a normal probability plot. The multiple regression model approached statistically significant prediction of MPSSSR values at follow-up, *F*(5, 21) = 2.295, *p* = .082, adj. *R*² = .199.

Although the multiple regression model did not statistically significantly predict CAPS values at follow-up (*p* = .082), the measure of MPSS-SR at baseline yielded a *p*-value of .05 in predicting the variability in the outcome measure of MPSS-SR. The measure of early therapeutic alliance did not (*p* = .57) statistically significantly predict outcomes in MPSS-SR ratings, suggesting that early therapeutic alliance was not significantly associated with PTSD symptom reduction post-
Early Therapeutic Alliance Predicting Substance Use Symptom Reduction Post-treatment.

*As measured by ASI scores:* A multiple regression was run to predict the effect of early therapeutic alliance on substance use symptoms, as measured by the ASI, at follow-up. There was independence of residuals, as assessed by a Durbin-Watson statistic of 1.575. There was homoscedasticity, as assessed by visual inspection of a plot of standardized residuals versus standardized predicted values. Residuals were normally distributed as assessed by visual inspection of a normal probability plot. Early therapeutic alliance was found to have no association with SUD symptom reduction post-treatment, using the ASI. The multiple regression
model failed to statistically significantly predicted average number of days of use of primary substance at follow-up, \( F(5, 21) = 1.612, p = .200, \text{adj. } R^2 = .105 \). However, the measure of ASI values at baseline added statistically significantly to the prediction, \( p < .05 \), but the measure of early therapeutic alliance did not \( (p = .41) \), suggesting that early therapeutic alliance was found to have no association with substance use symptom reduction post-treatment, using the ASI. Regression coefficients and standard errors are presented in Table 7.

### Table 7 Regression Analysis of Early Therapeutic Alliance Variables Prediction of Days of Primary Substance Use in Past Month at Follow-up (\( N = 28 \))

<table>
<thead>
<tr>
<th>Step</th>
<th>Predictor</th>
<th>Coefficients</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>( B )</td>
<td>( SEB )</td>
<td>( \beta )</td>
</tr>
<tr>
<td>Step 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Age</td>
<td>0.00</td>
<td>0.04</td>
<td>-0.00</td>
<td>-0.01</td>
</tr>
<tr>
<td></td>
<td>Sex</td>
<td>-0.89</td>
<td>0.85</td>
<td>-0.21</td>
<td>-1.05</td>
</tr>
<tr>
<td></td>
<td>Ethnicity</td>
<td>-0.15</td>
<td>0.39</td>
<td>-0.08</td>
<td>-0.39</td>
</tr>
<tr>
<td>( ^a ) Step 2</td>
<td>Days of Primary Substance Use in Past Month, Baseline (ASI)</td>
<td>-0.48</td>
<td>0.22</td>
<td>-0.42</td>
<td>-2.21</td>
</tr>
<tr>
<td></td>
<td>Therapeutic Alliance, Week 2</td>
<td>4.83</td>
<td>5.80</td>
<td>0.16</td>
<td>0.83</td>
</tr>
</tbody>
</table>

*Note. ASI = Addiction Severity Index

\( ^a R^2 \text{change}= .105, F(5,21)=1.612, p=.200 \)

As measured by SUI scores: A multiple regression was run to predict the effect of early therapeutic alliance on substance use symptoms, as measured by the SUI, at follow-up. There was independence of residuals, as assessed by a Durbin-Watson statistic of 2.277. There was homoscedasticity, as assessed by visual inspection of a plot of standardized residuals versus standardized predicted values. Residuals were normally distributed as assessed by visual
inspection of a normal probability plot. The multiple regression model did not statistically
significant predict SUI values at follow-up, $F(5, 21) = 1.259, p = .318$, adj. $R^2 = .047$. None of
the variables added statistically significantly to the prediction, although the measure of early
therapeutic alliance was close to trending ($p = .10$). This suggests that early therapeutic alliance
was found to have no association with substance use reduction post-treatment, using the SUI.
Regression coefficients and standard errors are presented in Table 8.

### 4.5 Hypothesis II Analysis

The second hypothesis was divided into the three parts.

**Changes In Therapeutic Alliance Over Treatment Course.** Part a) of the second
hypothesis predicted that there would be a U-shape in the strength of alliance over the course of
treatment such that there would be a weakening of the alliance from Session 2 to Session 5 when
imaginal exposures began, and then a strengthening of the alliance from Session 5 to Session 11.

### Table 8 Regression Analysis of Early Therapeutic Alliance Variables Prediction of Days of Primary Substance Use in Past Week at Follow-up ($N = 28$)

<table>
<thead>
<tr>
<th>Step</th>
<th>Predictor</th>
<th>Coefficients</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>$B$</td>
<td>$SEB$</td>
<td>$\beta$</td>
<td>$t$</td>
<td>$p$</td>
</tr>
<tr>
<td>Step 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Age</td>
<td>-0.01</td>
<td>0.01</td>
<td>-0.15</td>
<td>-0.64</td>
<td>0.53</td>
</tr>
<tr>
<td></td>
<td>Sex</td>
<td>0.06</td>
<td>0.14</td>
<td>0.09</td>
<td>0.41</td>
<td>0.69</td>
</tr>
<tr>
<td></td>
<td>Ethnicity</td>
<td>0.00</td>
<td>0.06</td>
<td>0.00</td>
<td>0.01</td>
<td>0.99</td>
</tr>
<tr>
<td>$^a$Step 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Days of Primary Substance Use in Past Week, Baseline (SUI)</td>
<td>-0.29</td>
<td>0.18</td>
<td>-0.36</td>
<td>-1.64</td>
<td>0.12</td>
</tr>
<tr>
<td></td>
<td>Therapeutic Alliance, Week 2</td>
<td>1.53</td>
<td>0.90</td>
<td>0.34</td>
<td>1.71</td>
<td>0.10</td>
</tr>
</tbody>
</table>

*Note. SUI = Substance Use Inventory
$^aR^2_{change} = .047, F(5,21) = 1.259, p = .318$
Due to the presence of outliers and non-normal distributions, a related-samples Friedman’s two-way analysis of variance (a nonparametric test) was used. A repeated measures ANOVA was also conducted as a comparison. Furthermore, results should be interpreted with caution given the proportion of estimated values used to generate data for Session 5 data and especially for Session 11 data.

**Friedman’s Test:** A Friedman test was run to determine if there were differences in therapeutic alliance over the course of the COPE treatment. Pairwise comparisons were performed (SPSS Statistics, 2013) with a Bonferroni correction for multiple comparisons. Therapeutic alliance was statistically significantly different at the time points over the course of therapy, $\chi^2(2) = 7.929, p < .05$. Post hoc analysis revealed statistically significant differences in therapeutic alliance from Session 5 ($Mdn = 4.7160$) to Session 11 ($Mdn = 5.0787$) ($p = .015$), but not from Session 2 to Session 5 or from Session 2 to Session 11.

**One-way repeated measures ANOVA:** A one-way repeated measures ANOVA was conducted to determine whether there was a statistically significant difference in strength of therapeutic alliance over the course of a 12-week intervention for comorbid PTSD and SUD. There were outliers on each variable, and data violated normality distributions at Session 2 and Session 11, as assessed by boxplots. The assumption of sphericity was met, as assessed by Mauchly’s test of sphericity, although the test approached significance at the $p < .05$ level, $\chi^2(2) = 5.513, p = .064$. Strength of therapeutic alliance was statistically significantly different at the different time points over the course of treatment, $F(2, 54) = 4.034, p = .023$, partial $\eta^2 = .130$, with strength of therapeutic alliance decreasing from $4.75 \pm 0.66$ in Session 2 to $4.71 \pm 0.59$ in Session 5, and increasing to $5.07 \pm 0.22$ in Session 11. Data are mean $\pm$ standard deviation. Post hoc analysis with a Bonferroni adjustment revealed that the strength of therapeutic alliance was
not significantly decreased from Session 2 to Session 5 (-.037 [95% CI, -.467 to .392], $p = 1.000$), but was significantly increased from Session 2 to Session 11 (.325 [95% CI, .001 to .649], $p = .049$), and also significantly increased from Session 5 to Session 11 (.363 [95% CI, .053 to .673], $p = .018$).

**Figure 1 Progression of Mean Therapeutic Alliance Scores Over Treatment Course**

**Therapeutic Alliance Before and After Imaginal Exposure.** Part b) of the second hypothesis predicted that the introduction of imaginal exposure will initially (during Session 5) weaken the alliance in the minutes following the exposure, but that this alliance weakening will no longer occur by Session 11 when the patient has grown accustomed to the imaginal exposure exercises.
Session 5. Due to the presence of outliers and non-normal distributions, the Wilcoxon signed-rank test (a nonparametric test) was used. A paired samples $t$-test was also conducted as a comparison.

**Wilcoxon signed-rank test:** Data are medians unless otherwise stated. Of the 28 participants in the sample, 23 demonstrated a strengthening of the therapeutic alliance after the imaginal exposure, whereas 5 demonstrated a weakening. A Wilcoxon signed-rank test determined that there was a statistically significant median increase in the strength of therapeutic alliance (0.314) in the ten minutes of Session 5 following the introduction of imaginal exposure (4.873) in comparison with the ten minutes prior to it (4.560), $z = 3.423$, $p = .001$.

**Paired Samples $T$-Test:** Data are mean $\pm$ standard deviation, unless otherwise stated. Participants demonstrated stronger therapeutic alliance in the ten minutes after the imaginal exposures ($4.873 \pm .641$) compared with the ten minutes prior ($4.559 \pm .617$). Therapeutic alliance following the imaginal exposure was 0.314 points higher (95% CI, 0.140 to 0.488). Following the first imaginal exposure during Session 5, there was a statistically significant increase in therapeutic alliance, $t(27) = 4.453$, $p = .001$. Cohen’s $d$ on (transformed) variables $d = 0.842$. Effect size findings should be interpreted with caution due to limited variance, an artifact of missing-values replacement methods.
Figure 2 Mean Therapeutic Alliance Scores Before and After Imaginal Exposure, Session 5

Session 11.

Wilcoxon signed-rank test: Data are medians unless otherwise stated. Of the 28 participants in the sample, 27 demonstrated an increase in the strength of the therapeutic alliance after the imaginal exposure, whereas 1 demonstrated a weakening after the imaginal exposure. A Wilcoxon signed-rank test determined that there was a statistically significant median increase in the strength of therapeutic alliance (0.341) in the ten minutes of Session 11 following the introduction of imaginal exposure (5.249) in comparison with the ten minutes prior (4.908), $z = 4.685$, $p < .05$. 
**Paired Samples T-Test:** Data are mean ± standard deviation, unless otherwise stated.

Therapeutic dyads demonstrated stronger therapeutic alliance in the 10 minutes following imaginal exposure (5.249 ± .211) than in the 10 minutes prior to exposure (4.908 ± .281), a statistically significant increase of 0.341 (95% CI, .250 to .432), \( t(27) = 7.669, p < .0005 \), \( d = 1.449 \). These results should be interpreted with caution, as the findings may be spurious due to the small degree of variance.

**Figure 3** Mean Therapeutic Alliance Scores Before and After Imaginal Exposure, Session 11
Associations Between Changes in Therapeutic Alliance and Concurrent Symptom

Self-Report. Part c) of the second hypothesis predicted that changes in the alliance over the course of treatment would be reflected in symptoms reported the following week, such that if the alliance decreased across two consecutive time points (i.e. Session 2 → Session 5), the participant would endorse greater levels of PTSD symptoms and increased substance use over the same period (i.e. symptoms reported across Week 3 → Week 6).

Several change variables were created for the following analysis, included variables for the change in therapeutic alliance from Session 2 to Session 5, from Session 5 to Session 11, as well as variables for the change in self-reported PTSD symptoms from Session 3 to Session 6 and for Session 6 to Session 12. In addition, variables were created to represent the change in self-reported SUD symptoms from Session 3 to Session 6 and from Session 6 to Session 12.

Two sets of Spearman’s rank-order correlations analyses were run to assess the relationship between changes in therapeutic alliance across sequential time-points in the therapy intervention and concurrent changes in self-reported levels of PTSD and SUD symptoms, respectively. No significant correlations were detected between changes in therapeutic alliance and concurrent changes in self-reported PTSD or SUD symptoms. See Tables 9 and 10 for results.

Table 9 Spearman’s rank-order correlation for changes in therapeutic alliance and concurrent symptoms from beginning to middle of treatment (N = 28)

<table>
<thead>
<tr>
<th></th>
<th>Change in TA Session 2--&gt;5</th>
<th>Change in MPSSSR Week 3--&gt;6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change in MPSSSR, Week 3--&gt;6</td>
<td>0.20</td>
<td></td>
</tr>
<tr>
<td>Change in SUI, Week 3--&gt;6</td>
<td>0.12</td>
<td>0.21</td>
</tr>
</tbody>
</table>

Note: MPSSSR = Modified PTSD Symptom Scale-Self Report; SUI = Substance Use Inventory
Table 10 Spearman’s rank-order correlation for changes in therapeutic alliance and concurrent symptoms from middle to end of treatment (N = 28)

<table>
<thead>
<tr>
<th></th>
<th>Change in TA Session 5---&gt;11</th>
<th>Change in MPSSSR Week 6---&gt;12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change in MPSSSR, Week 6---&gt; Week 12</td>
<td>-0.01</td>
<td></td>
</tr>
<tr>
<td>Change in SUI, Week 6---&gt; Week 12</td>
<td>-0.14</td>
<td>0.13</td>
</tr>
</tbody>
</table>

Note: MPSSSR = Modified PTSD Symptom Scale–Self Report; SUI = Substance Use Inventory

4.6 Hypothesis III Analysis

The third hypothesis was proposed as an exploratory exercise aiming to examine how baseline severity of PTSD symptoms (high vs. low) and substance use symptoms (high vs. low) might function as variables moderating the relationship between early therapeutic alliance and treatment outcomes.

**Baseline PTSD Severity Moderation on Early Therapeutic Alliance & Post-treatment PTSD.** A hierarchical multiple regression was run to assess the statistical significance of the interaction term between baseline symptom severity and early therapeutic alliance on post-treatment measures of PTSD. A scatterplot of post-treatment PTSD symptoms against early therapeutic alliance was plotted. Visual inspection of this plot indicated that the assumption of linearity was met. There was no evidence of multicollinearity, as evidenced by no tolerance values less than .015. The was homoscedasticity, as assessed by visual inspection of the studentized residuals plotted against the predicted values for participants with high and low levels of baseline substance use. The studentized residuals were normally distributed, as assessed by Shapiro-Wilk’s test (p > .05). Severity of baseline PTSD symptoms did not moderate the effect of early therapeutic alliance on post-treatment PTSD symptoms, as
evidenced by an increase in total variation explained by 0.8%, which was not statistically significant \(F(1,24) = 0.243, p = .626\). See table 11 for details.

**Table 11** Moderated Multiple Regression Analysis of Baseline PTSD Severity on Effect of Early Therapeutic Alliance on PTSD Severity at Follow-up \(N = 28\)

<table>
<thead>
<tr>
<th>Step</th>
<th>Predictor</th>
<th>Coefficients</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>B</td>
<td>SEB</td>
<td>β</td>
<td>t</td>
<td>p</td>
</tr>
<tr>
<td>Step 1</td>
<td>Early Therapeutic Alliance</td>
<td>39.81</td>
<td>46.84</td>
<td>0.15</td>
<td>0.85</td>
<td>0.40</td>
</tr>
<tr>
<td></td>
<td>Baseline PTSD Severity</td>
<td>22.05</td>
<td>7.63</td>
<td>0.52</td>
<td>2.89</td>
<td>0.01</td>
</tr>
<tr>
<td>Step 2</td>
<td>Early Therapeutic Alliance</td>
<td>29.12</td>
<td>52.26</td>
<td>0.11</td>
<td>0.56</td>
<td>0.58</td>
</tr>
<tr>
<td></td>
<td>Baseline PTSD Severity</td>
<td>-7.92</td>
<td>61.24</td>
<td>-0.19</td>
<td>-0.13</td>
<td>0.90</td>
</tr>
<tr>
<td></td>
<td>ETA x Baseline PTSD Severity</td>
<td>62.19</td>
<td>126.07</td>
<td>0.70</td>
<td>0.49</td>
<td>0.63</td>
</tr>
</tbody>
</table>

Note: ETA = Early Therapeutic Alliance; Therapeutic Alliance scores were measured with SWAI-O.

\(R^2\) change = 0.008, \(F(1,24) = 0.243, p=.626\)

**Baseline SUD Severity Moderation on Early Therapeutic Alliance & Post-treatment**

**SUD.** A hierarchical multiple regression was run to assess the statistical significance of the interaction term between early therapeutic alliance and post-treatment measures of substance use symptoms. A scatterplot of post-treatment substance use symptoms against early therapeutic alliance was plotted. Visual inspection of this plot indicated that the assumption of linearity was met. There was no evidence of multicollinearity, as evidenced by no tolerance values less than .016. Because values for participant Exp1622 were determined to be an outlier, the regressions were run with and without the value and were found not to strongly impact results. There was homoscedasticity, as assessed by visual inspection of the studentized residuals plotted against the predicted values for participants with high and low levels of baseline substance use. The studentized residuals were normally distributed, as assessed by Shapiro-Wilk’s test \(p > .05\).

Level of baseline substance use symptoms did not moderate the effect of early therapeutic
alliance on post-treatment substance use levels, as evidenced by an increase in total variation explained by 0.5%, which was not statistically significant \((F(1,24) = 0.137, p = .715)\). See table 12 for details.

### Table 12 Moderated Multiple Regression Analysis of Baseline SUD Severity on Effect of Early Therapeutic Alliance on SUD Severity at Follow-up (N = 28)

<table>
<thead>
<tr>
<th>Step</th>
<th>Predictor</th>
<th>Coefficients</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>B</td>
<td>SEB</td>
<td>ß</td>
<td>t</td>
<td>p</td>
</tr>
<tr>
<td>Step 1</td>
<td>Early Therapeutic Alliance</td>
<td>5.30</td>
<td>4.66</td>
<td>0.21</td>
<td>1.14</td>
<td>0.27</td>
</tr>
<tr>
<td></td>
<td>Baseline SUD Severity</td>
<td>1.16</td>
<td>0.74</td>
<td>0.30</td>
<td>1.58</td>
<td>0.13</td>
</tr>
<tr>
<td>Step 2</td>
<td>Early Therapeutic Alliance</td>
<td>2.30</td>
<td>9.42</td>
<td>0.09</td>
<td>0.81</td>
<td>0.81</td>
</tr>
<tr>
<td></td>
<td>Baseline SUD Severity</td>
<td>-0.82</td>
<td>5.43</td>
<td>-0.21</td>
<td>0.88</td>
<td>0.88</td>
</tr>
<tr>
<td></td>
<td>ETA x Baseline SUD Severity</td>
<td>4.03</td>
<td>10.90</td>
<td>0.55</td>
<td>0.72</td>
<td>0.72</td>
</tr>
</tbody>
</table>

Note: ETA = Early Therapeutic Alliance; SUD = Substance Use Disorder; Therapeutic Alliance scores were measured with SWAI-O.

\[ R^2_{change} = 0.005, F(1,24) = 0.137, p=.715 \]

### 4.7 Case Study: Exp521

Of the eight cases that completed all twelve sessions of COPE, several in particular bring to life the group-level patterns described above. Participant Exp521 was a 53-year-old, African-American male, who was originally from New York and who suffered the severe trauma of witnessing his father’s murder when he was 6 years old. He had a history of homelessness, had attended two years of college, and at the beginning of the study met criteria for alcohol and cocaine dependence as well as High Severity PTSD. At the time of the study, he was living with his sister and working part-time in a bar. He denied any history of physical or sexual abuse and reported being divorced. At the baseline interview, he also met criteria for past and current major depressive disorder, moderate. Exp521 had never been hospitalized, but had gone through four
prior outpatient psychiatric treatments, along with one trial on an SSRI. During the imaginal exposures, participant Exp521 drew upon the traumatic memories of his father’s murder (Kahn, 2016).

In regards to his self-report of PTSD symptoms, Exp521 endorsed a significant trend-level decrease over the course of treatment, with a few spikes along the way. It is worth observing how his symptoms declined significantly after his first psychotherapy session. Also worth observing is how his self-report of PTSD symptoms spiked upwards following the first imaginal exposure in Session 5. Over the full course of treatment he endorsed such a significant decrease in symptoms such that by the end, he was experiencing a sub-clinical level of PTSD symptoms.
Data from the Substance Use Inventory (SUI) were used to track Exp521’s self-report of his (drinking) patterns over the course of treatment. Unfortunately, data from his motivational interviewing (MI) session and week 4 of the study were missing. However, the data available demonstrate a remarkable decrease in the participant’s drinking patterns during the study. By week 5, he is reporting having had zero days of use in the past week, and by the end of the study, he further endorses just one day of use in the week before the last psychotherapy session.
The therapeutic alliance between participant Exp521 and his therapist grossly portrays the U-shaped curve whereby the alliance begins strong in Session 2 (with an overall session alliance score=5.56), dips slightly in the middle of treatment (Session 5 overall alliance score=5.26), and regains—and even surpasses—its original strength by the end-stages of treatment in Session 11 (overall alliance score=5.44). Due to scheduling reasons the participant reported on the day of his 11th psychotherapy session, he and his therapist were required to cut the session short, which resulted in just one 5-minute segment being available to code in the portion of the session following the final imaginal exposure in Session 11. Participant Exp521’s alliance with his therapist also demonstrates the pattern in which the alliance rated in the 10 minutes following the imaginal exposures is stronger that in the ten minutes before. The following summaries of each of the three sessions that were coded with Exp521 are presented below, integrating both the alliance ratings and excerpts of the coded material as illustrative of his progression through treatment. For detailed breakdown of the raw coding scores, see table 13.
### Table 13 Raw Therapeutic Alliance Coding Values for Exp521

<table>
<thead>
<tr>
<th>Item</th>
<th>Task</th>
<th>Agreement about steps taken</th>
<th>Agreement about the usefulness of activity</th>
<th>Lack of efficiency*</th>
<th>Therapy process not making sense to client*</th>
<th>Agreement about client's role</th>
<th>Client's frustration*</th>
<th>Discomfort in the relationship*</th>
<th>Mutual understanding</th>
<th>Mutual respect</th>
<th>Mutual trust</th>
<th>Client's awareness of therapist's concern</th>
<th>Both see relationship as important to client</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>C1</td>
<td>C2</td>
<td>C1</td>
<td>C2</td>
<td>C1</td>
<td>C2</td>
<td>C1</td>
<td>C2</td>
<td>C1</td>
<td>C2</td>
<td>C1</td>
<td>C2</td>
</tr>
<tr>
<td>1</td>
<td></td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>6</td>
<td>5</td>
<td>6</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td>5</td>
<td>6</td>
<td>5</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>7</td>
<td></td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>8</td>
<td></td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>5</td>
<td>6</td>
<td>6</td>
<td>5</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>9</td>
<td></td>
<td>5</td>
<td>6</td>
<td>5</td>
<td>6</td>
<td>5</td>
<td>6</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>6</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>10</td>
<td></td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>6</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>11</td>
<td></td>
<td>5</td>
<td>5</td>
<td>6</td>
<td>5</td>
<td>6</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>12</td>
<td></td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>6</td>
</tr>
</tbody>
</table>

Note: Items with * are reverse coded. C1 = Coder 1, C2 = Coder 2. Range of scores, 1-7.
**Therapeutic Alliance in Session 2.** In Session 2, it is clear that participant Exp521 and his therapist have already established what can only be characterized as a strong and healthy working alliance. The two raters assigned to code the middle fifteen minutes of the session, broken down into three 5-minute segments, consistently gave this dyad scores of 5s and 6s, indicating, respectively, “some evidence for” and “considerable evidence for” positive aspects of working alliance across items measuring both task and bond. The items that were consistently most elevated, rated as a 6 by each rater for each segment or all but one segment included an item measuring the efficiency of the two parties in staying on task, and an item measuring the degree of frustration (this item is reverse coded) expressed by the client in regards to the task at hand. Bond items that were consistently elevated across include items measuring the degree of “understanding” and “trust” between Exp521 and his therapist. Such patterns suggest how, even from the early stages of treatment the two shared a bond that had a strong foundation, both in terms of their interpersonal rapport, and also in terms of their ability to move forward in discussing material pertinent to the session. These dynamics are reflected in the transcript of this particular session, as with the following section when the therapist provides psycho-education about the nature of craving through using an analogy about stray cats:

*Min 43:20, Segment C*

T: So it’s replacing all those unhealthy thoughts with healthier thoughts. Right? In the time that you would spend scheming and planning and plotting and trying to get some money, you’re cooking healthy food and making healthier decisions, right? The time that you would have been using, you were riding your bike.

P: Right.

T: It’s a whole kind of change.

P: It is, yeah.

T: Physically, mentally, right?
P: It’s a cycle.

T: Yeah. And so, you know, that’s great. The cravings are still gonna come, the more that you can do things like that, you know, replace them with healthier thoughts, healthier activities, the easier it’s gonna be to kind of push them away, right?

P: Okay, yes.

T: But if you kind of feed into them they’re like—it’s like a stray cat, right?

P: Right.

T: If a stray cat comes and you feed it, what’s gonna happen?

P: It’s gonna come back.

T: Keep comin’ back. Right? Looking for that food.

P: Yup.

T: If you don’t feed the cat, what happens?

P: It might scratch you.

[They laugh together.]

T: But what happens over time?

P: It becomes habit forming.

T: Okay, so if you’re not feeding that cat—

P: It’s gonna leave.

T: It’s gonna leave!

P: He’s not gonna bother with you no more.

T: Exactly! Same thing with your craving.

P: Got you.

T: If you feed those cravings, they’re gonna keep coming back, stronger and stronger.

P: I got you.
T: If not, eventually, the cravings will get less, they’ll come back less frequently, and eventually they’ll die off.

P: Right.

T: Just like that stray cat, right? It will stop coming back to you.

P: Okay.

T: It will go elsewhere. Your craving is that stray cat, got it?

P: Got you.

T: Alright, good.

In this segment, though brief, participant Exp521 and his therapist demonstrate how good their understanding of one another is. What also comes through loud and clear is how focused the therapist is in supporting Exp521 in his growth relating to his understanding of cravings and in his development of new ways of thinking and acting that will support his recovery. Another aspect of this particular dyad that is so evident in the recording, is how the two are attuned to each other, and also able to have fun, and play within their therapeutic relationship. With such a genuinely strong bond early in treatment, in which both parties are actively working, the stage is set for a successful therapy.

**Therapeutic Alliance in Session 5.** In looking more deeply into the ratings given to specific aspects of therapeutic alliance across the two raters for this session, several patterns of mutual agreement emerged across items pertaining to both the task and bond aspects of therapeutic alliance as measured by the SWAI-O. For example, among the items that comprise the dimensions of “task” on the SWAI-O, both raters indicated a strengthening in the “agreement about the usefulness of the current activity” from the ten minutes before the imaginal exposure to after the exposure, with an average combined rating of 5.0 before to an average of 5.75 following. The raters also both rated the degree of “frustration” experienced by the participant
following the exposure as appreciably lower in the final segment, starting five minutes after the exposure had finished and as the participant was putting words to his decreasing distress (as measured by his “SUDS”, subjective units of distress), such that whereas both raters assigned ratings of 5 in the ten minutes before and first five minutes after the imaginal exposure, both agreed the degree of frustration lowered in the last segment, for which both raters assigned a 6.

The raters were in agreement about patterns that emerged over the course of Session 5 among the items comprising the “bond” dimension of therapeutic alliance as well. For example, the raters agreed that the ten minutes following the imaginal exposure were stronger among items pertaining to the degree of mutual respect and trust experienced in the therapeutic dyad, going from an average of 5.25 before the imaginal to an average of 5.75 after the imaginal for both items. The two raters also identified a strengthening in the aspects of the therapeutic bond articulated by item #11 (“The client is aware that the therapist is genuinely concerned for his/her welfare) for which the raters assigned an average rating of 5.25 before the imaginal, and 6 after the imaginal. Furthermore, the raters identified an increase in the degree to which “the client and therapist see their relationships as important to the client”, rating an average of 5 before the imaginal, to an average of 6 afterwards.

These trends emerge in the transcript of the segments as well. For example, participant Exp521 articulates the anxiety he is experiencing as his therapists introduces the nature of the imaginal exposure task they will dive into for the first time that day:

*Minute 28:25, Segment A*

T: What are you reactions to what we’re going to be doing?

P: We’re gonna talk about the whole incident again. We’re gonna have to re-live this. That sounds kind of scary.

T: Yes.
P: Yes, it is. We said, decrease the fear, and increase the sense of control. And what do you mean by the sense of control?

T: That you can control those thoughts, and that when you have nightmares, those thoughts, first of all, those will go down, but when you do have a thought, it won’t be as intense, and it won’t have as much control over you. You’re taking back control from the trauma.

P: Okay.

T: Does that make sense?

P: That makes sense.

As the session continues and the therapist does not back down from the task at hand, she continues to assess for the participant’s degree of distress, and as the exposure gets, closer, he again expresses:

*Minute 31:00, Segment A*

T: Your SUDS.

P: Wow, right now that’s about 30.

T: Okay. So let’s just kind of talk about--

P: It’s going up; I’m getting nervous.

T: Yeah, it’s going to.

And in the minutes just before the imaginal begins:

*Minute 37:21, Segment B*

T: Okay, what are your SUDS right now, 70?

P: A little higher than that, a 80.

During the imaginal exposure over the course of the next 25 minutes, Exp521 revisits the memory, from 1963 when he was 6 years old, of witnessing his father’s murder four times, being continually encouraged by his therapist to not avoid returning to the memory, and experiencing
the affect aroused in him by facing the traumatic memories. After this, his SUDS levels almost immediately begin to decline from a 70 down to a 30 in the moments before he leaves the therapy room to continue on with his day. As he explains just after completing the fourth imaginal:

_Minute: 1:02:30, Segment C_

T: What’s your SUDS?

P: About a 70, it’s going down.

Moments later, after the therapist has asked participant Exp521 to reflect on his reaction to having done the imaginal exercise for the first time, she checks in with him about his SUDS again, which leads him to further reflect on the experience of revisiting the trauma and also to identify a link between his traumatic experience and substance use:

_Minute 1:03:45, Segment C_

T: Okay, so what are your SUDS now?

P: It’s getting lower, about a 60. The more I talk, the lower it gets.

T: So, that makes sense, right? That it’s gonna get lower. So now that you can put it all together in a story, how does it make sense to you? Does it make sense to you?

P: What makes sense is that there are a few details, I didn’t realize or remember it, I didn’t remember it, you know. Um, when I first told it to you, I went deep, I didn’t realize how still getting high was involved, but I think that the more sober I get the more things I can remember and put my hands on, and uh, really uh, it’s helpful because I’m starting to get strong, I can feel it. I’m not anxious to get high, I’m not that, I don’t know how I’m gonna feel when I leave these doors.

This exchange also illustrates the reason why the two had such consistently high ratings across items of the SWAI-O about agreement on “the steps taken to improve the client’s situation,” about “the usefulness of the current activity in therapy,” regarding the efficiency of the sessions, as well as the degree to which the therapy process “makes sense to the client.” As the two
continue processing the experience of the imaginal, the therapist continues to convey her
appreciation of the participant’s work, and in turn, he expresses his understanding of how she
keeps him on task in the service of not avoiding the painful memories. As they communicate,
the sense of trust, respect, and understanding between them comes through loud and clear:

*Minute 1:04:55, Segment C*

T: Well, but as you remained in the memory, I mean you remained at 100 the
first time through, the third time through, you were at a 70.

P: Right.

T: Okay, so it does go down the more that we kind of revisit the memory, okay?

P: Uh-huh.

T: So it will go down. You’re already starting to take back some of the power
from the memory.

P: Okay.

T: The first time you thought about it, very intense. Right? You broke down, and that’s
normal. That’s a very intense image for you, right? The third time, fourth time you went
through it, it was much—it was 70, right? And it didn’t have as much control over you.
It wasn’t as intense, right? But you noticed, and I appreciate this, that you kept trying to
avoid it. Right?

P: Yeah.

T: You go off on a tangent, or go into a different—

P: You was not letting that happen.

[Laughter]

T: But that’s very normal, right? Your whole life.

P: Yeah, I try and escape. And you’ll always be on course.

T: That’s my job.

[Laughter]
P: I said wow, she is not letting that happen.

T: Right.

P: She’s not having it.

In the final minute of the session, as they are wrapping up, the therapist reminds the patient he can reach out to her if need be. She reiterates her support and her acknowledgement of the hard work he is doing, and this in turn leads to the patient spontaneously volunteering how he feels the therapy is working for him:

*Minute 1:11:55, Segment D*

T: So, you know, if you have any questions throughout the week, call.

P: I’ll call you.

T: But otherwise, you know, you’re doing an amazing job. This is really going to be a powerful change for you.

P: I see it now, I’m working with the program. I’m not taking this, just for—to be taking it, working with this, this thing, this is good stuff here. And I know I’m going to have a good opportunity to get myself better here.

**Therapeutic Alliance in Session 11.** In Session 11, the therapeutic alliance shared between participant Exp521 and his therapist continued to be remarkably strong, with an average overall session rating of 5.5. As with the first session, the alliance strengthened in the minutes after the imaginal exposure compared with the ten minutes before. But this time, the trends that emerged across the two raters had a slightly different focus. In particular, Session 11 saw an upward trend with ratings for item #2 which addresses “the usefulness of the current activity in therapy.” Before the imaginal, the raters assigned an average of 5.75, and in the minutes after, and average of 6. Interestingly, by Session 11, the initial anticipatory discomfort the participant had experienced in Session 5 leading up to the imaginal appeared to be absent, as evidenced by an average rating of 6 both before and after the imaginal for the item addressing the absence of
“discomfort” in the relationship. Furthermore, in Session 11, both raters discerned a dissipation in the degree of frustration the participant experienced before the exposure in comparison with after, as indicated by the average pre-exposure score of 5.25 and the average post-exposure score of 6.5, a score which indicates, per the SWAI-O manual, an expression of the client’s “enthusiasm”, “excitement” and “interest” in the task at hand. These trends are further expressed in the following passages from the transcript of Session 11:

_Minute 47:32, Segment C_

T: Talking about it now. When you’re going through the story and visualizing it now, what’s different now than when you were in it?

P: The noise. The screaming.

T: Okay, so it’s—

P: The shock, I don’t have the shock no more. The shock was overwhelming. It was overwhelming. It’s your hero, your superman.

T: So the shock is gone.

P: It’s not there anymore. I can talk about it.

T: You’re able to talk about it, sure. There’s a big, dramatic difference between when you first started doing this. Do you remember when we first did the story?

P: Yeah.

T: You couldn’t get through parts of it.

P: I couldn’t.

T: Right? And you skipped over parts of it. And now you were able to get through the entire story.

P: Yeah.

T: And your SUDS since last time—

P: I thank you very much for this.
T: You’ve done a tremendous job.

P: Thank you.

This passage captures beautifully the fear extinction, or “shock” extinction participant Exp521 has experienced over the course of treatment. I also indicates how with repeated imaginal over the course of 6 weeks, the participant’s narrative became increasingly linear, and less fractured. This passage also captures the mutual appreciation participant Exp521 and his therapist have for each other’s efforts. This same spirit is communicated in the following passage:

*Minute 50:00, Segment C*

T: You’re doing a tremendous job. It’s really nice to see how much you’ve improved.

P: Thank you, this is an opportunity that I needed, I wanted for a long time. Reaching out for help, I never had the opportunity to—I really asked for it, and I got it. It’s so refreshing to get it out of me.

T: Yes.

P: It is.

T: And you certainly needed to get help, and so I’m glad that you’re able to stick through this. This is hard, this is not an easy treatment. And you know, especially what you’ve been through, it’s very difficult to talk about. You haven’t done that in a long time. And so, your willingness to do that and to keep coming back here is what has made all the difference. So great job.

P: Thank you.

The therapist is warmly recognizing the participant’s efforts, and he is expressing his sense of accomplishment. The two are affectively attuned in their appreciation for each other and what the therapy has provided him, and they are also acknowledging how the tasks that have comprised the “hard” treatment—namely by confronting and talking about the trauma the participant had been avoiding for so long—paid off.
CHAPTER 5: DISCUSSION

5.1 Summary of Main Findings

The present study offers a novel contribution to psychotherapy process research in its focus on understanding the relationship between therapeutic alliance and changes in symptom severity over treatment, as well as the development of the therapeutic alliance—both across treatment and within sessions—in a manualized exposure-based psychotherapy designed for individuals with comorbid PTSD and substance use disorders. The first aim of the study was to ascertain the alliance-outcome relationship, specifically how early therapeutic alliance predicts treatment outcomes across measures of PTSD and SUD when controlling for baseline symptoms severity. Previous studies have led to mixed results in terms of the relationship between PTSD and substance use symptoms and therapeutic alliance, when it is treated as both a predictor and outcome measure (e.g. Ruglass et al., 2012; Cloitre et al., 2004; Meier et al., 2005b; McLaughlin et al., 2014). In addition, this study investigated the development of therapeutic alliance over the course of a manualized psychotherapy intervention, measuring alliance at the beginning, middle, and end of treatment, and also within the session itself, with a focus on understanding changes in alliance before and after the participant is engaged in an imaginal exposure. This second research goal contributes to a growing body of research that tracks the strength of working alliance using a “segmented” approach, analyzing psychotherapy sessions sequentially and in such a way that is sensitive to changes in alliance including ruptures and repairs over the course of a session (Berk, Safran, Muran, 2013; Eidlitz, 2017). Finally, this study conducted exploratory analyses to ascertain whether baseline levels of PTSD and substance use symptoms might have a moderating effect on the relationship between early therapeutic alliance and symptoms changes over treatment. This chapter presents an exploration of the results presented
above in the context of the relevant literature, followed by the clinical implications of the findings, study limitations, and recommended future directions for related research.

**Early Alliance Predicting Outcomes.** In keeping with prior studies that found a relationship between the strength of early therapeutic alliance and improvement in PTSD (Ruglass et al., 2012; Cloitre et al., 2004) and SUD symptoms (Meier et al., 2005b), it was hypothesized that a measure of therapeutic alliance taken early in the treatment (Session 2) would correlate positively with changes in symptoms of both PTSD and substance use from baseline to the end of treatment. This hypothesis was also consonant with recurring findings indicating how therapeutic alliance has a strong relationship with psychotherapy outcomes regardless of treatment approach (Horvath et al., 2011; Norcross, 2011). The present study’s findings did not provide support for the hypothesis that early therapeutic alliance would be found to have a relationship with the decrease in PTSD and SUD symptoms at the conclusion of treatment. A series of multiple regression analyses of how early therapeutic alliance functioned as a predictor of outcomes along both clinician-administered and self-report measures of PTSD symptoms and substance use yielded non-significant findings. While analyses investigating how early therapeutic alliance predicts treatment outcomes on a measure of self-reported substance use (Substance Use Inventory, Sobell & Sobell, 1992) approached trend-level significance with a $p$-value of 0.10, such a finding remains inconclusive. These results suggest, in contrast to prior findings regarding the consistent prediction of alliance on outcomes (Norcross, 2011; Horvath, 2011), that in the context of a treatment engaging prolonged exposure techniques, early therapeutic alliance did not predict changes in PTSD symptoms or substance use patterns post-treatment.
However, as mentioned above, the regression analyses supplied evidence for how, using both clinician-administered and self-report measures, baseline symptom severity functioned as a predictor of post-treatment PTSD symptoms and substance use patterns. Significant predictive values were demonstrated for the CAPS ($p=.01$, Table 5), for the MPSSSR ($p=.05$, Table 6), as well as for a clinician-administered measure of substance use severity, the ASI ($p=.04$, Table 7). Such values should be expected, and underscore the importance of factoring baseline values into analyses in order to ascertain baseline-by-treatment interactions (Nunes et al., 2010).

Given the robust literature supporting the idea that therapeutic alliance is a consistent predictor of psychotherapy outcomes (Norcross, 2011; Horvath et al., 2011), in a way it is surprising that this finding would not be maintained in the present study. However, there may be several compelling explanations for this discrepant finding. First, it is possible that limiting the outcome variables to two symptom-based factors such as post-treatment PTSD and SUD severity provided too narrow a lens in understanding the impact of therapeutic alliance on the benefits patients may have gained from treatment that this particular study was not designed to detect. Such benefits could include the strength of participants’ interpersonal functioning, which might have had an impact on the size of their social network, or on decreasing the social anxiety and social isolation participants may have experienced in the context of their PTSD symptoms (Hofmann et al., 2003). More broadly, a stronger alliance may have enhanced participants’ capacity for emotion regulation.

Another possible explanation is that using a measure of alliance taken during Session 2 may have been too early given that in this particular treatment, so many of the “active ingredients” are not added until later in treatment when the in-vivo and imaginal exposures begin. Indeed, several of Horvath’s meta-analyses have supported the finding that the strength of
the relationship between alliance and outcome increases over time (Horvath & Luborsky, 1993; Horvath et al., 2011). During Session 2, the therapist is providing psycho-education about cravings and typical reactions to trauma and is actively encouraging the participant to reflect upon these topics in his own life. The relationship is still being established, and the heaviest lifting, when the participant will be ushered forward into facing some of his most difficult memories, is still several weeks away.

In reflecting on the wider literature on therapeutic alliance in treatment studies with substance users, however, these findings may not be so discrepant after all. Several prior studies (DeWeert-Van Oene et al., 1999; Barber et al., 2001) demonstrated a relationship between therapeutic alliance and treatment retention, but not between alliance and symptom changes. The results of Meier et al.’s 2005 meta-analysis of alliance and treatment outcomes in studies with substance users arrived at a similar conclusion. The literature also supports the idea that due to the impact of alcohol and other substances on interpersonal functioning (i.e. reading social cues, theory of mind), substance users experience an automatic handicap in forming relationships and, by extension, in developing a strong therapeutic alliance at any time in the treatment process, but particularly early on (Uekermann & Daum, 2008; Horvath & Bedi, 2002).

The present study, while it does not provide support for alliance-outcome effects relating to substance use, does provide evidence that substance users are capable of forming a strong baseline alliance, which stands in contrast to this suggestion. The mean overall therapeutic alliance score for the present study was 4.84. As a score, 4.84 suggests that this sample received positive ratings (5 or more) with a notably greater frequency than they did neutral scores (of 4) or negative scores (3 or less). This overall positive rating may be in part related to the skill of the therapists in developing rapport, and also it may be somewhat inflated because it does not
include alliance scores of the 9 participants who dropped out of the study after Session 1 and who may have demonstrated weaker alliances with their therapists as a group. Regardless, the positive mean overall alliance score does suggest, perhaps in contrast to anecdotal or clinical reports, that substance users are capable of forming attachments with their therapists.

Another look into the literature on therapeutic alliance with patients living with PTSD underscores how, as a disorder, it poses specific challenges to sustaining a therapeutic bond, primarily due to challenges with emotion regulation that can hurt relationships (Chemtob et al., 1997), and with difficulty sustaining interpersonal relationships (Price et al., 2001). Other publications emphasize how in working with individuals with PTSD, repairing ruptures in the therapeutic alliance both protects the relationship (Safran & Muran, 2000) and predicts superior outcomes (McLaughlin et al., 2014). For the present study, rupture-repair events were not measured. However, it could be that therapeutic alliance measured at Session 2 did not predict outcomes on measures of PTSD because some dyads—especially those who dropped out of the study before alliance ratings could be taken at Session 5 and Session 11—experienced ruptures that were never sufficiently repaired, thereby impacting both alliance ratings and treatment outcomes.

Why, exactly, alliance ratings for substance users predict successful outcomes less reliably than they do for individuals with other disorders (Horvath & Bedi, 2002; Martin, Garske, & Davis, 2000), still remains unknown. Perhaps the difference relates to the biological mechanisms that characterize addiction and make it distinct from other psychiatric disorders (Yalisove, 1997) Another possibility is that individuals with comorbid substance use typically present with a more complex clinical picture, such that alliance is rendered a less powerful
predictor when there are many more variables at play influencing symptom improvements across both substance use and other psychiatric conditions.

**Changes in Alliance Over Treatment.** The second goal of the present study was to understand if the strength of therapeutic alliance changed over the course of treatment, and if the introduction of imaginal exposures impacted the strength of the alliance within sessions, and finally, if changes in alliance over treatment were correlated with concurrent changes in PTSD and SUD symptoms. It was hypothesized that the development of therapeutic alliance over the course of treatment would reflect a U-shaped pattern, akin to the model for maximal treatment effectiveness put forward by Gelso and Carter (1994), and also to Safran and Muran’s rupture-repair model (2000). Such a model corresponds with the progression of COPE (Concurrent Treatment of PTSD and Substance Use Disorders Using Prolonged Exposure), where the therapeutic dyad begins treatment with a focus on psychoeducation and skills development, before integrating more challenging and intentionally anxiety-provoking techniques into the treatment through in-vivo exposures (starting in Session 3) and, in Session 5, the first imaginal exposure. The treatment progresses by practicing the imaginal exposures as well as the the continuing review of relapse-prevention techniques, until the exposures are concluded in Session 11 before the participant and therapist complete their work together in Session 12. As mentioned, it was hypothesized that the present study would demonstrate a similar pattern, whereby around the introduction of imaginal exposures into the treatment, the heightened emotional arousal and anxiety introduced into the sessions would weaken the therapeutic alliance from its initial strength, and that by the end of treatment, after the imaginals had been reviewed again and again, gradually becoming less arousing and fractured, the alliance would have regained—and perhaps even surpassed—its initial strength. This hypothesis was partially
supported by the findings of the present study, which found a shallow U-shaped curve at the

group level, with statistically significant differences across both parametric and non-parametric

analyses in changes of therapeutic alliance ratings from Session 5 to Session 11.

A slight decline in therapeutic alliance was identified from Session 2 (mean alliance

value = 4.75) to Session 5 (mean alliance value = 4.71), but this 0.04 point difference on the

SWAI-O’s likert scale was not significant—statistically or clinically—and suggests that alliance

was maintained from the beginning of treatment to the introduction of imaginal exposures. The

portion of the U-shaped curve that was illustrated in the present study is centered around the

change in alliance from the onset of imaginal exposures in Session 5 to the end of exposures in

Session 11. The 0.36 point difference across these two sessions was statistically significant, and

it represents a clinically meaningful difference in the strength of alliance. Such a shift represents

the difference between a relationship with alignment on features of alliance between “no

evidence” and “some evidence” and ratings that were consistently showing “some evidence”

and in some instances “considerable evidence” for alignment across items.

As this description indicates, measuring variations in alliance from the observer’s

perspective was a process that required a high sensitivity for clinical nuance that often

necessitated direct conversation between the two raters to come to adequate agreement about

individual scores. And even after discussion, the scale may not have been sensitive enough to

detect important qualitative differences in the strength of a relationship. Because raters scoring

the scale are encouraged to default to a “neutral” rating of 4 for segments that lack evidence of

particular feature of alliance—be it pertaining to the therapy process “making sense” to the

client, or to whether or not “the client is aware that the therapist is genuinely concerned for
his/her welfare”—scores were often pulled to center and variability was often constrained to a limited range at both the individual and group level as a result.

The upward arc of the alliance at the group level offers an encouraging perspective on the impact of prolonged exposure techniques on therapeutic alliance. Although it was hypothesized that the alliance would weaken in Session 5 due to the challenges of introducing imaginal exposures into the therapy, this weakening was not seen to a meaningful degree—rather, the positive alliance that had been established in Session 2 was maintained, suggesting that the onset of prolonged exposure into the treatment did not weaken the strength of the bond between participants and their therapists. Furthermore, the upward arc of the alliance from Session 5 to Session 11 suggests that as the prolonged exposures continue, the dyads enjoy a strengthening in their alliance over time.

It is important to note, however, that the therapeutic alliance scores for Session 11 were generated using the scores of the 9 participants who remained in the study at that time, the “treatment completers.” The missing data points were filled with the mean score of these 9 participants, which also resulted in reduced variance for alliance scores across the sample for that time point. While it is difficult to know exactly why the 33 other participants randomized into the study dropped out before Session 11, it is safe to assume that these 9 participants may have been distinct from the others in terms of their motivation for treatment and in terms of their appraisal of the effectiveness of COPE in their lives. It is also possible that these 9 participants generated stronger alliance ratings with their therapists than the 33 others would have had they remained in the study through to the end. Because of this, there is a strong possibility that group-level alliance scores for Session 11 were inflated on account of the self-selection of these 9
participants. Therefore, any conclusions about the positive arc in alliance by the end of treatment may be spurious and should be taken with a degree of caution.

**Impact of Imaginal Exposures on Alliance.** It was additionally hypothesized that the introduction of imaginal exposures into psychotherapy sessions would initially pose a threat to the alliance, as measured within sessions before and after exposures, due to the inherently anxiety-arousing nature of recounting a trauma narrative for the first time. This hypothesis was illustrative of the concerns around engaging imaginal exposure techniques experienced by patients and therapists alike published by authors including Becker and colleagues (2004), Morris (2015), and Meuret and colleagues (2012). Furthermore, it was hypothesized that by the onset of the final exposure, any impact of the imaginal exposure on the alliance would disappear as a result of the desensitization to the emotionally-arousing content.

Analyses revealed no support for this hypothesis; in fact the data supported the opposite finding: that the introduction of imaginal exposures into the sessions strengthened the alliance between patient and therapist at the group level. The effect was found to be significant at both Session 5 ($p < .01$) and Session 11 ($p < .05$) using non-parametric and parametric tests. The difference in the measure of therapeutic alliance before and after imaginals at both Session 5 and Session 11 (changes on a Likert scale of 0.314 and 0.341, respectively) indicated that the difference in therapeutic alliance were not only statistically significant, but clinically significant as well. The large effect sizes ($d = 0.842$ for Session 5; $d = 1.449$ for Session 11) found for both sets of paired samples t-tests must be interpreted with caution, however, as the missing values replacement methods employed may have artificially limited the variability and impacted the distributions accordingly, thereby inflating the effect sizes presented.
At first glance this finding offers a powerful angle on what has often been considered a challenging, arduous therapeutic endeavor. Indeed, at the group level, the alliance between participant and therapist was palpably stronger in the minutes after imaginal exposures at both time points when within-session alliance was assessed. This suggests that the interpersonal impact of recounting traumatic memories in the context of a safe, structured, supportive relationship strengthens both the affective and collaborative aspects of the patient-therapist partnership. Such a finding should be powerful in alleviating the worries of therapists who may feel reluctant to engage imaginal exposures, especially with patients with PTSD who may be seen as having a higher level of vulnerability due to ongoing substance use behaviors. This finding does not simply reject the idea that imaginal exposures weaken the therapeutic alliance, but it offers evidence for the opposite effect. Notably, this “strengthening” effect is related to the growing literature on rupture-repair events in psychotherapy process research (McLaughlin et al., 2014; Friedlander, 2015; Larsson et al., 2015; Safran et al., 2011) in that it documents how therapeutic dyads can in fact grow stronger in reflecting together on an event that was experienced as anxiety-arousing to the patient in the context of the therapy relationship. And yet, the effect is also unrelated to the rupture-repair literature because it does not directly address an event that the patient experienced as a mistake on behalf of the therapist. Instead, this effect suggests how a therapist can prepare a patient for a challenging experience, usher her/him through it in a supportive, attentive way, and then experience a stronger attachment in the process of reflecting on the experience afterwards. At the group level, these results suggest how a strong alliance can become even stronger in going through the phases of preparing for, experiencing, and recovering from the imaginal exposure process.
Although it is just one distinct case that cannot speak for every therapeutic dyad in the sample, the case analysis of participant Exp521 helps to illustrate the specific aspects of alliance that shift before and after the imaginal exposure. The two raters who scored alliance levels for Session 5 were in agreement in documenting how the participant expressed a notably lower degree of frustration after the imaginal, which, per his account, was a result of the anticipatory anxiety he experienced prior to the imaginal and the contrasting relief he expressed when it was over. The two raters also documented an increase in the agreement about the usefulness of the therapy in the minutes following the imaginal, as well as many of the elements of alliance pertaining to the affective bond between the two, including trust, respect, the patient’s awareness of the therapist’s concern for him, and their joint appraisal of the importance of the relationship to participant Exp521. Similar patterns were evident for Session 11, in which the observed level of the patient’s “discomfort” decreased after the imaginal and his frustration lowered. These trends reveal how, rather than attributing the jump in alliance scores after the exposure to recovery from a mistake made by the therapist, or an evaluation of distrust or limited respect that was then restored, the change is better attributed to an easing of the anxiety experienced by the participant, along with—in Session 5 especially—a strengthening of the affective link between patient and therapist.

The possibility remains that the notable improvement in the strength of the alliance after the imaginal exposures could be influenced by the structure of the sessions that were chosen for measuring alliance. In the ten minutes leading up to the first imaginal in Session 5, the therapist is actively providing psycho-education on the efficacy and purpose of the exposures, while intermittently checking in on the participant’s SUDs level, as a way of mentally preparing the participants. While the level of vocal engagement in the participants varied in these segments,
the semi-instructional nature of the session at this point may have slightly depressed alliance scores in comparison with the session total simply because of the nature of the task at hand. In contrast, the ten minutes following the imaginal exposure are designed to give the participant space to reflect upon the experience of repeatedly going through the imaginal, and to receive further support from the therapist along with her observations as she continues to check in with the participant about his/her SUDs level following the exercise. In this way, the minutes following the imaginal are structured to invite direct processing on an emotionally arousing experience, an undertaking that, when conducted in a skillful and supportive way, may lend itself more readily to higher alliance ratings.

**Changes in Therapeutic Alliance and Concurrent Symptom Self-Report.** The last component of the second hypothesis posited that changes in therapeutic alliance would be reflected in symptoms participants reported the following week, such that if the alliance suffered, the participant would endorse higher levels of PTSD symptoms and increased substance use. This hypothesis was also not supported by the data, with an absence of meaningful correlations between changes in the alliance and concurrent changes in self-reported PTSD and SUD symptoms. And perhaps such a finding is not especially surprising in the context of the lack of evidence supporting other alliance-outcome hypotheses.

Another glance into the literature on alliance-outcome relationships suggests that what was considered a well-established relationship between alliance and treatment outcomes based on research conducted in the last decades of the 20th Century is now being seen with a more critical eye (Crits-Christoph, 2013). While contemporary meta-analyses continue to document associations between alliance and outcomes (Horvath, 2011), researchers are questioning whether such findings indicate that alliance directly impacts outcomes in psychotherapy, or
whether the relationship might in fact run in the opposite direction, with symptom changes influencing alliance (Strunk et al., 2010). In their review of psychotherapy process-outcome research, Crists-Christoph and colleagues (2013) conjecture that alliance may take a more causal role in the treatment effectiveness for patients with disorders like depression, with its associated social isolation and low self-worth, in comparison with anxiety-spectrum disorders, for which researchers have had more difficulty finding an alliance-outcome link (Ryum et al., 2009). It may be that in working with comorbid PTSD and SUD, two disorders that are typically characterized by avoidance tendencies and weakened interpersonal relationships, a strong alliance may not be as capable of addressing the difficulties at the root of a patient’s difficulties, as may be the case when working with depression, as Chrits-Christoph and his colleagues suggest.

Overall, the results of the analyses for Hypothesis II suggest that rather than threatening the relationship between therapist and patient, the introduction of prolonged exposure into treatment in fact improved the quality of the alliance when looking at the broad sweep of the development of the alliance over the course of treatment and when looking at alliance changes at the individual session level. While no links to concurrent symptom changes were evident, such findings are not unusual for studies looking at alliance-outcome effects among psychotherapy studies (Crits-Christoph, 2013).

**Moderating Effect of Baseline Symptoms on Early Alliance’s Prediction of Treatment Outcomes.** Consistent with previous studies finding that baseline symptom severity is associated with outcome in the context of treatment studies (Nunes et al., 2011), it was hypothesized that the strength of the relationship between early therapeutic alliance and treatment outcomes would be moderated by the baseline severity of participants’ PTSD and SUD
symptoms. This exploratory hypothesis was included in the context of previous literature that has called for a deeper investigation into the types of patients who are more likely to benefit from PTSD interventions (Seidler & Wagner, 2006) and treatments for individuals with co-occurring PTSD and SUD (Ruglass et al., 2012). No moderation effects were found for baseline level of symptom severity on the predictive value of therapeutic alliance for treatment outcomes. Such findings suggest that even when dichotomizing the participants according to the severity of their baseline symptoms, the absence of alliance-outcome findings was maintained in the present study.

Perhaps there is a positive way of viewing the absence of a moderating effect, which is to say that at the group level, baseline symptom severity does not alter a patient’s trajectory in terms of how the therapeutic alliance they form early in treatment will impact their ability to benefit from treatment overall. In the overall absence of alliance-outcome effects, it is difficult to make strong conclusions about these symptom-alliance interactions, but it is safe to suggest that those participants with more extreme levels of PTSD and SUD are not at a significant disadvantage in terms of forming an alliance that will be supportive of their recovery.

5.2 Clinical Implications

The findings of the present study have some valuable implications for clinicians working with individuals experiencing the deleterious effects of PTSD and substance use disorders. Most powerfully, the findings suggesting that introducing prolonged exposure into a therapeutic relationship will not harm the bond between patient and therapist—and that it may indeed strengthen it—help alleviate the concerns of clinician who feel concerned that using exposure would threaten therapeutic rapport. Many therapists worry that engaging exposure therapy might be contra-indicated for their patients in treating PTSD, and some are concerned that encouraging
their patients to do imaginal exposures may lead them to terminate therapy prematurely (Becker et al., 2004). But the trend among the therapeutic dyads in this study demonstrate how the process of approaching and remembering the traumatic memories head-on, in a supported, safe environment, under the supervision of a skilled and attentive clinician, can even enhance the strength of the bond between the two parties. Of course, as is often the case in psychotherapy process research, the fluctuations in alliance at the level of each individual dyad were varied; not every coupling exhibited the group level effects outlined above. But at the aggregate level, the data support Gelso and Carter’s theory (1994) about the “U-shape” being optimal for therapeutic alliance over the course of a short-term intervention, whereby the therapeutic alliance is strongest after enduring challenges, such as confronting memories that have been actively avoided out of fear of the emotional and physical distress facing them may arouse.

The finding about early therapeutic alliance not having a relationship with outcomes in PTSD and SUD symptoms may also alleviate concerns of therapists who may worry about the helpfulness of a treatment like COPE if they are struggling to establish a strong alliance with a patient in this population. Because the strength of the alliance early in treatment seemed to have no bearing on the degree of symptom alleviation patients experienced by the end of treatment, this study offers some evidence to suggest that those patients and therapists who form an average alliance early in treatment are just as likely as those who form a bond that is palpably supportive and goal-directed to do work that results in positive outcomes for patients.

5.3 Limitations & Future Directions

A primary limitation of this study has been the degree of missing data that needed to be filled in order to complete analyses. The smaller sample size limited the range and sophistication of techniques available to fill the missing values, such that multiple imputation and estimation
maximization were both attempted but rejected. In the end, a combination of linear interpolation and series mean replacement were used. Because data were missing completely at random (MCAR), these techniques provided valid estimates of symptom levels and alliance data, however they also resulted in an underestimation of variability for study variables—variability that would have been expanded by the missing values (Dziura et al., 2013). In regards to variability, it is worth highlighting how estimation techniques used to fill missing values resulted in data distributions on therapeutic alliance values, especially in Session 5 (35.7% missing) and Session 11 (67.9% missing), with what can only be presumed to be artificially small standard deviations, which may have impacted the outcome of analyses, especially on Hypothesis II.

Another limitation of the study is that alliance data were collected exclusively through observational means rather than directly from the participants and therapists participating in the study. While observational evaluations of alliance have been shown to be a stronger predictor of outcome than therapist ratings of alliance, having access to the participant’s perspective on the strength of their relationships with their therapists would have been optimal (Horvath & Symonds, 1991). Such a limitation in design is not unusual for a study that uses secondary data, and while more data would always provide a sharper focus on the nature of therapeutic alliance in this study, data taken from audio recordings provided a rich and manageable entry point into the inner workings of the therapeutic relationships that comprised the study sample.

Furthermore, the SWAI-O itself, while offering an innovative segmented approach to collecting alliance ratings, also presented a share of methodological challenges. As with other measures of therapeutic alliance (Raue et al., 1997), it had limited sensitivity that resulted in a diminished range of alliance scores that reduced variability and therefore associated analyses. In addition, the SWAI-O was normed on a population that was comparable to the present study’s
sample in terms of education, but not in terms of racial/ethnic composition (the SWAI-O patients being 72.7% Caucasian) or symptom presentation (the SWAI-O patients most often presented with a primary Mood Disorder diagnosis [63.6%], and participants with active substance abuse were excluded) (Birk et al., 2013). Furthermore, the SWAI-O was developed in the setting of a psychotherapy research center that studies therapeutic interventions that are comparatively less structured than COPE and in which the patient-therapist relationship is a used as a focus of the therapeutic process (Safran, 2002). While the SWAI-O is intended for use across therapeutic modalities, the contrast between COPE and the treatment approach the SWAI-O was developed with are sufficiently distinct such that this particular instrument may not have been optimal for measuring alliance in a study using COPE.

An additional potential limitation of the present study is that the study design did not account for racial/ethnic match in assigning participants to therapists. While the literature on the effects of racial/ethnic matching on treatment outcomes has been mixed overall, studies consistently demonstrate that African American clients—unlike other racial/ethnic groups—tend to have mildly improved treatment outcomes when matched with an African American therapist (Cabral & Smith, 2011). Furthermore, cross-ethnic dyads have been shown to demonstrate a weaker therapeutic alliance in comparison with ethnically matched dyads (Ruglass, 2005). In a study in which 50% of participants identified as Black and racial/ethnic matching with therapists was not employed, it is quite possible that the racial/ethnic mismatch could have complicated the development of alliance as well as treatment outcomes considerably.

A valuable next step for this research would be to integrate treatment adherence data into the analyses to ascertain a more nuanced understanding of the relationship between attendance and treatment outcomes. In effect, this study presents the data collected from the participants
who were able to complete a meaningful portion of the psychotherapy intervention, including at least one imaginal exposure session. As mentioned above, 9 participants of the original 42 randomized into the treatment dropped out after session 1, and as a result alliance data were not collected from them, effectively removing those cases from analyses. There were an additional five whose data were not included because recordings were not available for the sessions designated for coding which was in part due to errors in data collection, and in part to early dropout (after two or three sessions) on behalf of those participants. A future study would integrate alliance and treatment adherence data to ascertain any relationship between these two factors and also with treatment outcomes.

Future studies of therapeutic alliance in the context of a study using prolonged exposures in the treatment of comorbid PTSD and SUD would benefit from a design that includes participant and therapist ratings of alliance as well as observer ratings. Such exploration would enable researchers to gain a more layered understanding of the alliance from a range of perspectives, and it would also shed light on which aspect of the alliance is most sensitive to predicting alliance-outcome interactions, as well as predictions for treatment adherence.

5.4 Conclusion

The current study has contributed to the growing literature on the nature of therapeutic alliance in studies using prolonged exposure. Most notably, it has offered a novel look into the within-session changes alliance experiences from before to after imaginal exposure, finding evidence to suggest that—contrary to what was hypothesized—the introduction of exposure-based techniques were actually associated with an improvement in the quality of the alliance that was both statistically and clinically significant. Such a finding offers a valuable perspective for clinicians who may worry that exposure techniques could threaten their therapeutic bond and
lead to premature termination, especially in this uniquely vulnerable population of substance users with PTSD.
Appendix A: SWAI-O Scoring Sheet

SWAI-O Scoring Sheet

Patient Acronym _______    Patient Number _______                     Coder ________
Session Number _______      Session Date _______                     Date Coded ________
Segment # _______      Segment Time Span ________

Task:
1. Within this segment, there is agreement about the steps taken to help improve the client’s situation.
   1  2  3  4  5  6  7
2. Within this segment, there is agreement about the usefulness of the current activity in therapy (i.e., the client is seeing new ways to look at his/her problem).
   1  2  3  4  5  6  7
3. There is a perception that the time spent in this segment is not spent efficiently.
   1  2  3  4  5  6  7
4. The therapy process does not make sense to the client in this segment.
   1  2  3  4  5  6  7
5. There is agreement about what client’s role or responsibilities are in this segment.
   1  2  3  4  5  6  7
6. The client is frustrated with what he/she is being asked to do in this segment.
   1  2  3  4  5  6  7

Bond:
7. There is a sense of discomfort in the relationship.
   1  2  3  4  5  6  7
8. There is good understanding between the client and therapist.
   1  2  3  4  5  6  7
9. The client and the therapist respect each other.
   1  2  3  4  5  6  7
10. There is mutual trust between the client and therapist.
    1  2  3  4  5  6  7
11. The client is aware that the therapist is genuinely concerned for his/her welfare.
    1  2  3  4  5  6  7
12. Both the client and therapist see their relationship as important to the client
    1  2  3  4  5  6  7
REFERENCES


Psychotherapy Research Program in Conjunction With the New School for Social Research and Beth Israel Medical Center.


