THE MECHANISMS OF CHANGE ASSOCIATED WITH EXPOSURE IN ACT VERSUS CBT FOR TREATMENT OF ARACHNOPHOBIA

A Dissertation by
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To my parents, my brother,
and my fabulous friends
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ABSTRACT

The role that exposure plays and the related mechanisms of actions that contribute to the successful treatment of arachnophobia by cognitive behavioral therapy (CBT) versus acceptance and commitment therapy (ACT) were explored using a multiple baseline across participants single-subject design. Both interventions produced equivalent statistically and clinically significant improvements for nine arachnophobic participants that were maintained through 2 months of follow-up and moderated by lower levels of pretreatment experiential avoidance. Analyses of both macro- and microlevel process measures suggested that the two approaches instigated therapeutic change through mechanisms consistent with the different conceptual models on which each is based. Specifically, at a macrolevel, while greater anticipated reductions in spider-related beliefs were not obtained for CBT, increased levels of willingness for further contact with spiders, as expected, were reported by ACT participants. At a more microlevel of analysis, CBT alone, as hypothesized, produced significant decrements in measures of subjective fear and disgust with only reductions in fear mediating increased approach behavior towards the spider. Limitations of this study and implications of its findings for future research and clinical management of exposure-based approaches to the treatment of anxiety disorders, more generally, and of arachnophobia and other types of specific phobia, in particular, are discussed.
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>1.</td>
</tr>
<tr>
<td>1.1</td>
<td></td>
</tr>
<tr>
<td>INTRODUCTION</td>
<td>1.</td>
</tr>
<tr>
<td>Purpose of Study</td>
<td>1.1</td>
</tr>
<tr>
<td>2.</td>
<td>3.</td>
</tr>
<tr>
<td>LITERATURE REVIEW</td>
<td>2.</td>
</tr>
<tr>
<td>Specific Phobia</td>
<td>2.2</td>
</tr>
<tr>
<td>Types of Specific Phobia</td>
<td>2.2</td>
</tr>
<tr>
<td>Prevalence Rates</td>
<td>2.2</td>
</tr>
<tr>
<td>Comorbidity</td>
<td>2.2</td>
</tr>
<tr>
<td>Arachnophobia</td>
<td>2.3</td>
</tr>
<tr>
<td>Research with College Student Samples</td>
<td>2.3</td>
</tr>
<tr>
<td>Research with Community Samples</td>
<td>2.3</td>
</tr>
<tr>
<td>Treatment of Specific Phobia</td>
<td>2.4</td>
</tr>
<tr>
<td>Role of Exposure</td>
<td>2.4</td>
</tr>
<tr>
<td>Cognitive Behavioral Approach</td>
<td>2.5</td>
</tr>
<tr>
<td>One-Session Treatment</td>
<td>2.5</td>
</tr>
<tr>
<td>Role of Exposure</td>
<td>2.5</td>
</tr>
<tr>
<td>Fear and Disgust</td>
<td>2.5</td>
</tr>
<tr>
<td>Acceptance and Commitment Therapy</td>
<td>2.6</td>
</tr>
<tr>
<td>Core Processes</td>
<td>2.6</td>
</tr>
<tr>
<td>Experiential Avoidance/Acceptance</td>
<td>2.6</td>
</tr>
<tr>
<td>Fusion/Cognitive Defusion</td>
<td>2.6</td>
</tr>
<tr>
<td>Bidirectionality</td>
<td>2.6</td>
</tr>
<tr>
<td>Transformation of Stimulus Functions</td>
<td>2.6</td>
</tr>
<tr>
<td>Future Focus/Mindfulness</td>
<td>2.6</td>
</tr>
<tr>
<td>Fusion with Self-As-Concept/Self-As-Context</td>
<td>2.6</td>
</tr>
<tr>
<td>Dysfunctional Rule-Following/Valuing</td>
<td>2.6</td>
</tr>
<tr>
<td>Impulsivity and Dysfunctional Persistence/Committed Action</td>
<td>2.6</td>
</tr>
<tr>
<td>Comparison of CBT and ACT: Outcome Question</td>
<td>2.7</td>
</tr>
<tr>
<td>Comparison of CBT and ACT: Process Question</td>
<td>2.8</td>
</tr>
<tr>
<td>Macrolevel Analyses</td>
<td>2.9</td>
</tr>
<tr>
<td>Microlevel Analyses</td>
<td>2.10</td>
</tr>
<tr>
<td>3.</td>
<td>30.</td>
</tr>
<tr>
<td>METHODOLOGY</td>
<td>3.</td>
</tr>
<tr>
<td>Participants</td>
<td>3.1</td>
</tr>
<tr>
<td>Measures and Materials</td>
<td>3.2</td>
</tr>
<tr>
<td>Pretreatment Screening Measures</td>
<td>3.2</td>
</tr>
<tr>
<td>Background Information Questionnaire</td>
<td>3.2</td>
</tr>
<tr>
<td>Anxiety Disorders Interview Schedule</td>
<td>3.2</td>
</tr>
<tr>
<td>Chapter</td>
<td>Page</td>
</tr>
<tr>
<td>----------------------------------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>Spider Phobia Questionnaire</td>
<td>32</td>
</tr>
<tr>
<td>Moderating Measures</td>
<td>32</td>
</tr>
<tr>
<td>Acceptance and Action Questionnaire</td>
<td>32</td>
</tr>
<tr>
<td>Courage Measure</td>
<td>33</td>
</tr>
<tr>
<td>Macrolevel Process Measures</td>
<td>34</td>
</tr>
<tr>
<td>Disgust Scale-Revised</td>
<td>34</td>
</tr>
<tr>
<td>Spider Phobia Beliefs Questionnaire</td>
<td>35</td>
</tr>
<tr>
<td>The Emotional Stroop Task</td>
<td>36</td>
</tr>
<tr>
<td>Willingness Measure</td>
<td>38</td>
</tr>
<tr>
<td>Within Session/Microlevel Measures</td>
<td>38</td>
</tr>
<tr>
<td>Behavioral Approach/Avoidance</td>
<td>38</td>
</tr>
<tr>
<td>Blood Pressure/Pulse Rate Monitor</td>
<td>39</td>
</tr>
<tr>
<td>Distress Thermometer</td>
<td>39</td>
</tr>
<tr>
<td>Outcome Measures</td>
<td>40</td>
</tr>
<tr>
<td>Number of Modules</td>
<td>40</td>
</tr>
<tr>
<td>Treatment Recommendation</td>
<td>41</td>
</tr>
<tr>
<td>Self-Reported Avoidance of Spiders</td>
<td>41</td>
</tr>
<tr>
<td>Posttreatment Questionnaire</td>
<td>41</td>
</tr>
<tr>
<td>Follow-Up Questionnaire</td>
<td>42</td>
</tr>
<tr>
<td>3.3 Procedure</td>
<td>42</td>
</tr>
<tr>
<td>Pretreatment Assessment</td>
<td>42</td>
</tr>
<tr>
<td>Phase I: Pretreatment Screening</td>
<td>42</td>
</tr>
<tr>
<td>Phase II: Administration of Additional Measures</td>
<td>43</td>
</tr>
<tr>
<td>Phase III: Collection of Additional BATS</td>
<td>43</td>
</tr>
<tr>
<td>Treatment Conditions</td>
<td>45</td>
</tr>
<tr>
<td>CBT Condition</td>
<td>46</td>
</tr>
<tr>
<td>ACT Condition</td>
<td>46</td>
</tr>
<tr>
<td>Posttreatment Assessment</td>
<td>46</td>
</tr>
<tr>
<td>Follow-Up Assessment</td>
<td>47</td>
</tr>
<tr>
<td>4. RESULTS</td>
<td>48</td>
</tr>
<tr>
<td>Pretreatment Comparisons</td>
<td>48</td>
</tr>
<tr>
<td>Background Information Questionnaire</td>
<td>48</td>
</tr>
<tr>
<td>Supplemental Questionnaires</td>
<td>48</td>
</tr>
<tr>
<td>Treatment Utilization and Evaluation</td>
<td>48</td>
</tr>
<tr>
<td>Treatment Utilization</td>
<td>49</td>
</tr>
<tr>
<td>Helpful Therapeutic Components</td>
<td>49</td>
</tr>
<tr>
<td>Unhelpful Therapeutic Components</td>
<td>49</td>
</tr>
<tr>
<td>4.2 Outcome Measures</td>
<td>50</td>
</tr>
<tr>
<td>Spider Phobia Questionnaire</td>
<td>50</td>
</tr>
<tr>
<td>Analyses of Statistical Significance</td>
<td>50</td>
</tr>
<tr>
<td>Chapter</td>
<td>Page</td>
</tr>
<tr>
<td>---------</td>
<td>------</td>
</tr>
<tr>
<td>Analyses of Clinical Significance</td>
<td>51</td>
</tr>
<tr>
<td>Modules to meet successful treatment criterion</td>
<td>53</td>
</tr>
<tr>
<td>CBT Participants</td>
<td>54</td>
</tr>
<tr>
<td>ACT Participants</td>
<td>56</td>
</tr>
<tr>
<td>Treatment Recommendation</td>
<td>57</td>
</tr>
<tr>
<td>Self-Reported Avoidance of Spiders</td>
<td>57</td>
</tr>
<tr>
<td>4.3 Moderating Measures</td>
<td>58</td>
</tr>
<tr>
<td>Acceptance and Action Questionnaire-II</td>
<td>58</td>
</tr>
<tr>
<td>Courage Measure</td>
<td>59</td>
</tr>
<tr>
<td>4.4 Macrolevel Process Measures</td>
<td>61</td>
</tr>
<tr>
<td>Disgust Scale-Revised</td>
<td>61</td>
</tr>
<tr>
<td>Spider Phobia Beliefs Questionnaire</td>
<td>63</td>
</tr>
<tr>
<td>SBQI</td>
<td>63</td>
</tr>
<tr>
<td>SBQII</td>
<td>64</td>
</tr>
<tr>
<td>The Stroop Task</td>
<td>64</td>
</tr>
<tr>
<td>Error Rates</td>
<td>65</td>
</tr>
<tr>
<td>Response Times</td>
<td>65</td>
</tr>
<tr>
<td>Willingness Measure</td>
<td>67</td>
</tr>
<tr>
<td>Within Session/Microlevel Process Measures</td>
<td>68</td>
</tr>
<tr>
<td>Molar Analyses</td>
<td>69</td>
</tr>
<tr>
<td>Autonomic Arousal</td>
<td>70</td>
</tr>
<tr>
<td>Subjective Distress</td>
<td>71</td>
</tr>
<tr>
<td>Molecular Analyses</td>
<td>73</td>
</tr>
<tr>
<td>Summary</td>
<td>75</td>
</tr>
<tr>
<td>5. DISCUSSION</td>
<td>76</td>
</tr>
<tr>
<td>Analyses of Therapeutic Outcome</td>
<td>76</td>
</tr>
<tr>
<td>Analyses of Moderation</td>
<td>77</td>
</tr>
<tr>
<td>AAQ-II</td>
<td>77</td>
</tr>
<tr>
<td>Courage Measure</td>
<td>79</td>
</tr>
<tr>
<td>5.2 Analyses of Macrolevel Processes</td>
<td>80</td>
</tr>
<tr>
<td>Willingness</td>
<td>81</td>
</tr>
<tr>
<td>SBQ</td>
<td>81</td>
</tr>
<tr>
<td>DS-R</td>
<td>82</td>
</tr>
<tr>
<td>The Stroop Task</td>
<td>83</td>
</tr>
<tr>
<td>5.3 Analyses of Microlevel Processes</td>
<td>86</td>
</tr>
<tr>
<td>Autonomic Arousal</td>
<td>86</td>
</tr>
<tr>
<td>Subjective Distress</td>
<td>89</td>
</tr>
<tr>
<td>5.4 Study Limitations</td>
<td>91</td>
</tr>
<tr>
<td>5.5 Implications for Further Research</td>
<td>94</td>
</tr>
</tbody>
</table>
TABLE OF CONTENTS (continued)

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.6 Summary and Conclusions</td>
<td>96</td>
</tr>
</tbody>
</table>

REFERENCES ............................................................................................................. 98

APPENDICES ........................................................................................................... 113

A. Fear of Spiders Study Advertisement .................................................................. 114
B. The Background Information Questionnaire ......................................................... 115
C. Anxiety Disorders Interview Schedule IV ............................................................... 116
D. Spider Phobia Questionnaire ................................................................................. 121
E. Acceptance and Action Questionnaire-II ................................................................. 123
F. Courage Measure .................................................................................................. 124
G. Disgust Scale-Revised .......................................................................................... 125
H. Spider Phobia Beliefs Questionnaire ..................................................................... 127
I. Stroop Task Word List ........................................................................................... 132
J. Subjective Units of Distress – Fear ........................................................................ 133
K. Subjective Units of Distress – Disgust .................................................................. 134
L. Posttreatment Questionnaire ................................................................................. 135
M. Follow-up Questionnaire ....................................................................................... 136
N. Informed Consent I ............................................................................................... 138
O. Informed Consent II .............................................................................................. 143
P. Symptom Checklist-90-Revised ............................................................................ 149
Q. The State-Trait Anxiety Inventory, State Form Y-2 ............................................... 152
R. The Rosenberg Self-Esteem Scale ......................................................................... 153
S. The NEO Five-Factor Inventory ............................................................................ 154
T. CBT Protocol ......................................................................................................... 157
U. ACT Protocol ........................................................................................................ 163
# LIST OF TABLES

<table>
<thead>
<tr>
<th>Table</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Glossary of Abbreviations</td>
<td>172</td>
</tr>
<tr>
<td>2. List of Measures</td>
<td>174</td>
</tr>
<tr>
<td>3. Demographic and Background Information of Participants</td>
<td>175</td>
</tr>
<tr>
<td>4. Supplemental Questionnaire Data</td>
<td>176</td>
</tr>
<tr>
<td>5. NEO-FFI Subtest Scores for Participants</td>
<td>177</td>
</tr>
<tr>
<td>6. Posttreatment and Follow-Up Questionnaire Responses</td>
<td>178</td>
</tr>
<tr>
<td>7. Data for Outcome Measures</td>
<td>182</td>
</tr>
<tr>
<td>8. Clinical Status of Participants at Posttreatment and Follow-up: SPQ Scores</td>
<td>184</td>
</tr>
<tr>
<td>9. Data for Moderating Measures at Pretreatment, Posttreatment, and Follow-up…</td>
<td>185</td>
</tr>
<tr>
<td>10. Summary of Spearman Rank Correlations Between Pretreatment AAQ-2 and Outcome Measures</td>
<td>186</td>
</tr>
<tr>
<td>11. Summary of Spearman Rank Correlations Between CM Change Scores and Outcome Measures</td>
<td>187</td>
</tr>
<tr>
<td>12. Data for DS-R and SBQ at Pretreatment, Posttreatment, and Follow-up…</td>
<td>188</td>
</tr>
<tr>
<td>13. Summary of Spearman Rank Correlations Between DS-R Change Scores and Outcome Measures</td>
<td>189</td>
</tr>
<tr>
<td>14. Summary of Spearman Rank Correlations Between SBQI Change Scores and Outcome Measures</td>
<td>190</td>
</tr>
<tr>
<td>15. Summary of Spearman Rank Correlations Between SBQII Change Scores and Outcome Measures</td>
<td>191</td>
</tr>
<tr>
<td>16. Stroop Task Error Rates</td>
<td>192</td>
</tr>
<tr>
<td>17. Stroop Task Response Times at Pretreatment, Posttreatment, and Follow-up…</td>
<td>193</td>
</tr>
<tr>
<td>18. Willingness to Have a Spider Crawl in One’s Hair</td>
<td>194</td>
</tr>
<tr>
<td>Table</td>
<td>Summary</td>
</tr>
<tr>
<td>-------</td>
<td>--------------------------------------------------</td>
</tr>
<tr>
<td>19.</td>
<td>Summary of Spearman Rank Correlations Between Willingness to Have a Spider Crawl in One’s Hair and Outcome Measures</td>
</tr>
<tr>
<td>20.</td>
<td>Autonomic Arousal and Subjective Fear Data Across Phases</td>
</tr>
<tr>
<td>21.</td>
<td>Subjective Disgust Data Across Phases</td>
</tr>
<tr>
<td>22.</td>
<td>Summary of Spearman Rank Time Lagged Correlations Between Within-Session Mediating Variables and Approach Behavior During Baseline and Treatment Phase BATs</td>
</tr>
<tr>
<td>23.</td>
<td>Summary of Major Findings</td>
</tr>
<tr>
<td>Figure</td>
<td>Description</td>
</tr>
<tr>
<td>--------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>1.</td>
<td>Flow of Participants Through Each Stage of the Study</td>
</tr>
<tr>
<td>2.</td>
<td>Mean SPQ Scores for Treatment Groups Across Assessment Occasions</td>
</tr>
<tr>
<td>3.</td>
<td>Approach Behavior of CBT Participants Towards the Spider</td>
</tr>
<tr>
<td>4.</td>
<td>Approach Behavior of ACT Participants Towards the Spider</td>
</tr>
<tr>
<td>5.</td>
<td>Percentage of Change in Approach Behavior Between BATS for CBT Participants</td>
</tr>
<tr>
<td>6.</td>
<td>Percentage of Change in Approach Behavior Between BATS for ACT Participants</td>
</tr>
<tr>
<td>7.</td>
<td>Mean DS-R Scores for Treatment Groups Across Assessment Occasions</td>
</tr>
<tr>
<td>8.</td>
<td>Mean SBQI Scores for Treatment Groups Across Assessment Occasions</td>
</tr>
<tr>
<td>9.</td>
<td>Mean SBQII Scores for Treatment Groups Across Assessment Occasions</td>
</tr>
<tr>
<td>10.</td>
<td>Response Times by Stroop Task Word Conditions Across Assessment Occasions</td>
</tr>
<tr>
<td>11.</td>
<td>Mean Pre and PostBAT Levels of Fear for Treatment Groups Across Phases.....</td>
</tr>
<tr>
<td>12.</td>
<td>Mean SUDS-F Change Scores for Treatment Groups Across Phases.................</td>
</tr>
<tr>
<td>13.</td>
<td>Mean SUDS-D Levels for Treatment Groups Across Phases</td>
</tr>
</tbody>
</table>
CHAPTER 1

INTRODUCTION

Anxiety disorders are one of the most common psychiatric disorders in this country (Kessler, Berglund, Demler, Kin, Merikangas, & Walters, 2005), with lifetime prevalence rates of 18-28% (American Psychiatric Association, 2000). Approximately 40 million people will experience an anxiety disorder at some point in their lifetime (Koury & Rapaport, 2007). According to the Diagnostic and Statistical Manual for Mental Disorders IV-Text Revision (DSM-IV-TR; APA, 2000) there are ten anxiety disorders which include panic disorder (both with and without agoraphobia), obsessive-compulsive disorder, generalized anxiety disorder, social phobia, specific phobia, acute stress disorder, posttraumatic stress disorder, substance-induced anxiety disorder, and anxiety disorder not otherwise specified. (A glossary of abbreviations used in this document is provided in Table 1.) The impact of anxiety disorders is substantial as they can be severely debilitating to quality of life and general well-being. Individuals experiencing an anxiety disorder are nearly six times more likely to attempt suicide (Boden, Fergusson, & Horwood, 2007). In total, the direct and indirect financial impact of anxiety disorders in the United States is approximately $42 billion with the costs stemming from a range of clinical services, including emergency care (psychiatric and nonpsychiatric hospitals), misdiagnosis, inadequate care, absenteeism, and decreased work productivity (Lepine, 2002).

Purpose of Study

The primary purpose of this study was to enhance understanding of exposure as a key therapeutic process for treating specific phobia, more generally, and arachnophobia, in particular. In order to do so, the possible distinct mechanisms of action that exposure instigates in cognitive behavior therapy (CBT) and acceptance and commitment therapy (ACT) in treatment of
arachnophobia, were examined at idiographic and microlevels in the context of a single-subject design. Prior to elaborating on the purpose of this study, relevant background information on specific phobia and especially arachnophobia, the possibly differing roles exposure may play in each treatment approach, and the empirical status of each treatment will be discussed and summarized.
CHAPTER 2
LITERATURE REVIEW

Specific Phobia

Types of specific phobia. As one of the most common forms of anxiety disorders, specific phobia has a lifetime prevalence rate of 10-12% (Kessler et al., 2005), and accounts for about 40% of all phobias (Chapman, 1997). Specific phobia is characterized by an intense, excessive, and irrational fear of exposure to or anticipation of a specific object or situation that is avoided or endured with significant distress (APA, 2000). The majority of individuals with specific phobia realize that their fears are irrational, but continue to avoid coming into contact with the stimulus or situation that produces the unwanted emotional response. This emotional discomfort can be displayed by autonomic, respiratory, and endocrine reactivity (Alpers, Abelson, Wilhelm, & Roth, 2003; Alpers & Sell, 2008). The DSM-IV-TR (APA, 2000) identifies five subtypes of specific phobia: (a) animal type (e.g., snakes); (b) natural environment type (e.g., thunderstorms); (c) blood/injection/injury type (e.g., needles); (d) situational type (e.g., tunnels); and (e) other types (e.g., being buried alive).

In community samples, fear of small animals is one of the most prevalent types of specific phobia and can cause significant impairment in daily functioning (APA, 2000). Seligman (1971) suggested that the most prevalent specific phobias may serve an evolutionary function. Accordingly, encounters with small animals, such as snakes or spiders, may be most feared because of their potential lethality. Because such fears presumably had “survival value” for our species, humans over time have become “biologically prepared” to avoid and or fear these stimuli (Seligman, 1971). Forsyth and Eifert (1998), in particular, have argued that specific fears that serve an evolutionary function are more easily acquired than those of other
objects or situations that pose the same amount of danger. For example, because spiders are poisonous, fear of arachnids may serve a survival function and, therefore, be relatively prevalent and readily acquired. By contrast, gun shots account for more human deaths, but firearms are less likely to be feared insofar as guns were not present during the evolution of the human species.

**Prevalence rates.** Prevalence rates of specific phobia show a gender difference ranging from a 2:1 to 4:1 ratio of women to men (Becker et al., 2007). Variability among particular specific subtypes shows that animal phobia is most common in women and claustrophobia is most common in men (Curtis, Magee, Eaton, Wittchen, & Kessler, 1998). Differences in ethnicity also have been found. Specifically, rates of specific phobia are twice as high in African-American individuals compared to Caucasians (Eaton, Dryman, & Weissman, 1991; Stinson et al., 2007). The degree to which specific phobia can impair and damage the lives of people can begin at an early age. The National Comorbidity Survey found that people at age 15 years were at the greatest risk for developing a specific phobia (Magee, Eaton, Wittchen, McGonagale, & Kessler, 1996). Half of the people surveyed with a specific phobia diagnosis revealed that they had at least one episode so severe that they needed some type of assistance (medication or professional help) in managing it.

**Comorbidity.** Specific phobias are also highly comorbid with one another, with increasing impairment and difficulties occurring as the number of comorbid phobias increases (Curtis et al., 1998; Pull, 2008). Other types of comorbidity are also quite common. One third of people diagnosed with a specific phobia exhibit co-occurring depression (Sadock & Sadock, 2007) and 84% of all phobic clients are diagnosable with one or more comorbid disorders (Magee et al., 1996). Kushner, Krueger, Frye, and Peterson (2008) found that comorbid
affective disorders, substance-related disorders, and other anxiety disorders were most common with specific phobia.

**Arachnophobia**

One of the more prevalent types of small animal phobia in Western societies is arachnophobia (fear of spiders), with as many as 55% of females and 18% of males estimated to experience arachnophobia (Davey, 1992). If left untreated, most cases of spider phobia become chronic (Fredrikson, Annas, Fischer, & Wik, 1996).

**Research with college student samples.** This project selected arachnophobia as a “disorder of convenience” for several reasons. First, the prevalence of arachnophobia within college student populations appears to be fairly high. Seim and Spates (2010), for example, determined that out of the 813 college students surveyed, 34% experienced fear of spiders. While an undetermined proportion of such students display clinical levels of specific phobia related to spiders (Smith-Janik & Teachman, 2008), 17% of spider fearful students surveyed by Seim and Spates were willing to seek treatment for their phobia.

Several studies have investigated the alleviation of fear of spiders of college students as an analogue of clinically treating arachnophobia (Cochrane, Barnes-Holmes, & Barnes-Holmes, 2008; Osinsky et al., 2008; Smith-Janik & Teachman, 2008; Wagener & Zettle, 2011). In particular, analogue investigations involving college students fearful of spiders have been used as a means to explore and develop treatment protocols (Wagener & Zettle, 2011) as well as innovative assessment procedures and techniques that can potentially be extended to arachnophobic populations (Cochrane et al., 2008).

While some studies have included spider fearful college students as phobic analogues, others have recruited clinical samples from larger college student populations (Koch, Spates, &
Himle, 2004; Olatunji et al., 2009). Koch et al. (2004) assessed the effectiveness of behavioral and cognitive-behavioral one-session exposure treatment protocols for small animal phobia, including arachnophobia, in a college population. Olatunji et al. (2009) examined the impact and relationship of disgust and fear activation and reduction during repeated exposure treatment of college students exhibiting clinical levels of spider phobia. The feasibility of recruiting students who exhibited similar clinical levels of spider fear thus constitutes a second reason why arachnophobia was selected as a disorder of convenience for this study.

**Research with community samples.** The same issues addressed by Koch et al. (2004) and Olatunji et al. (2009) with college student samples have been explored further in community participants displaying arachnophobia. The majority of previous research with community samples has focused on issues related specifically to arachnophobia (Hellström & Öst, 1995; Muris, Mayer, & Merckelbach, 1998; Öst, Ferebee, & Furmark, 1997). For instance, Öst, Ferebee, and Furmark (1997) found that one-session of participant modeling therapy for arachnophobia, in which clients first viewed the therapist handling the spider before holding it themselves, was more efficacious than simply viewing a videotape of exposure in a group setting. The authors found that 74% of individuals in the participant modeling treatment group displayed clinically significant improvement compared to the symbolic modeling group, suggesting that it is exposure rather than modeling that produces clinical improvement.

Other research has used arachnophobia to address issues related to specific phobia and anxiety disorders more broadly (Antony, McCabe, Leeuw, Sano, & Swinson, 2001; Öst, 1989, 1991; Öst, Salkovskis, & Hellström, 1991; Öst, Stridh, & Wolf, 1998; Vansteenwegen, Vervliet, Hermans, Thewissen, & Eelen, 2007). For example, Antony et al. (2001) used spider phobia as a disorder of convenience to investigate how coping style and distraction can influence therapeutic
impact. Neither coping style nor distraction was found to have an effect on the treatment outcome of exposure-based interventions. However, the study did show support for the use of exposure in the treatment of spider phobia as well as other types of specific phobia.

The status of exposure as a key treatment component has been substantiated further by other research examining the impact of interventions in which it is emphasized (Chambless, 1990). While there seems to be general agreement that exposing clients to phobic objects and stimuli is a central ingredient in efficaciously treating specific phobia, it is far from clear what therapeutic mechanisms of action are initiated by exposure. This may particularly be the case when exposure as a treatment component or procedure is contextualized within differing therapeutic approaches (Craske, 2012). As will be discussed in much detail shortly, exposure as a treatment procedure or component might serve several different functions.

**Treatment of Specific Phobia**

There have been several meta-analyses of treatment approaches for specific phobia (Choy, Fyer, & Lipsitz, 2007; Wolitzky-Taylor, Horowitz, Powers, & Telch, 2008), but as far as can be determined, there have been no meta-analyses focusing specifically on arachnophobia. Choy et al. (2007) reviewed a number of different treatment modalities, including behavior therapy, cognitive therapy, hypnotherapy, and pharmacotherapy for the treatment of specific phobia. The authors identified exposure to the phobic object or stimulus as the common component in all of the treatment approaches shown to be the most efficacious in alleviating anxious symptoms of specific phobia in general, and of arachnophobia in particular. For example, Choy et al. (2007) found that in vivo exposure was successful for 80 - 90% of specific phobia treatment completers as measured by a behavioral avoidance task. Exposure has also been shown to be the most efficacious component for successful reduction of symptoms that
characterize other phobias as well, such as agoraphobia and social phobia (Chambless, 1990; Choy et al., 2007; Wolitzky-Taylor et al., 2008).

**Role of exposure.** Exposure as a common key therapeutic ingredient or component may serve several different functions, especially when contextualized with differing therapeutic approaches. Moreover, such processes may not be mutually exclusive. In short, the mechanisms of action of exposure in targeting specific phobia have yet to be identified unambiguously and may differ from their purported conceptual roles. As several researchers have observed, therapeutic techniques and components, such as exposure, can be effective for reasons apart from the theoretical ideas from which they were derived (Davison & Lazarus, 1995; Rosen & Davison, 2003). For example, exposure as part of traditional behavior therapy (Levis & Hare, 1977; Rachman, 1978; Wolpe, 1958) has long been viewed as a means to help clients become habituated to and extinguish their fear towards phobic stimuli. By contrast, within main-stream cognitive or cognitive-behavioral approaches (Öst, 1989), exposure may primarily serve as a vehicle for restructuring distorted beliefs clients have about feared stimuli and for altering their coping abilities. Finally, within what have been referred to broadly as “third wave” cognitive-behavioral interventions, such as acceptance and commitment therapy (ACT; Hayes, Strosahl, & Wilson, 1999), exposure may provide an opportunity for clients to practice responding to fear-related thoughts and bodily sensations with mindful acceptance. In what follows, the possibly divergent roles that exposure may play within the two approaches compared within this project—cognitive behavior therapy (CBT) and ACT – are further explicated.

**Cognitive Behavioral Approach**

Cognitive and cognitive behavioral therapies have been shown to be efficacious in the treatment of specific phobia (Kamphuis & Telch, 2000; Koch, Luterek, & Spates, 1998; Koch et
al., 2004; Öst, 1985, 1987, 1989), and more specifically in the treatment of small animal phobia, especially arachnophobia (Hellström & Öst, 1995; Muris et al., 1998; Öst, Ferebee, & Furmark, 1997). An empirically-derived treatment manual for specific phobia has also been developed and disseminated (Craske, Antony, & Barlow, 1997) in which exposure serves as a major component.

**One-session treatment.** One of the leading treatments of choice for specific phobia is a brief intervention developed by Lars-Goran Öst (1989) that packages several ostensibly efficacious techniques in one approach. Öst developed his one-session treatment for specific phobias, including but not limited to arachnophobia. This intervention has been shown to be efficacious in both individual (Hellström & Öst, 1995; Öst et al., 1991) and group formats (Öst, 1996; Öst, Ferebee, & Furmark, 1997; Öst et al., 1998) for treatment of spider phobia, as well as with other types of specific phobia such as injection phobia (Öst, Hellström, & Kåver, 1992), blood phobia (Hellström, Fellenius, & Öst, 1996), aerophobia (Öst, Brandberg, & Alm, 1997), and claustrophobia (Öst, Alm, Brandberg, & Breitholtz, 2001).

Regardless of treatment format or type of specific phobia being addressed, psychoeducational material and participant modeling with prolonged in vivo exposure to the phobic object are incorporated in the 3 hours of Öst’s one-session treatment. In the treatment of spider phobia, exposure consists of a series of behavioral avoidance tests, or BATs, first modeled by the therapist, in which the client is induced to gradually approach the feared stimulus. BATs continue until anxiety is eliminated or sufficiently decreased as indicated by the client’s self-reported subjective units of disturbance (SUDS) rating. Criteria to move onto the next BAT are met when the client’s anxiety level is reduced by 50%, completely eliminated, or the client terminates treatment.
Role of exposure. Despite the obvious emphasis on anxiety reduction within this approach, exposure is thought more centrally to serve a cognitive restructuring function (Öst, 1989). For example, as Öst (1997) has noted, the purpose of his treatment is to “expose the patient to the phobic situation in a controlled way, thus enabling him/her to realize that the consequences one feared would happen do not occur” (p. 4). Thus, the key purported mechanism of action of exposure in Öst’s approach is the restructuring of catastrophic cognitions regarding spiders, and fostering ability to cope with anxiety when faced with them. It is posited that unchallenged catastrophic beliefs about spiders (e.g. “the spider will attack me”) rather than autonomic arousal maintain the avoidance and escape behavior. However, the underlying mechanisms of action behind exposure in Öst’s approach have yet to be clearly supported empirically (Zlomke & Davis III, 2008).

To the extent that cognitive restructuring occurs during exposure in Öst’s approach, it may unfold concurrently with habituation and/or extinction processes. Habituation is generally defined as reduced responding to a given eliciting stimulus as a function of its repeated presentation (Sadock & Sadock, 1997). For example, a reduction in hyperactivity to a loud noise after repeated exposure to it demonstrates an habituation process. Extinction, on the other hand, is typically construed as the reduction of a conditioned response as a function of repeated presentations of a conditioned stimulus in the absence of its pairing with an unconditioned stimulus (Kring, Johnson, Davison, & Neale, 2010). For instance, Pavlov (1927) found that dogs conditioned to salivate to a bell (CS) that is accompanied by meat powder (UCS) gradually decreased the conditioned salivation response (CR) when the bell was presented without the meat powder. That is, the bell lost its salivation eliciting function when repeatedly presented by itself.
While conceptual differences exist between habituation and extinction, it is not possible to methodologically isolate the different functions that each may possibly serve in the context of exposure to a phobic stimulus. This is because the critical object, such as a spider, that is repeatedly presented functions as a conditioned stimulus. Habituation can only be differentiated from extinction if the stimulus presented is not a conditioned stimulus. Accordingly, the term “habituation/extinction” will subsequently be used to denote reductions in autonomic arousal that occur during exposure with repeated presentations of a phobic stimulus.

In general, CBT approaches use exposure to reduce levels of autonomic arousal according to a model that combines both habituation/extinction and cognitive restructuring. CBT approaches that are more closely tied to respondent conditioning perspectives tend to emphasize the purported habituation/extinction function of exposure (Wolpe, 1958), while those that stress cognitive therapeutic components maintain that exposure serves a primary cognitive restructuring function (Öst, 1997). Regardless of how exposure has been conceptualized in CBT, clients are required to remain in contact with spiders until their negative arousal subsides.

Historically, the key emotional state that was thought to be impacted by an habituation/extinction process during exposure was fear (Arntz, Lavy, van den Berg, & van Rijsoort, 1993). As long as client exposure to the feared stimulus is accompanied by response prevention in which clients are unable to escape from or otherwise terminate contact with the phobic object, habituation/extinction should occur. Accordingly, the use of exposure and some type of response prevention are almost always used within CBT approaches such as Öst’s (Alpers, 2009).

**Fear and disgust.** In recent years, it has been suggested that fear may not be the only key emotional state that is implicated with specific phobias and their treatment (Ekman, 1992). In
particular, research suggests that both fear and disgust play an important role in specific phobias (Olatunji et al., 2009). While studies have shown that both disgust and fear are reported by spider-fearful clients when confronted with spiders (Sawchuk, Lohr, Tolin, Lee, & Kleinknecht, 2000), there is debate about the role and the impact of each of these emotional states on the development and treatment of arachnophobia (Olatunji & Sawchuk, 2005). The fear of spiders is attributed to perceptions of the uncontrollability and unpredictability of the spider’s physical movements, often with negative beliefs about the spider harming or physically attacking the person (Rachman & Cuk, 1992). On the other hand, disgust towards spiders is influenced by unwanted physical contact with a revolting or gross stimulus that may be viewed as having disease-inducing or contamination properties (de Jong, Vorage, & van den Hout, 2000).

The precise relationship between disgust and fear in the development and treatment of spider phobia is still in the process of being specified. Olatunji et al. (2009) found that the relationship between fear and disgust is influenced by the emotional structure that is activated before exposure therapy. Specifically, they found that unless disgust is primed, by for example, presenting clients with pictures of disgusting stimuli (e.g., vomit) prior to exposure to the spider, fear seems to be the predominant emotional state that is both elicited by the phobic object and that is reduced during exposure. However, when clients were primed with disgust pictures, disgust appeared to be the more salient emotional state and was impacted to a greater degree than fear by the habituation/extinction process associated with exposure. To summarize the findings of Olatunji et al. (2009) somewhat differently, when disgust is primed, reductions in it are hypothesized to be the primary mechanism of change during exposure. By contrast, if disgust is not primed, fear seems to function as the “default” mode and habituation/extinction of fear may instead constitute the principal mechanism of change.
Further differentiating the possible processes through which disgust and fear are activated and attenuated during exposure may help identify specific mechanisms of change in the successful treatment of spider phobia. Although the major purpose of this project was not to address this question of whether the reduction of disgust or fear was more critical in the treatment of arachnophobia, its focus on the possible mechanisms of change underlying exposure may nonetheless help shed some light on this issue.

Orsillo, Roemer, Block, LeJeune, and Herbert, (2004) suggest that, although cognitive behavior therapies may be effective for short-term gains in functional improvement, the long-term benefits remain questionable (Foa & Kozak, 1997). Also, a large number of people never engage in treatment once they understand that the intervention involves exposure (Becker & Zayfert, 2001). This has led to calls for new and innovative ways of approaching and treating these disorders such as acceptance and commitment therapy.

Acceptance and Commitment Therapy

Acceptance and commitment therapy (ACT; Hayes et al., 1999) is a “third wave” intervention that has emerged within CBT, as broadly defined. ACT focuses on how clients respond or relate to their unwanted thoughts, feelings, and emotions (such as fear of a spider) rather than on ways to reduce or eliminate anxiety-related experiences (Hayes, Follette, & Linehan, 2004). That is, ACT is a second-order behavioral change strategy that is focused on changing the way clients relate to and react to unpleasant experiences instead of emphasizing the means by which the unwanted experience itself can be minimized. The premise that it is not necessary therapeutically to eliminate negative thoughts or emotions is a defining characteristic of ACT and other second-order change strategies (Ossman, Wilson, Storaasli, & McNeill, 2006). This is in contrast to traditional CBT approaches that emphasize first order change strategies to
directly change and control the frequency and/or content of unwanted thoughts, feelings, or emotions (Öst, 1989). This paradigmatic distinction is of utmost importance when applying these two differing approaches with clients. For example, when arachnophobic clients encounter a spider, ACT would encourage them to focus on changing their relationship to their unpleasant thoughts, emotions, and bodily sensations elicited by the spider in the service of valued living. Stated somewhat differently, the purpose of ACT is not to eliminate, or for that matter necessarily even minimize, clients’ fear of spiders, but to explore ways for them to lead full and meaningful lives that are not limited by such emotions. By contrast, traditional CBT seeks to change client thoughts and feelings about spiders with the assumption that doing so will minimize avoidant behavior.

Core processes. The overarching goal of ACT is to increase psychological flexibility (Hayes, Luoma, Bond, Masuda, & Lillis, 2006). Psychological flexibility can be understood as engaging in whatever actions are consistent with valued living. Common barriers to psychological flexibility are efforts to control unwanted thoughts, emotions, bodily sensations, and other unpleasant psychological experiences that may emerge when engaging in or even contemplating value-directed actions. For example, arachnophobic clients may be limited in ways that they can enact their value of being a loving parent to their children because their fear of spiders makes certain activities (e.g., going on a picnic) “off limits.”

Six major processes within the ACT model (commonly referred to as the “hexaflex”) are seen as contributing to psychological flexibility: (a) acceptance, (b) defusion, (c) self-as-context, (d) being present, (e) values, and (f) committed action (Hayes et al., 1999). Each of these processes has an antagonist process that contributes to psychological inflexibility and results in both clinical and subclinical levels of human suffering. ACT seeks strategically to strengthen the
core processes that contribute to psychological flexibility while simultaneously weakening those maladaptive processes within the “hexainflex” that instead support and maintain psychological rigidity. How the core processes within the ACT model may contribute to both arachnophobia and its treatment will be explicated in the sections that follow.

**Experiential avoidance/acceptance.** Experiential avoidance is conceptualized as efforts to alter the frequency, form, and/or duration of difficult private events (e.g., thoughts, feelings, emotions, sensations) as well as the situations that occasion them (Hayes, Wilson, Gifford, Follette, & Strosahl, 1996). With arachnophobia, clients may avoid situations in which they might come into physical contact with spiders (e.g., attics, basements, and certain outdoor settings), but also other contexts, such as merely talking or thinking about spiders, that also elicit distressing reactions. From this perspective, clients do not so much avoid spiders per se, but the panic-like anxious response they experience when in psychological contact with them (Forsyth & Eifert, 1996).

Acceptance within ACT does not encompass tolerance or resignation (Hayes et al., 1999). Rather, it is a deliberate choice to “make room” for unwanted psychological experiences as opposed to pushing them away. In ACT, acceptance-enhancing metaphors and experiential exercises are used to help clients learn to respond differently to anxious thoughts and feelings towards spiders. For example, the Tug-of-War with a Monster metaphor and exercise (Hayes et al., 1999, p.109) asks arachnophobic clients to consider that their fear of spiders can be likened to a monster with which they are engaged in an unwinnable tug-of-war. Time and energy spent in the struggle precludes valued actions by locking their hands and feet into place.

A related metaphor that further illustrates the ultimate costs of experiential control likens client efforts to quell their anxiety to that of feeding a growing and hungry tiger (Hayes et al.,
1999). This metaphor underscores that clients cannot control their anxiety by trying to appease it or give in to it and further illustrates the time and effort this control strategy consumes in their lives. Other procedures and techniques often used in ACT to strengthen acceptance and undermine the experiential control agenda include The Chinese handcuff exercise and Man in the Hole metaphor, (Hayes et al., 1999, p. 104.)

**Fusion/cognitive defusion.** ACT is based in relational frame theory (RFT; Hayes, Barnes-Holmes, & Roche, 2001) which is a functional, contextualistic account of human language and cognition. Stated most simply, RFT holds that the ability of humans to engage in arbitrary applicable derived relational responding serves as the basis for languaging. According to RFT, the three defining properties of derived relational responding are mutual entailment, or bidirectionality; combinatorial entailment; and transformation of stimulus functions. Only the first (bidirectionality) and third properties (transformation of stimulus functions) are of particular relevance here in considering how arbitrary applicable derived relational responding contributes to psychological inflexibility.

**Bidirectionality.** The bidirectional property of relational framing is perhaps seen most clearly in naming. Early on in their language development, children are taught that words and things “go together” in what RFT refers to as frames of coordination or equivalence. For example, saying “spider” is differentially reinforced when the child is asked “What is this?” and an arachnid is presented. Conversely, saying “cat” is differentially reinforced in the presence of a feline. An equivalence relationship is thereby established between the word “spider” and the actual arachnid, such that the child will correctly point to the arachnid when asked to identify the “spider” even though this response has not been previously reinforced. As far as can be
determined, this ability to derive bidirectional relationships between words and the objects they name is uniquely human.

Transformation of stimulus functions. A stimulus such as a spider can elicit certain psychological reactions such as fear, anxiety, or disgust, given particular learning histories. These stimulus properties through the bidirectional relationship between words and things can then be transformed from the actual phobic object (spider) to the spoken or written word “spider.” Arachnophobic individuals can experience the same emotional response to the written word “spider”, a picture of a spider, and the spoken word “spider” as they would in coming into actual contact with the arachnid. Through the bidirectional transformation of stimulus functions, words that refer to anxiety-eliciting events can be just as, if not even more scary, than the events themselves.

The capacity of words and languaging to acquire anxiety-eliciting and other stimulus functions is what is known in the ACT model as fusion. More formally, fusion is defined as the dominance of particular derived stimulus functions over other available derived and direct stimulus functions (Hayes & Strosahl, 2004). For example, through the process of fusion, spider phobic clients may respond to words like “spider” and “cobweb” in the same manner as they do to actual arachnids. As a consequence, clients may not only avoid coming into physical contact with a spider, but may further avoid pictures of arachnids or talking about them. Taken a step further, arachnophobics may then avoid coming into psychological contact with the phobic object by suppressing thoughts about spiders (Eifert & Forsyth, 2005), even though there is an increasing body of research suggesting that such a strategy is ultimately counterproductive (Gold & Wegner, 1995; Wegner, 1994).
Responding to thoughts based on what individuals say they are, as opposed to what they are, is weakened in ACT by cognitive defusion techniques. These exercises and metaphors attempt to change the way clients respond to their thoughts about spiders as more verbal constructions rather than as “facts” or the functional equivalents of actual arachnids. Stated somewhat differently, defusion techniques enhance psychological flexibility by enabling clients to respond to their own thoughts based upon their direct rather than derived stimulus functions. For example, the “milk, milk, milk” exercise within ACT (Hayes et al., 1999, p. 154) demonstrates how the direct stimulus functions of spoken words (i.e., how a word sounds) are all that remain once any derived stimulus functions are stripped away. In this exercise, the client along with the therapist repeat out loud the word “milk” for 30 seconds. As the word is repeated, the word “milk” tends to lose its meaning and what remains is simply how the word sounds. Similarly, having arachnophobic clients say “spider” aloud repeatedly should render it less scary.

Another defusion exercise in ACT asks clients to articulate their scary thoughts in an altered voice. For example, clients can be asked to say their scary thought about spiders (i.e., “spiders are dangerous”) in the voice of a cartoon character or in a speeded up or slowed down voice. This again may serve a defusing function by helping clients detach from and respond differently to their anxiety-eliciting thoughts about spiders.

**Future focus/mindfulness.** Kabat-Zinn (1990, 2005) defines mindfulness as making direct contact with present experiences with acceptance, compassion, and without judgment. When arachnophobic clients become anxious, they are often instead focused on the future and hypervigilant to the “what if”s” about what might happen should they encounter a spider. From an ACT perspective, it is important to help clients maintain on-going nonjudgmental contact with
the present moment as it occurs in order to experience their world more directly and act in value-directed ways within it.

In ACT, lack of present moment awareness is typically addressed by mindfulness exercises. The purpose of such exercises is not to eliminate or control unpleasant thoughts or feelings about spiders, but to facilitate ultimate acceptance of them by first increasing present moment awareness of them. In other words, the goal of mindfulness exercises within ACT is not to become relaxed or calm, but rather it is to be open, kind, and compassionate to whatever experiences may unfold, even if those events have previously been evaluated negatively.

One example of a mindfulness exercise is mindful breathing in which clients are guided to simply notice their breathing as it naturally occurs. These exercises have been shown to increase overall psychological well-being (Kabat-Zinn, 1990; Shapiro, Schwartz, & Bonner, 1998) and have been an integral component of mindfulness-based interventions for stress management (Kabat-Zinn, 1990) and recurrent major depressive episodes (Segal, Williams, Teasdale, 2002). Other mindfulness procedures typically incorporated with ACT include the “mind watching exercise,” raisin exercise, and inventoring (Hayes et al, 1999) as well as the acceptance of anxiety exercise (Eifert & Forsyth, 2005, p. 163).

**Fusion with self-as-concept/self-as-context.** As discussed earlier, humans become fused with particular thoughts or ideas and begin to respond to those thoughts as “literal truths.” This process also occurs with thoughts we have about ourselves and in the ACT model produces what is known as a “conceptualized self.” For example, clients who have the thought “I’m a loser because I’m afraid of spiders” may respond to this verbal construction as a genuine reflection of themselves rather than being able to see it as merely a thought they are having about themselves. Fused overidentification with such negative self-referential thoughts can lead to psychological
and behavioral rigidity. For example, clients who see themselves as losers may be less engaged with life and more likely to adopt a risk-aversive lifestyle.

A process that competes with fusion with a defective self-as-concept and thereby promotes psychological flexibility is “self-as-context” (Hayes et al., 1999). In ACT, self-as-context refers to a perspective from which otherwise troublesome thoughts and feelings, including those about oneself, can be “just noticed” without attempting to control or minimize them. According to relational frame theory, self-as-context is a byproduct of deictic framing (Hayes et al., 2001). Deictic framing can be thought of as a type of relational responding in which differential reinforcement is contingent upon reporting about behavior from a consistent perspective.

In typically developing children acquisition of deictic framing is thought to occur naturally via discrete multiple exemplar training (Barnes-Holmes, Hayes, Barnes-Holmes, & Roche, 2001). For example, children are frequently asked questions that inquire about what they are presently doing (e.g. “what are you doing right now?”), did in the past (e.g. “what did you do yesterday?”), and will do in the future (e.g. “what are you going to do tomorrow?”). According to RFT, differential reinforcement of answering such questions establishes oppositional frames of “I-here-now” versus “you-there-then.” Stated somewhat differently, responding to questions about where are you and what are you doing can only be offered from a consistent perspective of one’s self. Accurate reports of what the child is doing now or what the child did yesterday are reinforced; answers that indicate what some other child is doing now or what that other child did yesterday, are not. According to this account, self-awareness emerges from such social interchanges (Skinner, 1957) and serves as the foundation for a sense of spirituality (Hayes, 1984) and perspective taking. While the answers to the questions obviously
vary depending upon what the child is doing at any given moment, the perspective from which they are given is invariant.

A number of exercises within ACT are in the service of strengthening perspective taking. For example, The Chessboard Metaphor and exercise (Hayes et al., 1999) likens wanted and unwanted private events to the pieces that do battle against each other in a game of chess. Clients, by contrast, are asked to see themselves as the chessboard that holds the pieces and as the context within which their thoughts and feelings can be seen for what they are. In addition to holding the pieces, the chessboard when “disidentified” from the pieces can also watch the battle that unfolds between them without having a vested interest in the outcome. Finally, the chessboard can choose to move while taking the battling chess pieces “along for the ride.”

**Dysfunctional rule-following/valuing.** Rule-governed behavior is defined as actions under the control of verbally-specified contingencies rather than by direct interaction with them (Skinner, 1969). While rule-following can be advantageous in protecting us from harm, it often supports behavioral rigidity that is insensitive to changing external contingencies (Hayes et al., 1999). Inflexible rule-following is especially likely when it is under aversive control. Sometimes this aversive control it is arbitrarily mediated, while at other times it comes from natural contingencies, resulting in two different functional classes of rigid rule-following – pliance and avoidant tracking.

Pliance is one of the earliest forms of rule-governed behavior that children learn and is under the control of two sets of contingencies. One of these involves the natural consequences that surround the behavior that is engaged in when the rule is followed. The other set of contingencies are arbitrarily mediated, typically by the rule-giver, and surround the behavior of following the rule (Hayes et al., 2001). For instance, a parent may tell a child to “put on your
coat before going outside in the cold.” One consequence of putting on the coat is naturalistic as the child is able to stay warm while outdoors. The other operative contingency here, however, is arbitrarily mediated by the parent. That is, the child may put on the coat based upon previous consequences for not following parental advice (e.g., being punished for not putting on the coat).

As just illustrated, pliance is usually first demonstrated by others advising or telling one how to behave. For instance, arachnophobic clients as children may have been warned to “avoid spiders.” Later clients may come to follow their own directives, such as “I must avoid spiders” and thereby engage in a form of self-pliance.

Tracking is defined as rule-governed behavior under the control of a correspondence between the rule and the way the world is arranged (Barnes-Holmes et al., 2001). For example, if the child wears the coat because he does not want to be cold, rather than in an effort to avoid parental punishment, the behavior is considered tracking. Natural reinforcement for tracking can be positive or negative in nature. Of particular interest for phobic clients is avoidant tracking. For example, a child may follow the advice to not go into the basement because scary spiders are down there. Avoidant tracking becomes negatively reinforced insofar as following this rule allows the child to bypass something aversive and frightening. Just like pliance can become self-pliance, tracking can also become internalized such that arachnophobic clients may begin to formulate rules to guide their behavior to avoid any fearful experience with spiders. For example, following the rule “If I am careful where I go and what I do, I can avoid coming into contact with spiders” may minimize emotional distress, but at the cost of disengagement from valued living.

To counteract dysfunctional rule-following, clients within ACT are asked to get in touch with their values as verbally construed life directions that support approach and appetitive
behaviors, rather than rigid avoidance. Valuing itself can be thought of as a type of constructed self-track in which clients are encouraged to articulate values that they wish to serve as guides for their behavior. More specifically, values in the ACT approach have been defined as “…freely chosen, verbally constructed consequences of ongoing, dynamic, evolving patterns of activity, which establish predominate reinforcers for that activity that are intrinsic in engagement in the valued behavioral pattern itself” (Wilson & Dufrene, 2008, p. 64). Stated somewhat differently, because values are “freely” chosen, actions that are consistent with them function as appetitive tracking rather than pliance or avoidant tracking. Moreover, reinforcement for such rule-following is inherent within the behavior itself.

As discussed earlier, arachnophobic clients may rigidly structure their lives around whether or not they come into contact with spiders. In doing so, valued actions and psychological flexibility fall by the wayside. Identification and clarification of values is an important process in the ACT therapeutic model. Exercises in ACT that help clients identify what matters most to them include the “epitaph” and “What do you want your life to stand for?” exercises (Hayes et al., 1999, p. 215). Clients are asked to imagine what engraving they would like to have on their gravestone to express how they would like others to remember them. This helps clarify the underlying values that clients want their lives to be about and serves as a focal point for organizing committed, valued-directed actions.

**Impulsivity and dysfunctional persistence/ committed action.** Because pliance and avoidant tracking as just discussed are predominately under aversive control, the rule-following that results is typically rigid. While behavioral persistence in some contexts may be value-consistent, under these circumstances it is not. Paradoxically, at other times behavior that is disconnected from valuing may take the form of impulsivity as frantic efforts are made to attain
relief from unwanted distress. For instance, arachnophobic clients may rigidly follow a set of rules that allow them to avoid coming into contact with spiders, while simultaneously engaging in impulsive acts when they do encounter a spider (e.g., acting in a frantic manner when a spider is present). Persistence and impulsivity occur in the service of avoiding or escaping negative psychological events elicited by spiders. Regardless of the form they take, actions that are not value-directed display a lack of flexibility, vitality, and engagement with life. In short, it is as if life is to be led by rigidly following a set of rules that minimize discomfort rather than by flexibly pursuing actions that add meaning and purpose to life.

A process incompatible with the persistence and impulsivity of pliance and avoidant tracking is committed action. Once values have been identified and clarified, the next step in ACT is to select a specific course of committed action clients can take that gives life to those values. Returning to an earlier example, an arachnophobic woman might go on a picnic with her family because she values being a loving wife and mother. Under such circumstances, going camping shifts from avoiding spiders to spending quality family time.

ACT promotes committed action through various in-session exercises and homework assignments. For example, goal-setting, skills acquisition, and shaping methods have been used to help move clients in the direction of their values. The Passengers on a Bus metaphor (Hayes et al., 1999; p. 157) clarifies that clients have control over what direction they move their lives in, but not over what experiences they may encounter in doing so. This metaphor compares the client to the driver of a bus who chooses a destination in which to head, while the passengers on the bus include unwanted thoughts, feelings, and bodily sensations that may serve as barriers to such committed action.

**Comparison of CBT and ACT: Outcome Question**
Even though it is of secondary interest and not the primary focus of this study, a brief discussion and summary of the comparative efficacies of CBT and ACT in treatment of anxiety disorders seem to be in order. To date, CBT, relative to ACT, has been identified as an empirically-supported approach for treatment of a wider range of anxiety disorders (Task Force, 1995). ACT has been shown to compare favorably to CBT and other approaches in addressing a number of clinically relevant issues apart from anxiety disorders, such as psychosis (Bach & Hayes, 2002), depression (Folke & Parling, 2004; Zettle, 2007), smoking (Gifford et al., 2004), pain (Dahl, Wilson, & Nilsson, 2004; Gutierrez, Luciano, Rodriguez, & Fink, 2004; Hesser, Westin, Hayes, & Andersson, 2009; Paez-Blarrina et al., 2008), and stressful or traumatic life events (Plumb, Orsillo, & Luterek, 2004).

While some ACT research has specifically focused on anxiety disorders (Eifert & Heffner, 2003; Feldner, Zvolensky, Eifert, & Spira, 2003; Karekla, Forsyth, & Kelly, 2004; Twohig et al., 2010; Zettle, 2003), to date there have been relatively few studies comparing ACT specifically to CBT. ACT has been more often compared to behavioral therapies such as systematic desensitization (Zettle, 2003) and progressive relaxation training (Twohig et al., 2010) that lack a cognitive restructuring component. Among the studies directly comparing ACT to CBT, Block and Wulfert (2000) evaluated 5 weeks of ACT, cognitive-behavioral group therapy (CBGT; Hope & Heimberg, 1993), or a wait-list control condition in the treatment of speech anxiety. Results revealed that in both ACT and CBGT conditions, overall social anxiety decreased and willingness to speak in public situations increased relative to the wait-list control condition. However, there was a slight trend favoring CBGT in overall reduction of anxiety symptoms and another favoring ACT in increasing willingness to engage in various academic-speaking situations. In another study, Forman, Herbert, Moitra, Yeomans, and Geller (2007)
compared cognitive therapy (CT) versus ACT administered by new therapists in the treatment of anxiety and depression. The authors found equivalent decrements in depression and anxiety, as well as increases in overall functioning, quality of life, life satisfaction, and clinician-rated functioning. While modest in number, these two studies suggest that ACT is a viable and effective therapeutic alternative comparable to the well-established CT/CBT interventions in the treatment of anxiety.

Prior to this study, there has been no research to date comparing CBT to ACT in the treatment of specific phobia. Consequently, a secondary purpose of the present study was to explore the relative efficacy of ACT for the treatment of specific phobia, and arachnophobia, in particular, by comparing it to the already empirically established protocol of Öst (1989). Despite its empirical status, questions still remain about the mechanisms by which exposure has its effects in Öst’s approach. As suggested, exposure may serve different functions and activate different therapeutic processes in ACT versus CBT. Based on research summarized above (Block & Wulfert, 2000; Forman et al., 2007), it was generally expected that CBT and ACT would have comparable outcomes in reducing levels of arachnophobia and overall anxiety. However, the processes through which such treatment effects may be realized remained unknown and were of greater interest in this study.

**Comparison of CBT and ACT: Process Question**

The primary purpose of the current study was to examine the processes and related mechanisms of action through which exposure may contribute to the efficacy of CBT and ACT in the treatment of arachnophobia. Although this study was not tightly hypothesis-guided, there were several findings based on previous research that were generally expected as being more likely than others. Regardless of how the outcome question is ultimately answered, it was
expected that exposure in the two treatment approaches would initiate different mediational processes. To address this question, measures of differing processes specific to the interventions were evaluated at both macro and micro levels of analysis.

**Macrolevel analyses.** Purported differential therapeutic processes were examined at a macrolevel of analysis through several measures collected at multiple assessment occasions. These measures included evaluations of disgust sensitivity, spider-related beliefs, cognitive attentional processes as assessed by a Stroop task measure, and willingness to have a spider crawl in one’s hair. Previous research has shown that ACT promotes a willingness to participate in procedures and protocols involving increased exposure to various biological and psychological challenges (Eifert & Heffner, 2003; Levitt, Brown, Orsillo, & Barlow, 2004; Wagener & Zettle, 2011). Specifically, Eifert and Heffner (2003) and Levitt et al. (2004) found that participants within an acceptance-based protocol were more willing to undergo a carbon dioxide challenge a second time than their counterparts who received diaphragmatic breathing strategies or a control group. Accordingly, it was expected that ACT participants would report greater levels of willingness to place a spider in their hair relative to those receiving CBT.

Directional hypotheses involving the other macrolevel processes measures were somewhat less definitive. While it was anticipated that CBT participants would show greater decrements than those receiving ACT in spider-related beliefs over the course of the study, no equally strong a priori hypothesis existed about treatment-related differences in disgust sensitivity and performance on the Stroop task. Nonetheless, any changes that did emerge on these measures were generally expected to be greater for CBT than ACT.

**Microlevel analyses.** To address the process question at a more fine-grained level of analysis, subjective distress, physiological levels of autonomic arousal, and avoidance behavior
were assessed and monitored during both baseline and treatment phases within a single-subject design. Analyses of therapeutic processes at this level complemented the more macrolevel assessments and provided a more detailed picture of the mechanisms of action occurring with exposure as contextualized within the two treatment approaches.

Measures of subjective fear and disgust were recorded prior to (in the case of fear) and after (in the case of both) each BAT throughout all phases of the study. Based on evidence of CBT’s ability to reduce subjective levels of distress correlated with therapeutic improvement (Zlomke & Davis III, 2008), it was expected that increased approach behavior during BATs attributable to CBT would be mediated by reductions in levels of fear and/or disgust. By contrast, it was expected that any therapeutic improvement that occurred in ACT would be independent of reductions in subjective distress largely based on a recent analogue study comparing control-, acceptance, and information-based approaches in the treatment of midlevel spider phobia (Wagener & Zettle, 2011). Participants in the acceptance-based intervention displayed the highest level of approach behavior and were more willing to return a week later to place their hands in jars that they believed contained spiders, despite reporting only modest reductions in levels of distress compared to the control- and information-based approaches. Similar patterns of desynchrony between approach/avoidance behavior and related private events have also been documented with other similar acceptance-related approaches and protocols (Gutierrez et al., 2004), suggesting that therapeutic improvement in ACT is unlikely to be mediated by reductions in subjective distress.

An overall pattern of results similar to those expected for subjective distress was also anticipated at a physiological level in examining measures of autonomic arousal that were taken both pre and postBAT. More specifically, it was expected that in the CBT approach, levels of
autonomic arousal would be reduced as therapeutic change occurs as found in similar studies (Kamphuis & Telch, 2000; Olatunji et al., 2009; Öst et al., 1991). To the degree that exposure in CBT serves an habituation and/or extinction function, it was expected that an overall reduction in physiological arousal and increased approach behavior during BATs would be highly correlated for CBT participants. By contrast, it was again anticipated that desynchrony will be displayed among those receiving ACT such that physiological arousal would not be correlated with therapeutic improvement as assessed by movement towards the spider.

With regard to phobic avoidance, CBT has consistently been shown to improve approach behavior by arachnophobic clients (Öst et al., 1992). In ACT, there has not been any research demonstrating increased approach behavior with arachnophobic clients. However, studies have shown a decrease in avoidant behavior for several other anxiety disorders, such as panic (Feldner et al., 2003; Karekla et al., 2004) and OCD (Twohig et al., 2010). Based on this body of research, it was generally expected that both CBT and ACT would show an equivalent increase in approach behavior to the phobic stimulus as assessed by the BAT during the treatment phase of this study.
CHAPTER 3

METHODOLOGY

Participants

A total of 16 potential participants inquired about the study via means of online advertisements and announcements in campus and city-wide newspapers about “A Fear of Spiders Study.” (see Appendix A). Of these, 9 were screened over a period of 7 months for their eligibility after receiving detailed information about the study. Potential participants first completed the Spider Phobia Questionnaire (SPQ; Klorman, Weerts, Hastings, Melamed, & Lang, 1974) to ensure a clinical level of arachnophobia as reflected by a score of 19 or higher. They were also required to meet a DSM-IV-TR diagnosis of specific phobia (APA, 2000) as determined by the Anxiety Disorders Interview Schedule (ADIS-IV; Brown, DiNardo, & Barlow, 1994). Exclusionary criteria included current psychotherapy for depression or anxiety and/or pharmacotherapy.

As can be seen in the flowchart in Figure 1, none of the 9 participants were screened out of the study. They had a mean age of 22 ($SD = 3.12$; range $= 19 - 27$) with the majority being female (77.8%) and single (88.9%). With the exception of one African-American, all participants were Caucasian (88.9%) and were treated per the “Ethical Principles of Psychologists and Code of Conduct” (American Psychological Association, 2002).

Measures and Materials

A number of assessment measures, as listed in Table 2, were taken before, during, and/or after the implementation of the two interventions. One way of organizing the discussion of these measures is according to the sequence in which they were administered and by the purposes they served.
**Pretreatment screening measures.** Three measures were administered at pretreatment to obtain relevant background information on participants and to screen them for inclusionary and exclusionary criteria. These measures included a Background Information Questionnaire, the ADIS-IV, and the SPQ. While the first two of these measures were administered at pretreatment only, the SPQ was administered also at posttreatment and follow-up, insofar as it served as an outcome as well as a screening measure.

**Background Information Questionnaire.** Participants were asked to provide demographic information about their age, gender, and ethnicity to help identify any background variables that may impact the study’s findings. Participants were asked to disclose any past critical incidents involving spiders, including attacks or of being bitten, and length of time afraid of spiders. This information was not used for matched random assignment, but to subsequently verify that participants across the two conditions did not significantly differ from each other in such histories. As can be seen in Table 3, no differences were found between the two conditions. The Background Information Questionnaire is presented in Appendix B.

**Anxiety Disorders Interview Schedule** (ADIS-IV; Brown et al., 1994). The specific phobia section of the ADIS-IV (see Appendix C) was used to verify that a differential diagnosis of arachnophobia was warranted for each participant. The ADIS-IV was administered by a graduate level clinical psychology student. Each interview was taped and subsequently, independently reviewed for diagnostic reliability by another graduate student under the supervision of a licensed clinical psychologist. The evaluator was in complete agreement with a diagnosis of specific phobia for all participants and was highly confident ($M = 98\%$, range 89-100%) in her ratings.


**Spider Phobia Questionnaire.** The SPQ (Klorman et al., 1974; Muris & Merckelbach, 1996) is a 31-item self-report, true/false measure of fear and avoidance of spiders, with higher scores indicating increased levels of arachnophobia. Items consist of statements like “I shudder when I think of spiders” and “I would feel some anxiety holding a toy spider in my hand.” The SPQ (see Appendix D) has shown internal consistency with a Cronbach’s alpha of .83-.90 (Klorman et al., 1974), and excellent test-retest reliability over a period of 3 weeks ($r = .94$; Muris & Merckelbach, 1996). The SPQ has shown good discriminant validity by differentiating between spider phobic and nonphobic populations (Fredrikson, 1983; Muris & Merckelbach, 1996) and displays adequate sensitivity to treatment (Hellström & Öst, 1995). It has also been shown to correlate highly with other measures of avoidance and fear of spiders (Muris & Merckelbach, 1996).

As previously mentioned, participants were required to score 19 or higher on the SPQ which is reflective of a clinical level of arachnophobia (Öst, Ferebee, & Furmark, 1997). In addition, the SPQ was used to assess possible changes in specific fears related to spiders as shown in other research (Antony et al., 2001; Hellström & Öst, 1995; Öst, Ferebee, & Furmark, 1997). For example, Hellström and Öst, (1995) found decreases in level of spider fear as assessed by the SPQ after participants received one-session of a CBT intervention.

**Moderating measures.** Two variables that might function as moderators (e.g., Baron & Kenny, 1986) of differential treatment outcome were assessed at pre and posttreatment, as well as at follow-up with the Acceptance and Action Questionnaire-II and the Courage Measure.

**Acceptance and Action Questionnaire-II** (AAQ-II; Bond et al., 2011). The AAQ-II (see Appendix E) is a 7-item inventory that is a revision of an earlier instrument, (AAQ; Hayes, Strosahl, et al., 2004) designed to assess psychological inflexibility. Each question is rated on a
7-point Likert-type scale, with higher scores reflecting more experiential avoidance and psychological rigidity. Psychometric properties of the AAQ-II appear to be adequate as it displays high levels of both internal (mean $\alpha = .84$) and temporal stability (test-retest reliabilities of .81 and .79 at 3 and 12 months, respectively) (Bond et al., 2011). Concurrent, discriminant, and predictive validity also appear to be adequate (e.g., Bond & Flaxman, 2006; Hayes, Strosahl, et al., 2004). For example, the AAQ-II significantly correlates with measures of general psychopathology, but not so highly that it cannot be differentiated from other measures of specific psychopathology such as the Beck Depression Inventory-II (Beck, Steer, Ball, & Ranieri, 1996; Beck, Steer, & Brown, 1996) and the Beck Anxiety Inventory (Beck, Epstein, Brown, & Steer, 1988) (Bond et al., 2011).

The original AAQ has been widely used in research involving acceptance-based approaches, such as ACT, as both moderating and mediating measures (Gird & Zettle, 2009; Zettle et al., 2005; Zettle, Petersen, Hocker, & Provines, 2007). In this study the AAQ-II was included ostensibly as a moderating measure. Doing so seemed especially important in light of recent research suggesting the individuals who report lower levels of experiential avoidance may respond more favorably to acceptance-based approaches than those that emphasize more traditional cognitive behavioral techniques (Blacker, Herbert, Forman, & Kounios, 2012).

**Courage measure** (CM; Norton & Weiss, 2009). The CM (see Appendix F) is a 12-item measure that assesses self-perceived courageousness. The CM defines courage as “persistence or perseverance despite having fear” (Norton & Weiss, 2009, p. 214). Items include “If something scares me, I try to get away from it” and “I will do things even though they seem to be dangerous” and are scored on a 7-point Likert-type scale. The CM has shown good internal consistency ($\alpha = .88-92$) and modest test-retest reliability over a 3 week period ($r = .66$; Norton
& Weiss, 2009). Due to the CM being a relatively new measure, there is a limited amount of research documenting its validity. A finding that participants who reported higher levels of courage as assessed by the CM displayed more approach behavior during the BAT provides evidence for the scale’s predictive validity (Norton & Weiss, 2009). There is also evidence to suggest adequate discriminant validity of the CM as it correlates moderately with measures of subjective distress (Norton & Weiss, 2009). The CM helped determine if overall and/or differential pretreatment levels of courage moderated treatment outcome. The relationship between courage and psychological flexibility has not yet been examined empirically. However, the two seem to be similar enough conceptually to generally expect that the CM would behave in a manner similar to the AAQ-II. Accordingly, it was anticipated that participants scoring higher on the CM would show a more favorable response to ACT than CBT.

**Macrolevel process measures.** Several measures were administered at multiple occasions to assess the processes that might account for the therapeutic impact of the interventions. These measures included the Disgust Scale-Revised, Spider Phobia Beliefs Questionnaire, the Stroop task, and a Willingness measure. The Willingness measure was administered at posttreatment and follow-up only, while the others were also administered at pretreatment.

**Disgust Scale-Revised** (DS-R; Haidt, McCauley, & Rozin, 1994). The DS-R (see Appendix G) as modified by (Olatunji, Sawchuk, de Jong, & Lohr, 2007) consists of two subscales containing 25 items total. The first subscale (repulsion scale) contains 13 true/false items such as “If I see someone vomit, it makes me sick to my stomach.” The second subscale which will be called “situational disgust” in this study, contains 12 items assessing how disgusting the respondent rates certain situations such as seeing “maggots on a piece of meat in
an outdoor garbage pail” according to a 3-point scale (e.g., “not disgusting at all,” “slightly disgusting,” or “very disgusting”). A total score for overall disgust sensitivity was calculated by computing the mean of the two subscale scores.

The DS-R has demonstrated adequate internal consistency (α > .70) and convergent and discriminant validity (Olatunji et al., 2007; Olatunji, Haidt, McKay, & David, 2008). In particular, the DS-R has been shown to correlate with both avoidant behavior and physiological arousal (increased heart rate) and spider phobics report higher levels of disgust sensitivity than normal control subjects (Merckelbach, de Jong, Arntz, & Schouten, 1993). It was generally expected that any differential changes in disgust ratings would favor CBT, given research showing that similar interventions (Öst, 1989) reduce disgust levels while increasing approach behavior (Huijding & de Jong, 2007). More specifically, it was predicted that any changes in disgust levels that occurred would be more closely correlated with responsivity to CBT than ACT.

**Spider Phobia Beliefs Questionnaire** (SBQ). The SBQ (Arntz et al., 1993) is a 78-item self-report measure assessing beliefs about and fears of spiders (see Appendix H). The SBQ itself is comprised of two scales. The first consists of 42 items measuring the strength of irrational beliefs about spiders (e.g., “When there is a spider in my vicinity, I believe that the spider will bite me”). This first scale is commonly referred to as the SBQ, but to avoid confusion with the parent questionnaire and its second scale, it will be designated here as the SBQI. The second scale of the SBQ, known as the SBQII, is comprised of 36 items assessing beliefs about one’s ability to cope with a confrontation with spiders (e.g., “If the spider does not go away and crawls on me, I will die of fear”). Ratings of the SBQI and SBQII items range from 0% to 100% to reflect how much the participant believes each thought. Total scores on the SBQI and the
SBQII were determined by averaging the believability ratings for the items that load on each. The SBQ has been shown to have excellent internal consistency for both of its scales (α = .94) and adequate test-retest reliability at 2 months for each (SBQI, r = .68; SBQII, r = .71) (Arntz et al., 1993.) Both the SBQI and SBQII have also demonstrated sufficient concurrent validity with other spider phobia indices and adequate discriminant validity by differentiating spider phobic individuals from nonspider phobic subjects (Arntz et al., 1993).

Spider phobic individuals have been shown to have a number of negative and irrational thoughts (harm, attack, and predator related ideas) about spiders. The SBQI was used to track any decreases in severity of spider-related beliefs that occurred over the course of treatment and the SBQII was used to track changes in self-related abilities to cope with the spider. Given the emphasis of cognitive restructuring within CBT and evidence that negative fear-related beliefs about spiders can be reduced by a related one-session treatment (Öst, 1989), it was expected that greater changes in SBQI and SBQII scores would be observed for participants who received this intervention. It was unclear as to whether or not participants in the ACT condition would show any reductions in SBQI and SBQII scores.

**The Stroop task.** In order to assess possible changes in information processing occurring from pre to posttreatment, participants were administered an emotional Stroop task. The Stroop task (1935) is used to assess automatic attentional processing in which participants are asked to name the ink color of the letters in which a word is printed, while ignoring the actual word itself. Several studies using a “spider-specific” Stroop task have documented differences in predictable response times during the test between arachnophobic participants and normal controls (Lavy, van den Hout, & Arntz, 1993; van den Hout, Tenney, Huygens, & de Jong, 1997; Williams, Mathews, MacLeod, 1996).
Of even greater relevance for this study are additional findings that attentional processes as assessed by the Stroop task change in expected ways as a function of successful treatment of arachnophobia (Lavy et al., 1993; van den Hout et al., 1997). For instance, Lavy et al. (1993) found decreases in response times on the Stroop task after successful treatment of spider phobia with a one-session CBT approach (Öst, 1989). Based upon this research, similar findings on the Stroop task generally were expected for the CBT condition in this study. It was unclear if these same findings would hold for the ACT group. However, if ACT participants did show equivalent levels of therapeutic improvement over the course of treatment compared to the CBT condition, but no corresponding change in attentional processes as assessed by the Stroop task, it might suggest that those treatment gains were due to differential mechanisms of action.

The Stroop task in this study was programmed using MATLAB (version 2010a) and the Psychophysics Toolbox (Brainard, 1997; Pelli & Farell, 1994). The Stroop task words were presented on a laptop computer with a color monitor. All words appeared in 8 mm block letters in red, blue, or green in the center of the screen. The appearance of both words and colors were randomly determined. Three word conditions were presented: (a) “neutral,” in which the names of neutral objects were printed in different colors and were matched for number of letters and frequency of usage in the English language with the spider-related words (e.g., the word “ash” printed in red), (b) “incompatible,” in which the names of colors were printed in different colors (e.g., the word “red” printed in blue), and (c) “spider-related,” in which arachnid-related words were printed in different colored letters (e.g., the word “web” printed in red). The spider-related words were generated by asking over 100 undergraduate students to free associate what came to mind when thinking of the word “spider.” The list of words is presented in Appendix I and
contain items such as “web”, “crawl”, and “legs.” Response times and error rates were recorded. Before the test began, participants completed a practice trial containing all three word conditions

**Willingness measure.** Included in the Posttreatment Questionnaire and Follow-up Questionnaire, was a question that asked about how willing participants were to let a spider crawl in their hair. Participants rated their level of willingness on a Likert scale ranging from 0-10, with 0 indicating “not at all willing” and 10 being “extremely willing.” Based on previous research showing that an acceptance-based approach increased the willingness of spider-fearful participants to contact spiders compared to a control-based approach (Wagener & Zettle, 2011), it was generally expected that ACT participants would report higher levels of willingness at both assessment occasions and that they would be correlated with therapeutic improvement.

**Within session/microlevel measures.** Several measures were gathered during each administration of the BAT that occurred during the baseline phase as well as during the treatment modules. These measures included an assessment of behavioral approach/avoidance, blood pressure/pulse rate recordings, and subjective ratings of fear and disgust.

**Behavioral approach/avoidance (BAT).** An adaptation of the BAT by Öst et al. (1991) was presented several times during baseline as well as after each treatment module to yield measures of avoidant/approach behavior towards the phobic object. A BAT is considered to be the cornerstone for objective assessment of phobias (Meng, Kirkby, Martin, Gilroy, & Daniels, 2004; Mineka, Mystkowski, Hladek, & Rodriguez, 1999). A 20” x 10.5” x 12.5” terrarium containing a stuffed tarantula (i.e., Eurypeima Spinearcs) was placed 24 ft away from participants within a large, quiet room away from the majority of outside noises and distractions. A large tape measure was placed on the floor to measure how close participants approached the spider when asked to do so. Participants continued approaching the spider until they were able to place their
hand inside the terrarium for a period of 30 s. Each attempt to do so was timed separately with a stopwatch, thus yielding an overall gradient consisting of physical distance from the terrarium as well as duration of hand exposure within it.

**Blood pressure/pulse rate monitor.** A OMRON HEM-629 IntelliSense automatic wrist blood pressure and pulse rate monitor (073796006297, US Patent) was used to digitally record blood pressure and pulse rate immediately before and after administration of the BAT. This monitor uses the oscillometric method of blood pressure to measure the blood’s movement through arteries and converts the movements into a digital recording. Participants wore the wrist monitor on their left wrist and positioned the unit at heart level throughout the measurement, while remaining still to assure accurate readings. Similar physiological measures have been used in prior research (Hellström et al., 1996; Hellström & Öst, 1995; McGlynn, Rose, & Lazarte, 1994; Schwartz, Houlihan, Krueger, & Simon, 1997). For example Hellström et al. (1996) treated 30 clients suffering from blood phobia with either one or five sessions of applied tension treatment. They measured pulse rate, systolic and diastolic blood pressure and found a pretreatment/posttreatment difference effect on pulse rate taken during baseline. It was generally expected that reductions in autonomic arousal as approach behavior increases would be obtained within the CBT condition consistent with findings from similar research (Hellström et al., 1996; Hellström & Öst, 1995). By contrast, relative desynchrony between recordings of autonomic arousal and approach/avoidance behavior was expected among participants receiving ACT.

**Distress Thermometer.** The Distress Thermometer used to rate level of subjective distress (SUDS) was originally developed by Roth et al. (1998) as a fast way to identify cancer patients who are suffering from significant psychological distress. Participants rated their fear on a scale of 1-10 (SUDS-F) prior to the start of the BAT and immediately following each
completed BAT (see Appendix J). They also rated their levels of disgust using a similar scale (SUDS-D) at the conclusion of each BAT (see Appendix K). Other research has used similar SUDS ratings as a measure to verify treatment success and efficacy (Antony et al., 2001; Hellström et al., 1996; Hellström & Öst, 1995; Koch et al., 2004; Öst, Ferebee, & Furmark, 1997).

In this study, the SUDS ratings served to gauge a purported mechanism of change associated with exposure during the BAT. Previous research found that reductions in SUDS ratings closely tracked increases in approach behavior for spider-fearful participants receiving a control-based intervention (Wagener & Zettle, 2011). By contrast, however, even greater increases in approach behavior noted among participants receiving an acceptance-based approach were not accompanied by comparable reductions in levels of distress. Similar findings were expected in this study.

**Outcome measures.** There were five ways in which therapeutic outcome was assessed. One of these means, as already discussed, was done through the administration of the SPQ at both pre and posttreatment as well as at follow-up. The other four measures of treatment outcome reflected how many modules were required to meet a criterion for successful treatment, how much the participants would recommend the treatment to a friend or family member, and the amount of continued avoidance of spiders as assessed by two questions asked of participants at follow-up.

**Number of modules.** A “module” for the purpose of this study was defined as a 20 min segment during which relevant treatment components were introduced and administered. The two interventions, CBT and ACT, were administered within these “modules” and participants continued treatment until they attained the criterion for discontinuation. At the end of each
treatment module, participants were administered the BAT to assess therapeutic progress and collect the aforementioned within session process measures. Treatment was successfully terminated when participants placed their hand in the terrarium for a period of 30 s. Using a trials-to-criterion design, the number of modules required to meet this criterion was recorded and analyzed as an outcome measure. Based on previous work, showing that therapeutic improvement is generally seen within a 3 hr time period (Öst, 1991), a maximum of nine modules were available to constitute an initial session of treatment. None of the participants, however, required this many modules to meet criterion for successful treatment.

**Treatment recommendation.** Participants were asked in questionnaires administered at posttreatment and at 2 month follow-up “How much would you recommend this treatment to a friend or family member who also wished to address their fear of spiders (1 = Not at all, 10 = Most definitely)?”

**Self-reported avoidance of spiders.** Participants at follow-up also were asked two related questions to assess the extent to which they continued to avoid contact with spiders (i.e., “To what degree have you avoided coming into contact with spiders?”) and refrain from activities due to their arachnophobia, (i.e., “In the past two months, to what degree have you engaged in activities that you initially refrained from doing due to your fear of spiders?”). The same scale (1 = Not at all, 10 = All the time) was used to quantify their responses to them.

**Posttreatment questionnaire.** A questionnaire (see Appendix L) was administered at the completion of the treatment phase to assess treatment integrity and aspects of the program participants particularly liked and did not like, in addition to their willingness to recommend the treatment to a friend who experiences fear of spiders (as previously discussed), and willingness to have a spider crawl in their hair. To evaluate treatment integrity participants were first asked
(yes/no) if they used any of the suggestions presented to them during the sessions and, if so, which ones. They were also asked to indicate the most beneficial and least helpful aspects of the therapy.

**Follow-up questionnaire.** A questionnaire (see Appendix M) was administered at the 2 month follow-up assessment session. In addition to asking about recommending the treatment to a friend or familiar member and willingness to have contact with a spider, this questionnaire also assessed if participants had used any aspects of the intervention over the past 2 months, to what degree they avoided coming into contact with spiders, and to what degree they engaged in activities that they initially refrained from doing due to their fear of spiders (as previously discussed in the outcome measures section).

**Procedure**

**Pretreatment assessment.** As reflected in the flowchart of Figure 1, prior to administering treatment, all participants completed an assessment consisting of three phases.

**Phase I: Pretreatment screening.** After obtaining informed consent (see Appendix N), participants were screened for inclusionary and exclusionary criteria. Participants were first administered the Background Information Questionnaire to obtain basic demographic information and assess any variables that might impact the results of the study, such as past incidents of being harmed by a spider and current treatment for anxiety and/or depression. Next, participants were administered the SPQ, with the requirement of a score of 19 or higher before the presentation of the initial BAT.

Participants were asked to slowly approach the terrarium containing the spider while wearing a pulse rate/blood pressure monitor. Immediately before and after doing so, participants
also completed a Distress Thermometer measuring subjective fear (SUDS-F). A rating of disgust (SUDS-D) was obtained at the conclusion of the BAT.

All participants were next interviewed by a graduate level clinical psychology student using the ADIS-IV to verify a diagnosis of specific phobia before moving to the second phase of the screening session.

**Phase II: Administration of additional measures.** Participants were first presented with a second consent form detailing further pretreatment, treatment, and follow-up information (see Appendix O). Next, participants were administered a battery of questionnaires including moderating measures (i.e., AAQ-II and the CM), as well as macrolevel process measures (i.e., the DS-R, SBQ, and the Stroop task). Following the completion of the battery, participants were administered their second BAT along with the collection of measures of autonomic arousal as well as the SUDS-F and SUDS-D.

**Phase III: Collection of additional BATs.** The major purpose of this phase was to collect additional BATs to meet the requirements of a multiple baseline design across participants (Hersen & Barlow, 1976) prior to initiating treatment. Five participants were randomly assigned to CBT and four to ACT. Participants within each condition were further randomly assigned to receive either 3, 4, or 5 BATs during baseline. Of the five CBT participants, one (P2) was assigned to the 3 baseline condition, two participants (P1 and P9) were assigned to the 4 BAT baseline condition, and two participants (P3 and P7) were in the 5 BAT baseline condition. Among the ACT participants, one (P5) was administered 3 BATs during baseline, two participants (P4 and P8) were in the 4 BAT baseline condition, and one (P6) was in the 5 BAT baseline condition. The final BAT of baseline for all participants was administered prior to the presentation of the initial module in the first treatment session. This third phase of assessment
was necessary to obtain additional BATs from those participants assigned to the 4 and 5 baseline conditions. All participants were included within Phase III during which time they were administered supplemental measures to occupy approximately 20 min between the administrations of additional BATs. Analyses of the supplemental questionnaires were of secondary focus, as they were used to further inform findings involving the primary measures. The primary purpose of including the supplemental questionnaires was to expend time between BATs by having participants complete measures possessing face validity and having some overall relevance to the study.

The first supplemental measure administered was the Symptom Checklist- 90-Revised (SCL-90-R; Derogatis, 1994), which is a 90-item self-report measure that evaluates broad psychological problems and symptoms of psychopathology (see Appendix P). It took approximately 15 min to complete. The State-Trait Anxiety Inventory, State Form Y-2 (STAI-Y-2; Spielberger, Gorsuch & Lushene, 1970) was also administered during this period of time (see Appendix Q). The STAI-Y-2 consists of 20 self-statements (e.g., “I feel upset”) to which participants respond on a 1-4 scale based upon how they are feeling at the time. It took approximately 5 min to complete. At the completion of these two questionnaires, a third BAT was administered to participants who were randomly assigned to both the 4 and 5 BAT baseline conditions. During the time in which the BAT was administered for these participants, the participants in the 3 BAT baseline condition were offered a break equivalent to the length of time necessary to do so.

Following this BAT, participants were administered the Rosenberg Self-Esteem Scale (RSE; Rosenberg, 1979). The RSE is a self-report scale designed to measure global self-esteem, (see Appendix R) consisting of 10 items rated on a 4 point Likert scale ranging from “Strongly
Agree” to “Strongly Disagree.” The RSE has demonstrated satisfactory levels of reliability and validity across a large number of different sample groups (Fleming & Courtney, 1984). This measure took approximately 5 min to complete.

After completion of the RSE, participants completed The NEO Five-Factor Inventory (NEO-FFI; Costa & McCrae, 1992) (see Appendix S), which is a short form of the revised NEO Personality Inventory (Costa & McCrae, 2010). It consists of 60 items, with five 12-item subscales that measure the “big five” personality dimensions of neuroticism, extraversion, openness, agreeableness, and conscientiousness. The answer format is a 5-point Likert-type scale, ranging from “Strongly disagree” (0) to “Strongly agree” (4). Numerous studies have used this instrument in the assessment of personality given its demonstrated internal consistency and external validity (Costa & McCrae, 1992; Matthews, Deary, & Whiteman, 2003; Olatunji et al., 2008). The completion of the NEO-FFI took another 15 min, thus filling the remainder of the 20 min period prior to the administration of a final BAT. Upon completion of the RSE and NEO-FFI, participants in the 3 and 4 BAT baseline conditions were released, while participants in the 5 BAT baseline condition were given one final BAT before being dismissed.

**Treatment conditions.** The two treatments were offered in one treatment session, lasting up to 3 hr in length and consisting of as many as nine modules within each session. As previously discussed, modules within each session were continued until participants reached criterion for treatment discontinuation.

Both treatment protocols were administered by the researcher, Alexandra Wagener, M.A., a clinical psychology graduate student. The treatment sessions were audiotaped for subsequent checks of treatment integrity. Two independent evaluators were provided with the recordings for each of the modules organized by participant number. Both evaluators correctly
identified with 100% accuracy all of the treatment modules and were highly confident in their ratings.

**CBT condition.** The CBT condition was largely adapted from the *Manual for the 1-session treatment of specific phobias* by Lars-Goran Öst (1997) and incorporated the protocol for progressive muscle relaxation (PMR) based upon the work of Jacobson (1938) and Craske and Barlow (2006). This intervention targeted factors that maintain spider phobic behavior within a cognitive behavioral perspective, such as catastrophic beliefs surrounding spiders through cognitive restructuring, and unpleasant physiological arousal through training in PMR. For a complete description of the CBT protocol see Appendix T.

**ACT condition.** The ACT condition was mainly based upon *Acceptance and commitment therapy: An experiential approach to behavior change* by Hayes et al. (1999), *Acceptance and commitment therapy for anxiety disorders: A practitioner’s treatment guide to using mindfulness, acceptance, and values-based behavior change strategies* by Eifert and Forsyth (2005), and *Get out of your mind and into your life: The new acceptance and commitment therapy* by Hayes and Smith (2005). The main areas emphasized within this intervention were focused around the six major processes that ACT attempts to target in helping clients become more psychologically flexible. These included acceptance, cognitive defusion, mindfulness, self-as-context, valuing, and committed action. The ACT protocol can be viewed in Appendix T.

**Posttreatment assessment.** Participants returned 1 week after the completion of treatment for the administration of another BAT and completion of the same battery of questionnaires they previously filled out during Phase II of pretreatment assessment. These measures included the AAQ-II, CM, DS-R, SBQ, SPQ, and the Stroop task. Participants were also administered the
Posttreatment Questionnaire as was discussed earlier (see Appendix L) that includes the Willingness measure.

**Follow-up assessment.** Two months after the posttreatment assessment, participants returned to complete one final BAT, the battery of questionnaires just described, and the Follow-up Questionnaire (see Appendix M).
CHAPTER 4

RESULTS

Pretreatment Comparisons

Participant background and demographic variables (see Table 3) as well as supplemental questionnaires were first analyzed for any pretreatment differences between the two treatment conditions. Because of the small sample size, a series of Mann-Whitney (Siegel, 1956) and chi-square tests were conducted.

Background Information Questionnaire. As can be seen in Table 3, there were no significant treatment condition differences on any of the pretreatment variables, including demographic variables, such as gender, age, marital status, and ethnicity, as well as history of being harmed by a spider, and length of time afraid of spiders.

Supplemental questionnaires. Table 4 shows scores from each of the supplemental questionnaires, except the scales of the NEO-FFI (see Table 5), that participants completed during Phase III of pretreatment assessment. A series of Mann-Whitney tests revealed no differences between treatment conditions on any of the measures.

Treatment Utilization and Evaluation

The degree to which participants reported using techniques and suggestions presented to them during the treatment protocols and their evaluation of them were examined before undertaking analyses of outcome and process data. This was done to ensure that any treatment condition effects, or lack thereof, that might emerge from these analyses could not be attributed to differences in the way in which strategies and techniques presented in the protocols were
received and applied by participants during the BATs and in any spider-related experiences occurring outside of the program. Three specific questions contained in the Posttreatment and Follow-Up Questionnaire addressed these issues with participant responses to them provided in Table 6.

**Treatment utilization.** Participants were asked if they used “any of the techniques or suggestions you learned in therapy during your interactions with the spider” at posttreatment and in “dealing with spiders” at follow-up, and “if so, which ones?” All participants reported using at least one technique specific to the intervention they received (see Table 6) and none that were from other therapeutic approaches, including the opposing protocol.

For CBT, all participants cited using cognitive restructuring (e.g., “replacement thoughts” and “self-statements”) at both posttreatment and follow-up. Use of relaxation was mentioned by four of five CBT participants at posttreatment, but by only one (P9) at follow-up. The most common therapeutic component cited by ACT participants at both assessment occasions was defusion (e.g., “talking in a funny voice” and “repeating a word over and over”) with acceptance and mindfulness also being mentioned.

**Helpful therapeutic components.** Perhaps not surprisingly, as seen in Table 6, participants evaluated the techniques they reported using as those which they also found most useful. CBT participants mentioned cognitive restructuring most often (e.g., “challenging beliefs”), but also cited relaxation (e.g., “clenching and releasing fists”). By contrast, those treated with ACT reported the use of acceptance to most helpful (e.g., “to ‘be with’ my fear”).

**Unhelpful therapeutic components.** A third question asked of participants at both posttreatment and follow-up concerned “the least helpful part of therapy.” As seen in Table 6,
none of the CBT participants identified any aspects specific to their treatment other than relaxation training that was cited by P2. The only other response to this question referenced the Stroop task (i.e., “the word-color test”) mentioned by P3. Within the ACT condition, the only therapeutic component identified was “defusion exercise in character voice” by P8 at follow-up. Interestingly, the only other comment offered by ACT participants was P4’s apparent complaint at posttreatment of not gaining “any insight into why I am afraid of spiders.” Insofar as ACT deliberately steers away from any such therapeutic focus, this response can be seen as further evidence of its integrity.

**Outcome Measures**

Therapeutic outcome was assessed in the study in multiple ways: (a) through the administration of the SPQ at both pre and posttreatment as well as at follow-up, (b) the number of modules required to meet criterion for successful treatment, (c) the degree to which participants would recommend the treatment to a friend or family member at both posttreatment and follow-up, and (d) the amount of continued avoidance of spiders as assessed by two questions asked of participants at follow-up (see Table 7).

**Spider Phobia Questionnaire.** Given its status as a widely-used outcome measure in treatment of arachnophobia, scores from the SPQ were analyzed for both statistically and clinically significant change.

*Analyses of statistical significance.* A Mann-Whitney test initially conducted to assess for any pretreatment differences between the two treatment groups in levels of arachnophobia as assessed by the SPQ was nonsignificant, $U = 4.5$, $p = .17$. As seen in Table 7, all participants met a clinical level of arachnophobia based on SPQ pretreatment scores of $\geq 19$, with an aggregate
mean that was statistically equivalent (i.e., within 1 SD) to those from other phobic samples (Teachman & Woody, 2003).

Nonparametric analyses, using one-tailed tests in evaluating a priori directional hypotheses, were next conducted to evaluate changes in levels in arachnophobia over the course of the program for each treatment condition. Using Friedman analyses of variance (Siegel, 1956), both CBT, $\chi^2_r(2) = 7.6, p = .02$, and ACT participants, $\chi^2_r(2) = 8.0, p = .02$, reported significant reductions in levels of arachnophobia from pretreatment through follow-up. However, when analyzed closer, it appears, as can be seen in Figure 2, that the process of change was different for each treatment group. In the CBT condition, there was a significant reduction in SPQ scores from pre to posttreatment as indicated by a Wilcoxon signed-rank test (Siegel, 1956), $z = 2.02, p = .02$, one-tailed, with no further improvement evident through the 2 months of follow-up, $z = 0.54, p = .59$. By contrast, participants in the ACT condition reported decreased levels of arachnophobia in moving from both pre to posttreatment, $z = 1.82, p = .03$, one-tailed, and from posttreatment to follow-up, $z = 1.83, p = .03$, one-tailed. The different trajectories of change for the two treatment conditions as seen in Figure 2, however, did not result in significant differences between them in SPQ scores at either posttreatment, $U = 3.5, p = .11$, or follow-up, $U = 7.5, p = .54$.

Analyses of clinical significance. The clinical status of participants at both posttreatment and follow-up was determined by using the twofold criterion for clinically significant change proposed by Jacobson and Truax (1991). The first criterion of recovery ascertains whether each participant’s SPQ score is more representative of a normal, nonclinical or clinical distribution of that variable at both posttreatment and follow-up. Operationally, Jacobson and Truax propose three different “decision rules” for determining a cutoff score that defines recovery. Of these, the
one (i.e., decision rule c) that requires the use of normative data from both functional and clinical populations and is recommended by them when such distributions overlap (as is the case with SPQ scores), was used to categorize each participant separately at both posttreatment and follow-up as recovered or not. Based on this decision rule, an SBQ score ≤ 14 was established as the cutoff for recovery at both assessment occasions.

The second criterion proposed by Jacobson and Truax, (1991) in determining clinically significant change is *improvement*. Improvement is determined by whether the amount of change that occurs between assessment occasions for each participant exceeds that which could be attributed probabilistically to the temporal instability of the measure in question. Improvement is operationally defined by the calculation of a reliable change index (RC; Jacobson & Truax, 1991) that takes into account the standard deviation as well as test-retest reliability coefficient of the instrument involved. Specifically, the standard deviation of the SPQ (*SD* = 4.96; Norton & Weiss, 2009) and its temporal stability over 3 weeks (*r* = .94; Muris & Merckelbach, 1996) were used in calculating an RC for each participant at both posttreatment and follow-up. Following Jacobson and Truax’s recommendation, an RC ≥ 1.96 was selected as the cutoff necessary for improvement, meaning that any change scores exceeding this value were statistically unlikely (*p* ≤ .05) to be attributable to the temporal instability of the SPQ, but instead to the intervention.

The clinical status of participants at posttreatment and follow-up is summarized in Table 8. As can be seen, all participants demonstrated improvement by exceeding the RC of 1.96 at both measurement occasions. Proportionally, more CBT participants demonstrated recovery than their ACT counterparts, but to a nonsignificant degree at both posttreatment, $\chi^2(1) = .90, p = .52$ and follow-up, $\chi^2(1) = 1.41, p = .44$, based upon Fisher’s exact probability test (Siegel, 1956). Specifically, 80% of the CBT participants (four of five) reported levels of arachnophobia
at posttreatment that were closer to the mean of SPQ scores for a nonclinical than clinical population compared to half (two of four) of those receiving ACT. At follow-up, the lone CBT participant (P2) who had not demonstrated recovery at posttreatment now did so (SPQ = 12), with a similar change in recovery status also noted for one of the two (P8) ACT participants (SPQ = 14), thus leaving P6 as the only participant at follow-up (SPQ = 17) not meeting both of Jacobson and Truax’s (1991) benchmarks for clinically significant change.

**Modules to meet successful treatment criterion.** At the end of each 20 min treatment module, participants were administered the BAT and treatment was continued until they placed their hand in the terrarium for at least 30 s. As indicated in Table 7, a Mann-Whitney test revealed no significant difference between CBT \((M = 5.00, SD = .71)\) and ACT \((M = 4.75, SD = .96)\) in the number of modules required to meet this criterion, \(U = 8, p = .60\).

The number of BATs administered during the treatment phase matched the number of modules received by each participant. Because of this, it was possible that the lack of a significant difference between the two conditions in the number of modules required for successful treatment might have occurred due to the mere successive administration of BATs that began in baseline and then continued after each module in the treatment phase, rather than to the two treatment approaches themselves. There was no difference in the number of BATs administered from baseline to treatment termination to CBT participants \((M = 8.4, SD = .89)\) versus those assigned to ACT \((M = 8.5, SD = 1.73)\), \(U = 8.5, p = .70\), and all participants in both conditions passed BATs administered at both posttreatment and follow-up by placing their hand in the terrarium for 30 s.
The multiple-baseline feature of this study’s design made it possible to evaluate whether the introduction of the treatment modules contributed to any trend in approach behavior already initiated by the administration of BATs during baseline. Figure 3 displays the progress displayed by each CBT participant over successive BATs beginning in baseline until the criterion for successful treatment termination was attained, while Figure 4 displays comparable data for ACT participants. All participants except one in both CBT (P1) and ACT (P8) required at least one additional treatment module after progressing the 24 ft to the terrarium before meeting the criterion for treatment termination by pacing their hand inside of it for at least 30 s. These data points are represented in Figure 3 and Figure 4 as circles (●) rather than diamonds (♦).

**CBT participants.** As can be seen in Figure 3, three of the five CBT participants (i.e., P1, P9, and P7) displayed fairly low and stable levels of approach behavior towards the spider during baseline. A noticeable shift in the level of approach behavior and a subsequent accelerating trend occurred with the introduction of treatment for all three of these participants, as seen most clearly with P7, suggesting that these improvements can be attributed to the intervention. A similar pattern is less evident with the two remaining CBT participants, P2 and P3. The baseline trend for P2 was slightly decelerating, while that for P3 was slightly accelerating. However, the levels of approach behavior for both participants were quite high during baseline, especially relative to their three peers, thus creating a sort of “ceiling effect” that made it difficult to evaluate the impact of the CBT modules.

To visually analyze the BAT data through a different lens, they were regraphed as percentage change measures with these data presented in Figure 5 for CBT participants and in Figure 6 for those treated with ACT. To calculate these data points, beginning with the second baseline BAT administration and continuing until each participant arrived at the terrarium, the
amount of absolute change in a participant’s distance from the spider during each BAT was divided by the possible amount of distance in feet that a participant could have moved either towards or away from the spider based upon the previous BAT. For example as seen in Figure 3, during the initial BAT of baseline, P2 moved to within 2 feet of the terrarium, meaning that she could have regressed as much as 22 feet or progressed as much as 2 feet during the next BAT. In fact, she stopped her approach at 21 feet or a foot shorter than during the first BAT, thereby producing a percentage change score of -5% (-1/22) that appears as the first data point for P2 in Figure 5. As seen in Figure 3, P2 regressed even more during the third BAT of baseline, stopping at 18 feet, or 6 feet short of the terrarium, yielding a percentage change score of -14% (-3/21) that constitutes the second data point for P2 within Figure 5. Following the first module of CBT, she moved 2 feet closer to the terrarium producing a percentage change score of 33% (2/6) that appears as the first data point within the treatment phase for P2 within Figure 5.

After arriving at the terrarium, percentage change measures from any additional BATs administered until participants met the criterion of placing their hand inside of it for 30 s were based upon duration and are denoted by circles (●) within Figure 5 and Figure 6. No participants in either treatment condition received more than one additional “post-terrarium” module and related BATs with the exception of P3 who required three. P3 refused to place her hand in the terrarium upon initially reaching it as well as during the next BAT. Following another treatment module, she placed her hand within the terrarium for 8 s, a 27% improvement (8/30) as reflected by the third treatment phase data point for P3 within Figure 5. As further indicated in Figure 5, after a third and final module of treatment, she met criterion by leaving her hand in the terrarium for the full 30 s.
As seen in Figure 5, converting the BAT data to percentage change scores provided a clearer picture of the impact of introducing CBT following baseline, especially for the two participants (P2 and P3) who displayed high levels of approach behavior during it. The pattern of a shift in trend as well as level of approach behavior apparent for P1, P9, and P7 within Figure 3 is mirrored in Figure 5 as well. More importantly, a similar pattern also now becomes more apparent for P2 and P3. As seen in Figure 5, P2 showed a dramatic proportional increase in her approach behavior over that seen in baseline following the first CBT module, with an accelerating trend that continued until the termination of treatment three modules later. P3’s baseline approach behavior showed a U-shaped pattern, proportionally decreasing between the second and third BATs, but then increasing between the fourth and last BAT of baseline. As seen in Figure 5, after the first treatment module P3 also displayed an appreciable change in her approach behavior by progressing all the way to the terrarium and ultimately placing her hand inside of it for 30 s following three more CBT modules.

ACT participants. As shown in Figure 4, all four ACT participants displayed stable, but somewhat differing levels of approach behavior towards the spider during baseline. While P5 and P4 displayed moderately high levels of baseline approach behavior, those for P8 and P6 were remarkably low. A shift in the level of approach behavior was evident as treatment was introduced for all four participants, followed by a subsequent accelerating trend during the treatment phase that is most striking for P8, suggesting that such changes in approach behavior can be attributed to the ACT intervention. The trend in approach behavior during the treatment phase is somewhat less apparent for P5 and P4 in part due to a “ceiling effect” attributable to moderately high baseline levels of approach behavior. As seen in Figure 6, reconfiguring the data
as percentage change scores yields an unambiguous pattern of progress for P5, but one for P4 that remains relatively less clear.

Clearly the most unusual progression of approach behavior during treatment was displayed by P6. While the overall trend is clearly accelerating, it is also characterized by a distinctive stepwise pattern. As seen in Figure 5 and Figure 6, P6 displayed minimal change in approach behavior following the first treatment module, but a dramatic shift after the second. Her approach behavior subsequently remained at this level within 7-8 ft of the terrarium following the next two treatment modules until she arrived at and placed her hand inside of the terrarium for 30 s during the last two BATs.

**Treatment recommendation.** On a scale of (1 = Not at all, 10 = Most definitely), participants rated their level of willingness to recommend the intervention to a friend or family member. As apparent in Table 7, a Mann-Whitney test at posttreatment showed that CBT participants \(M = 9.20, SD = .83\) and those who received ACT \(M = 9.00, SD = 1.15\) were equally enthusiastic in recommending the treatment to a friend or family member, \(U = 9, p = .79\). This was also found to be the case when assessed at follow-up, \(U = 9, p = .79\), with no significant differences noted within either group between their posttreatment and follow-up ratings.

**Self-reported avoidance of spiders.** Participants at follow-up were asked two related questions to assess the extent to which they continued to avoid contact with spiders and refrain from activities due to their arachnophobia (see Appendix K). The same scale (1 = Not at all, 10 = All the time) was used to quantify their responses to them. As indicated in Table 7, CBT and ACT participants reported equivalently low levels of avoiding “coming into contact with
spiders”, $U = 9.5$, $p = .89$. Similarly, there was also no difference between the two groups in their reported engagement “in activities that you initially refrained from doing due to your fear of spiders”, $U = 9$, $p = .80$, with both indicating fairly high levels of activities 2 months following the conclusion of treatment.

**Moderating Measures**

The two questionnaires administered to serve as possible moderators of differential treatment outcome (i.e., the AAQ-II and CM) were first evaluated for significant aggregate change over the three measurement occasions of pretreatment, posttreatment, and follow-up with a Friedman two-way analysis of variance (Siegel, 1956). An absence of significant change in either measure would suggest that both could be analyzed further as potential moderators of therapeutic improvement. Alternatively, significant change in either measure would suggest that they could be most usefully regarded and analyzed as possible mediators, rather than moderators, of treatment outcome.

**Acceptance and Action Questionnaire-II.** As seen in Table 9, the AAQ-II showed no significant changes in levels of experiential avoidance over the three assessment occasions when examined for the entire participant sample, $\chi^2_r(2) = 2.46$, $p = .29$, and separately for CBT, $\chi^2_r(2) = 4.80$, $p = .09$, and ACT participants, $\chi^2_r(2) = .93$, $p = .63$. The AAQ-II was included to help determine if overall and/or differential pretreatment levels of experiential avoidance moderated treatment outcome. Based on previous work (Blacker et al., 2012), it was hypothesized that participants who reported lower levels of experiential avoidance/higher levels of acceptance would respond more favorably to ACT than CBT. Before examining this further, the statistical
equivalence of pretreatment AAQ-II scores across the two treatment conditions was verified with a Mann-Whitney test, $U = 7, p = .46$.

A series of Spearman’s rank correlations reported in Table 10 were conducted to assess the relationships between pretreatment AAQ-II scores and the following measures of treatment outcome: (a) pre to posttreatment reductions in arachnophobia as assessed by the SPQ, (b) pre to follow-up SPQ change scores, (c) number of modules required for treatment termination, treatment recommendation ratings at (d) posttreatment as well as at (e) follow-up, and (f) continued avoidance of spiders reported at follow-up. As seen in Table 10, there were two statistically significant findings that only partially matched expectations. The first was between pretreatment AAQ-II scores and pre to posttreatment reductions in arachnophobia for CBT participants ($r = -.90, p < .05$), suggesting that among those treated with CBT, participants lower in experiential avoidance unexpectedly displayed a more favorable therapeutic response.

The other significant finding indicated in Table 10 was more consistent with what had been anticipated. Pretreatment levels of experiential avoidance were positively correlated with self-reported arachnophobic avoidance at follow-up for those treated with ACT, ($r = .94, p = .05$). By contrast, these two variables were inversely related to each other, though not to a significant degree ($r = -.78, p = .11$), for CBT participants, with this correlation differing significantly from that obtained with their ACT counterparts, $z = 2.27, p = .02$. Collectively, the significant findings reported in Table 10 suggest that participants lower in experiential avoidance were more responsive to either treatment approach and not differentially to ACT alone as had been expected.

**Courage measure.** As indicated in Table 9, significant increases in courage over the three assessment occasions occurred for the entire pool of participants, $\chi^2(2) = 13.56, p < .01$, as
well as separately for those treated with CBT, $\chi^2(2) = 7.60$, $p = .02$, and ACT, $\chi^2(2) = 6.00$, $p = .05$, suggesting that it was more appropriate to further analyze CM as a possible mediator rather than moderator of therapeutic outcome. While the two treatment conditions did not differ from each other at pretreatment, $U = 5$, $p = .22$, posttreatment, $U = 9.5$, $p = .90$, or follow-up, $U = 8.5$, $p = .71$, they displayed a somewhat different pattern of change across the three measurement occasions. Specifically, CBT participants reported a significant increase in courage from pretreatment to posttreatment, $z = 2.02$, $p = .04$, that was maintained, but not advanced during the follow-up period, $z = 0.00$, $p = 1.00$. By contrast, within the ACT group, pre to posttreatment increases in CM scores fell just short of that required for statistical significance, $z = 1.83$, $p = .07$. However, like their CBT counterparts, ACT participants also showed no change in their levels of courage from posttreatment to follow-up, $z = 0.73$, $p = .47$.

Because courage as assessed by the CM increased over the course of treatment, it was next evaluated as a possible differential mediator, rather than moderator, of therapeutic outcome. In order to do so, CM change scores from pre to posttreatment and from pretreatment to follow-up were correlated with indices of therapeutic outcome that were either limited to or extended beyond these same measurement occasions. More specifically, the degree to which increased courage from pre to posttreatment mediated change in all seven measures of therapeutic outcome was examined separately for each treatment condition. A mediational analysis of pretreatment to follow-up CM change scores was limited to reductions in levels of spider phobia over this same time period as assessed by the SPQ, to how strongly participants were willing to recommend the program to family and friends at follow-up, and to their self-reports of continued arachnophobic avoidance at follow-up.
As seen in Table 11, the only significant relationship between increased courage from pre to posttreatment and any of the outcome measures involved increased activity engagement reported at follow-up by ACT participants \((r = .94)\). This correlation, however, did not differ significantly from that obtained for CBT participants and there were no significant correlations, obtained either within or between treatment conditions, between CM change scores from pretreatment to follow-up and any of the outcome measures, suggesting that increased courage did not strongly mediate treatment effects for either group.

**Macrolevel Process Measures**

Several measures were administered at multiple assessment occasions to evaluate processes that might account for the therapeutic impact of the interventions. These measures included the DS-R, SBQ, and the Stroop task administered at pretreatment, posttreatment, and follow-up, as well as a Willingness measure obtained at the last two assessment occasions. Data for the DS-R and SBQ are reported in Table 12. To the extent that these indices function as process measures, they were expected to differentially change by treatment condition over the course of the program and to display different relationships to therapeutic outcome.

**Disgust Scale-Revised.** As indicated in Table 12, the DS-R showed no significant changes over the three assessment occasions when examined for the entire sample, \(\chi^2_r(2) = 3.6, p = .17\). This aggregate finding, however, obscured differences between the two interventions. As seen in Figure 7, while there were no significant changes in DS-R scores across the three measurement occasions for CBT participants, \(\chi^2_r(2) = .105, p = .95\), their ACT counterparts reported significant decrements in disgust levels, \(\chi^2_r(2) = 6.5, p = .04\). Within the ACT group, however, the amount of change that occurred separately from pre to posttreatment, \(z = 1.83, p = \)
.07, and from posttreatment to follow-up, \( z = 1.46, p = .14 \), fell short of that required for statistical significance.

In order to better understand the differential patterns of change in disgust by treatment condition, they were compared with each other at each of the three assessment occasions. At pretreatment, significantly higher levels of disgust were reported by ACT participants, \( U = 2, p = .05 \) (see Figure 7). However, this differential diminished over time to where there were no differences between groups at posttreatment, \( U = 3.5, p = .11 \), and follow-up, \( U = 4, p = .14 \), suggesting that the changes seen in DS-R scores among ACT participants may have represented a regression-to-the-mean effect.

Because there was a significant reduction in disgust levels at least among ACT participants, the DS-R was further analyzed as a possible mediator of therapeutic outcome. As was done with CM, DS-R pre to posttreatment and pretreatment to follow-up change scores were correlated with measures of treatment outcome. As seen in Table 13, several significant, but unexpected findings emerged. Among ACT participants, the number of modules necessary to meet the criterion for treatment termination was positively related to DS-R pre to posttreatment change scores \( (r = .95) \), meaning that those receiving a larger dose of treatment reported greater reductions in levels of disgust. An expected, albeit nonsignificant inverse relationship between these two variables was obtained for CBT participants \( (r = -.45) \) that fell just short of being significantly different from that of their ACT counterparts, \( z = 1.89, p = .06 \). Further unanticipated findings were of significant negative correlations between how strongly CBT participants would recommend the treatment to a friend or family member at both posttreatment \( (r = -.95) \) and follow-up \( (r = -.89) \) and their DS-R pre to posttreatment change scores. In other
words, those whose levels of disgust diminished the most were least likely to strongly endorse the treatment they received.

**Spider Phobia Beliefs Questionnaire.** Two measures were derived from the SBQ and analyzed separately: (a) the SBQI (spider-related beliefs) and (b) the SBQII (beliefs about one’s ability to cope with a confrontation with spiders).

**SBQI.** Significant reductions in spider-related beliefs were noted for the aggregate sample, $\chi^2(2) = 14.00, p \leq .01$, and separately for CBT, $\chi^2(2) = 7.6, p = .02$, and ACT participants, $\chi^2(2) = 8.0, p = .02$. In the CBT condition, there was a significant reduction in SBQI scores from pre to posttreatment, $z = 2.02, p = .04$, with no further improvement evident through the 2 months of follow-up, $z = 0.67, p = .50$ (see Table 12). By contrast as can be seen in Figure 8, decreased levels of spider-related beliefs reported by ACT participants from both pre to posttreatment, $z = 1.83, p = .07$, and from posttreatment to follow-up, $z = 1.83, p = .07$ fell just short of that required for statistical significance.

In order to better understand the differential patterns of change across the two treatment conditions, SBQI scores were further evaluated at each of the three assessment occasions. No differences in levels of spider-related beliefs between CBT and ACT were noted at pretreatment, $U = 5, p = .22$, posttreatment, $U = 5, p = .22$, or follow-up, $U = 8, p = .62$. As was done with CM and DS-R, changes in spider-related beliefs were next evaluated as a possible differential mediator of therapeutic outcome. As summarized in Table 14, SBQI change scores were not significantly correlated with any of the outcome measures for either treatment condition. Although participant’s spider-related beliefs in both conditions decreased over time, they were not as expected, correlated with any of the outcome measures.
**SBQII.** Significant reductions in self-related beliefs about one’s ability to cope with spiders across assessment occasions were noted for the aggregate sample, \( \chi^2_r(2) = 14.00, p \leq .01 \), as well as separately for both CBT, \( \chi^2_r(2) = 7.6, p = .02 \), and ACT participants, \( \chi^2_r(2) = 6.5, p = .04 \). When analyzed more closely, participants in each condition, however, as depicted in Figure 9 showed a different process of change. As also displayed in Table 12, SBQII scores in the CBT condition significantly decreased from pretreatment to posttreatment, \( z = 2.02, p = .04 \); however, further decrements did not occur through follow-up, \( z = .27, p = .78 \). This was consistent with the a priori hypothesis that CBT participants would show changes in SBQII scores. In the ACT condition, no significant differences were found when analyzed with post-hoc tests from pretreatment to posttreatment, \( z = 1.83, p = .07 \), and through follow-up, \( z = 1.46, p = .14 \). When further analyzing the SBQII for differential patterns of change, no significant differences were noted between treatment groups at pretreatment, \( U = 4, p = .14 \), posttreatment, \( U = 5, p = .22 \), or at follow-up, \( U = 7, p = .46 \) (see Figure 9).

As seen in Table 15, a mediational analysis of SBQII change scores revealed two unexpected findings. At follow-up, how strongly participants would recommend the treatment they received to others was significantly, but negatively, related to how much their belief in their ability to cope with spiders had improved. Those whose beliefs had changed the least over the course of the program were more likely to recommend the treatment they received. For CBT participants, SBQII change scores from pre to posttreatment were predictive (inversely) of treatment endorsement \( (r = -.90) \), while for those treated with ACT, it was change in beliefs from pretreatment to follow-up \( (r = -.95) \).

**The Stroop Task.** The Stroop task was administered at each of the three measurement occasions to assess any differential changes in information processing that occurred over the
course of treatment, particularly among spider-related words relative to neutral and incompatible words. The Stroop task yields two performance measures (i.e., error rates and response times) that were analyzed separately.

**Error rates.** As seen in Table 16, the two treatment groups did not differ from each other in their rates of incorrect responding (e.g., selecting “red” to a spider-related word printed in blue) across any of the word conditions at any of the three assessment occasions, suggesting that the presence or absence of any condition-specific emotional Stroop task effects were not an artifact of differing error rates. While there was no indication of a main effect for measurement occasion in collapsing across word and treatment conditions, a significant difference was detected in word conditions in collapsing across measurement occasions and treatment conditions, \( \chi^2_r (2) = 14.81, p \leq .01 \). Significantly more errors were made by participants in identifying the color of incompatible words (\( M = .22, SD = .13 \)), than in identifying both neutral (\( M = .13, SD = .10 \)), \( z = 2.70, p \leq .01 \), and spider-related words (\( M = .14, SD = .11 \)), \( z = 2.52, p \leq .01 \), with no difference noted between these last two conditions, \( z = 1.45, p = .15 \).

**Response times.** Response time data derived from the Stroop task and presented in Table 17 are for correct responses only. As expected, there were no differences between treatment conditions in this variable at pretreatment for any of the word conditions. However, analyses collapsing across the two groups revealed unanticipated pretreatment differences by word condition, \( \chi^2_r (2) = 11.60, p \leq .01 \). Specifically, paralleling the difference just noted in error rates, response times for incompatible words were significantly higher than those for both neutral, \( z = 2.55, p \leq .01 \), and spider-related words, \( z = 2.70, p \leq .01 \), which did not differ from each other, \( z = 1.60, p = .11 \). The difference between neutral and incompatible words was expected and is reflective of the well-documented “Stroop effect.” Entirely unanticipated, however, was the
absence of a similar difference in response times between the neutral and spider-related words that would have indicated an emotional or spider-specific “Stroop effect.”

Neither a general nor a treatment-specific Stroop effect for spider-related words also materialized at either posttreatment or follow-up. As seen in Table 17, from pre to posttreatment, response times decreased, but not to a significant degree across all three word conditions for both treatment groups; neutral, $z = .90, p = .40$; incompatible, $z = .90, p = .40$; and spider-related, $z = .80, p = .40$; suggesting a general practice effect. As a consequence, the same relative differences in pretreatment response times as a function of word condition were maintained at posttreatment, $\chi^2_r(2) = 12.51, p \leq .01$. Once again response times were significantly higher for incompatible than neutral, $z = 2.52, p \leq .01$, and spider-related words, $z = 2.67, p \leq .01$, with no difference between the latter two word conditions, $z = 1.12, p = .26$.

This same pattern was maintained through follow-up. Response times decreased even further, albeit nonsignificantly, from posttreatment to follow-up across both treatment conditions for all three word conditions; neutral, $z = .70, p = .52$; incompatible, $z = .60, p = .60$; and spider-related, $z = .95, p = .34$. As had been seen at pre and posttreatment, higher response times at follow-up were again obtained for incompatible words compared to neutral, $z = 1.72, p = .02$, and spider-related words, $z = 2.55, p \leq .01$, but not between neutral and spider-related words, $z = 1.72, p = .09$.

Figure 10 provides a visual summary of the overall Stroop findings. As it shows, beginning at pretreatment, participants took significantly longer to correctly identify the color of incompatible than neutral and spider-related words, and this same pattern was maintained at both posttreatment and follow-up. The overall skill of participants in completing the task improved to
a nonsignificant degree over time, but contrary to what had been anticipated, not differentially as a function of the two treatment conditions or of any of the three word conditions. The significant difference in response times at each measurement occasion between the incompatible and neutral words was expected and reflects the well-documented Stroop effect. Completely unexpected in light of previous research (Lavy et al., 1993; van den Hout et al., 1997; Williams et al., 1996) was a failure to also obtain either a general or treatment-specific emotional Stroop effect in which the response times for spider-related words were higher than in the two other word conditions.

**Willingness measure.** Embedded in the Posttreatment Questionnaire and Follow-up Questionnaire, was an item that asked about how willing participants were to let a spider crawl in their hair (0 = not at all willing to 10 = extremely willing). As had been predicted and can be seen in Table 18, ACT participants indicated significantly higher levels of willingness at both posttreatment, \( U = 3, p = .03 \), one-tailed, and follow-up, \( U = 0, p \leq .01 \), one-tailed. The willingness of all ACT participants to have a spider crawl in their hair continued to increase from posttreatment to follow-up to a level that fell just short of attaining statistical significance, \( z = 1.90, p = .06 \). By contrast, in the CBT condition, participant levels of willingness at follow-up either stayed the same as posttreatment levels (P1, P2, & P3) or decreased (P7 & P9), \( z = 1.41, p = .20 \).

Table 19 reports correlations between willingness ratings and various outcome measures. There were two significant, but unexpected, findings within the ACT condition between posttreatment willingness and how much participants would recommend the treatment to a friend or family member at both posttreatment \( (r = -.94) \) and follow-up \( (r = -1.00) \). These correlations did not differ significantly from CBT at posttreatment \( (r = .30) \), \( z = 1.67, p = .09 \), but did so at
follow-up, $z = 3.21, p \leq .01$. Significant correlations for CBT participants, even if not entirely expected, were at least more readily interpretable. Specifically, willingness at posttreatment was significantly and inversely related to avoidance of spiders reported at that same point in time ($r = -1.00, p = < .01$), with this relationship differing significantly from that noted for ACT participants ($r = .50, p = .50$), $z = 2.65, p < .01$. The same relationship between willingness and spider avoidance for those treated with CBT was also maintained at follow-up ($r = -.91, p = .02$), although the significant difference in the correlations between treatment groups noted at posttreatment was not, $z = 1.53, p = .12$.

**Within Session/Microlevel Process Measures**

Several measures were taken in conjunction with each BAT that was administered over the course of the project, beginning during the baseline phase and continuing until the completion of the follow-up assessment. In addition to approach towards the spider, these measures included blood pressure/pulse rate recordings and subjective levels of fear (SUDS-F) and disgust (SUDS-D) rated on scales of 1-10 (see Appendix I). Except for ratings of disgust, each of these measures was obtained immediately before and after each BAT. These BAT-related measures were analyzed at both a molar level to evaluate changes that occurred over the course of the entire project, spanning from baseline through follow-up, as well as at a more molecular level to evaluate potential changes specifically occurring within the treatment phase that might differentially mediate increased approach behavior towards the spider.

Similar findings were anticipated for the three measures of autonomic arousal as well as two ratings of subjective distress. Specifically, at a molar level, it was generally expected that there would be no differences in levels of these variables between treatment conditions during
baseline, but that CBT participants would show greater reductions in all five of these measures during the treatment phase as well as during the posttreatment and follow-up administrations of the BAT. At a more fine-grained and molecular level of analysis, it was anticipated that greater synchrony between changes in arousal and distress (especially subjective fear), on the one hand, and approach behavior towards the spider, on the other, would be displayed by those treated with CBT. In particular, given its emphasis on anxiety management and reduction, in contrast to ACT’s focus on acceptance and defusion, it was expected that within-session analyses during the CBT treatment phase would provide evidence of a related mediational process. Stated somewhat differently, it was anticipated that CBT would not only result in greater decrements in autonomic arousal and in subjective levels of both fear and disgust compared to ACT, but that such reductions would precede correlated increases in approach behavior towards the spider.

**Molar analyses.** Because participants were administered varying numbers of BATs during both baseline and treatment, mean levels of autonomic arousal and subjective fear at both pre and postBAT were first calculated for each participant separately for both phases. For example, the preBAT baseline SUDS-F mean of 3.00 reported in Table 20 for CBT participants was calculated by first ascertaining for each participant the average SUDS-F rating made prior to each BAT administered to them during baseline. These individual participant means were then added together and divided by the number of participants (5) to yield the group mean of 3.00. The posttreatment and follow-up data reported in Table 20 are from the administration of single BATs at these two assessment occasions.

To simplify subsequent analyses, the possibility of collapsing across pre and postBAT data at each of the four phases (i.e., baseline, treatment, posttreatment, and follow-up) was considered. To the extent that preBAT levels of autonomic arousal and SUDS-F scores reflect
anticipatory fear prior to exposure to the spider, whereas postBAT levels may provide an index of contact fear after such exposure, it was generally expected that postBAT levels of these measures would be significantly higher than those obtained preBAT. A series of Wilcoxon tests collapsing across treatment conditions at each of the four phases found this to be the case for all comparisons except for systolic blood pressure at posttreatment and diastolic blood pressure during the treatment phase and at follow-up. For this reason and for ease of comparison, all three measures of autonomic arousal and SUDS-F ratings reported in Table 20 subsequently were analyzed separately by pre versus postBAT. Because subjective ratings of disgust were only obtained following the completion of each BAT, SUDS-D data across the four phases are presented separately in Table 21.

As expected, a series of Mann-Whitney tests revealed no significant differences between treatment groups during the baseline phase in their levels of disgust as well as in both pre and postBAT systolic blood pressure and ratings of subjective fear. The only treatment condition differences during baseline were unanticipated higher levels of preBAT diastolic blood pressure, $U = 2, p = .05$, and postBAT pulse rates, $U = 2, p = .05$, for CBT participants. Some thought was given to conducting analyses of baseline-to-treatment phase change scores, but given that significant baseline differences only occurred for two of nine variables, direct treatment comparisons were instead undertaken at each of three remaining phases.

**Autonomic arousal.** Generally speaking, greater differential change occurred in the subjective distress ratings than in the three measures of autonomic arousal. The only difference noted between groups among the treatment phase data was in higher preBAT pulse rates for CBT, $U = 1, p = .03$, even though this variable did not change significantly from its baseline levels for either group. As seen in Table 20, pulse rate and blood pressure levels remained
statistically unchanged in moving from the treatment phase to posttreatment, yielding no
treatment condition differences at posttreatment. This same stable pattern and absence of
treatment differences repeated itself in also moving from posttreatment to follow-up.

Subjective distress. Mann-Whitney tests revealed no significant differences between
treatment conditions during the baseline phase in levels of subjective fear assessed at either pre ,
\( U = 4.5, p = .17 \), or postBAT, \( U = 10, p = 1.0 \). While the equivalence in preBAT or anticipatory fear was maintained throughout the treatment phase, a significant difference emerged between CBT and ACT for postBAT levels of contact fear, \( U = 2, p = .05 \). Consistent with expectations and as can be seen in the bottom graph of Figure 11, this occurred as a result of CBT participants reporting a significant reduction in their levels of fear following exposure as they moved from the baseline through treatment phases, \( z = 2.02, p = .04 \), presumably as a function of implementing their newly acquired anxiety reduction and management skills. By contrast, as apparent in the top graph of Figure 11, preBAT ratings of anticipatory fear remained unchanged over this same period of time for both conditions; CBT, \( z = 1.62, p = .10 \), and ACT, \( z = .53, p = .59 \); as well as for postBAT levels of contact fear reported by ACT participants, \( z = .36, p = .71 \). CBT participants continued to decrease their levels of postBAT fear from the treatment phase to posttreatment, \( z = 2.02, p = .04 \). No further changes in subjective fear occurred between the end of the treatment phase and the administration of posttreatment and follow-up BATs for either treatment group.

Another lens through which to view the differential reductions in anticipatory and contact fear just discussed is through an analysis of SUDS-F change scores. PreBAT fear ratings were subtracted from those obtained postBAT in examining any treatment condition differences across the four phases. These data are presented in Figure 12. As can be seen, there was no expected
difference between CBT and ACT in pre to post changes in subjective fear during BATs administered during baseline, \( U = 14, p = .14 \). As predicted, the change scores for CBT participants decreased, but to a nonsignificant degree, in moving from the baseline through treatment phase, \( z = 1.21, p = .22 \). By contrast, change scores over this same span for those treated with ACT slightly increased, \( z = .36, p = .71 \), but resulted in no significant difference between treatment groups in their treatment phase change scores, \( U = 8.5, p = .71 \). Change scores for ACT participants essentially remained stable during BATs administered as part of the posttreatment, \( z = .81, p = .41 \), and follow-up evaluations, \( z = .18, p = .85 \). By contrast and as expected, those treated with CBT reported a significant reduction from the treatment phase to posttreatment in the difference between levels of anticipatory and contact fear experienced during BATs, \( z = 1.75, p = .04 \), one-tailed. The follow-up assessment, however, revealed no further reductions in subjective fear for CBT participants, but instead a slight, but insignificant increase, \( z = .81, p = .41 \).

SUDS-D data for treatment groups across the four different phases of the study are presented in Figure 13. As expected, they were statistically equivalent to each other during the baseline phase, \( U = 5, p = .21 \). As seen in Figure 13, from that point through the follow-up assessment, the overall pattern of reduced levels of disgust for each condition appears to mirror each other. However, even though no differences were detected between the two groups during the treatment phase, \( U = 4, p = .14 \), and at posttreatment, \( U = 6, p = .31 \), or follow-up, \( U = 6, p = .31 \), the overall decreasing trend in SUDS-D scores from the baseline phase through follow-up seen in Figure 13 was statistically significant for CBT, \( \chi^2_r(3) = 8.41, p = .03 \), but not for ACT, \( \chi^2_r(3) = 2.51, p = .47 \). Post hoc analyses indicated that this significant trend for CBT was accounted for by a significant reduction in SUDS-D scores from the treatment phase to
posttreatment, $z = 1.82, p = .03$, one-tailed, thereby providing at least partial support for the a priori hypothesis that greater reductions in disgust as well as fear would be reported by participants within this treatment condition.

**Molecular analyses.** The more molar analyses of BAT-related measures provided at least some support for the expectation that the therapeutic mechanisms of changes differed between CBT and ACT. These findings, however, did not provide the more fine-grained within session analyses necessary to uncover the possible mediational processes behind such differential therapeutic mechanisms. Establishing the proper temporal relationship between mediating and mediated variables is being increasingly recognized as a requirement in mediational analyses (e.g., Kazdin, 2007). For this reason, separate sets of lagged correlation coefficients were computed across the baseline and treatment phases for each treatment condition as presented respectively within the top and bottom halves of Table 22. In doing so, postBAT levels of potential mediating variables (i.e., measures of autonomic arousal and ratings of subjective distress) at time 1 were correlated with approach behavior during the next BAT at time 2.

As expected and as can be seen within the top portion of Table 22, there were no treatment condition differences during the baseline phase in these time lagged correlations, despite statistically significant relationships between approach behavior and both diastolic blood pressure ($r = .61, p < .01$) and levels of disgust ($r = -.78, p < .01$) for participants assigned to CBT. Differential changes in the time lagged baseline correlations were expected to occur during the treatment phase in a manner consistent with differing therapeutic mechanisms of change presumably instigated by CBT versus ACT. More specifically, it was expected that reductions in levels of autonomic arousal and subjective distress would mediate and precede increased approach behavior to a greater degree for participants treated with CBT. Accordingly, it was
expected that the baseline lagged correlations would significantly move in a more negative
direction for CBT participants, reflecting a strong inverse relationship between autonomic
arousal and distress at time 1 and approach behavior at time 2. No similar directional change in
baseline phase correlations was predicted for ACT participants.

As can be seen in the bottom portion of Table 22, the general shift in lagged correlations
expected during the treatment phase for CBT occurred for three of the four potential mediating
variables. While none of the treatment phase correlations were statistically significant, the
anticipated movement towards an inverse relationship between autonomic arousal as well as
distress and approach behavior was significant for diastolic blood pressure, $z = 1.70, p = .04$,
one-tailed; pulse rate, $z = 1.66, p = .05$, one-tailed; and levels of subjective fear, $z = 1.77, p =
.03$, one-tailed. As expected, increased movement towards the spider during CBT was preceded
by reductions in autonomic arousal (as assessed by diastolic blood pressure and pulse rate) and
self-reported fear. Unanticipated was the change that occurred from baseline to treatment in the
lagged correlation between disgust and approach behavior for CBT participants. Given the
significant inverse relationship ($r = -.78$) between SUDS-D scores and approach behavior during
baseline, a “ceiling effect” prohibited appreciable movement in an even more negative direction
during treatment. Accordingly, the most logical and reasonable expectation was that the lagged
correlation between disgust and approach behavior would remain unchanged during treatment.
Instead, as seen in Table 22, the correlation during CBT ($r = -.11$) moved significantly in a
positive direction, $z = 2.08, p = .03$.

As shown in Table 22, time lagged correlations for ACT participants showed a slightly
different picture that was at least partially consistent with expectations. The same three potential
mediating variables that changed in the predicted negative direction for CBT (i.e., diastolic blood
pressure, pulse rate, and SUDS-F) also moved in this same direction for those treated with ACT, but not to a significant degree for the two autonomic arousal measures. The findings for these two variables are generally consistent with what had been anticipated, and at the very least do not violate what had been expected. The same, however, cannot be said for the relationship between SUDS-F and approach behavior during ACT. As indicated in Table 22, the moderately positive lagged correlation between these two variables during the baseline phase ($r = .44$) was significantly transformed, $z = 2.68, p < .01$, into a significant inverse one ($r = -.68, p = .02$) that was comparable to that obtained for CBT ($r = -.58$), suggesting that reduced subjective fear functioned as a common mediator for both treatment conditions.

Summary

The major findings presented within this chapter are summarized in Table 23. The analyses of outcome measures found that CBT and ACT did not differ from each other in affecting statistically and clinically significant reductions in arachnophobia, and that experiential avoidance, as assessed by the AAQ-II, did not differentially moderate therapeutic outcome. Contrary to expectations, participants lower in experiential avoidance generally responded more favorably to both interventions. An examination of putative process measures at a molar level of analysis indicated that reductions in disgust and increases in willingness were more closely associated with ACT than CBT, while a more fine-grained analysis of within session data during the treatment phase suggested that reductions in autonomic arousal in the form of diastolic blood pressure and pulse rate served as mediators for increased approach behavior for CBT alone, with reductions in subjective fear apparently mediating improvement within both treatment conditions.
CHAPTER 5
DISCUSSION

The primary purpose of this study was to advance our understanding of exposure as a key therapeutic process in treating arachnophobia. To do so, the possible distinct mechanisms of action that exposure instigates in CBT and ACT in treating arachnophobia were examined at a fine-grained, idiographic level using a single-subject design. Any efforts to clearly identify differential therapeutic processes and related mechanisms of action are, of necessity, compromised by any ambiguity in attributing clinical improvement to the interventions being investigated. A particular strength of this study was its inclusion of a single-subject design element that made it possible to not only verify treatment success at the level of individual participants, but also that such outcomes could be attributed to the intervention, rather than to the mere passage of time or extratherapeutic variables (Hayes, Nelson, & Jarrett, 1986).

Analyses of Therapeutic Outcome

The comparative outcome question of the relative efficacy of CBT versus ACT in treatment of arachnophobia was of largely secondary importance in this study, but of considerable relevance in providing a broader context within which to meaningfully address questions about therapeutic process and mechanisms of action, as well as those involving possible moderating variables. Based on previous research (Block & Wulfert, 2000; Forman et al., 2007), it was generally expected that CBT and ACT would yield comparable outcomes in reducing self-reported levels of arachnophobia and in increasing approach behavior towards the spider. As predicted, the interventions resulted in equivalent statistically and clinically significant improvements that were maintained through posttreatment and follow-up. Moreover,
the inclusion of the multiple-baseline across participants design suggests that successfully approaching the spider as well as therapeutic changes in other outcome measures could be attributed to the introduction of the two treatments. In short, there were clear and specific treatment effects around which both related moderating and mediating analyses could be meaningfully undertaken with considerable confidence.

**Analyses of Moderation**

While the overall outcome findings indicating that the two interventions were equally efficacious in addressing arachnophobia were expected, other related results for variables that functioned as potential moderators of therapeutic outcome were not entirely as anticipated.

**AAQ-II.** Based on recent findings of an analogue study by Blacker et al. (2012), lower levels of experiential avoidance, as assessed by the AAQ-II, were expected to be associated with greater responsivity to ACT than to CBT. Instead, lower levels of pretreatment experiential avoidance generally were associated with better treatment outcomes for both interventions. As seen in Table 10, within the CBT condition, reductions in self-reported spider phobia from pretreatment to posttreatment were significantly correlated with pretreatment levels of experiential avoidance. Participants with lower levels of experiential avoidance reported greater improvement in arachnophobia. Within the ACT condition, participants with lower pretreatment levels of experiential avoidance indicated greater reductions in avoidant behavior at follow-up.

It should be noted that the AAQ-II did not moderate responsivity on the majority of the outcome measures and the two significant findings just highlighted involved two different indicators of therapeutic improvement. However, while the overall moderating effects for experiential avoidance are thus not very robust, the aggregate findings do seem worthy of further
discussion within the context of a broader body of related research. To date, the possible
moderating role of experiential avoidance has been examined in over two dozen analogue studies
as well as in a more modest number of clinical trials (Herbert, Yadavaia, & Forman, 2009). In
general, analogue investigations like that of Blacker et al. (2009) that compared a brief
acceptance- versus control-based protocol in increasing experimentally-induced pain tolerance
have reported treatment-specific moderating effects for experiential avoidance. In particular, the
aggregate analogue findings that were the basis for the AAQ-II results expected in this study
support a type of “coping-congruency” model in which less experientially avoidant participants
typically respond more favorably to acceptance-based protocols that in effect “match” or
complement their pre-existing coping styles (Herbert et al., 2009). By contrast within the more
limited number of clinical samples that have been examined, lower levels of experiential
avoidance, much like the findings of this study, have been associated with better therapeutic
outcomes irrespective of type of treatment (Herbert et al., 2009).

While knowing the pretreatment levels of experiential avoidance of psychotherapy clients
appears to have some prognostic value, it thus far, unfortunately, has demonstrated limited
treatment utility (Hayes, Nelson, & Jarrett, 1987) in facilitating the design and selection of
therapeutic options that are maximally responsive to their psychological needs. Future research
should be helpful in addressing two issues related to treatment utility of the AAQ-II. First, more
clinical trials across a wider array of populations and presenting problems in which experiential
avoidance is examined as a possible moderating variable are necessary to further substantiate the
somewhat tentative predictive relationship between pretreatment AAQ-II scores and therapeutic
responsivity. If such research indeed does support the current moderating role of experiential
avoidance, how to adjust existing therapeutic approaches and/or develop new ones to provide
more efficacious services to highly avoidant clients would emerge as a second major focus of further study. For example, evaluating an enhanced version of “ACT-as-usual” that provides more extensive focus on strengthening acceptance and related processes, such as defusion and mindfulness with such clients, would seem to be in order.

**Courage measure.** Because courage was expected to be inversely correlated with experiential avoidance, findings parallel to those expected for the AAQ-II were also anticipated for the CM measure; i.e., that participants reporting higher levels of courage at pretreatment would show a more favorable response to ACT than CBT. An unexpected moderately positive pretreatment correlation between the AAQ-II and CM \(r = .46, p = .21\) may in part explain why these expected results were not obtained. Rather than functioning as a moderator, CM scores increased significantly, but equivalently, for both interventions from pretreatment through follow-up. Given that CM is a newly-developed measure that has not been used as extensively as the AAQ-II with clinical samples, any findings involving it must be interpreted in an even more guarded fashion.

One possibility is that the finding of increased courage scores over time simply represents a regression to the mean effect. Not surprisingly, pretreatment CM scores for participants in this study \((M = 40.55, SD = 12.40)\) were significant lower, \(t(38) = 1.86, p = .04\), one-tailed, than that of Norton and Weiss’s (2009) normative sample of undergraduate college students \((M = 44.57, SD = 11.10)\). It’s possible that CM scores would have risen significantly over the mere passage of time even in the absence of any treatment, an interpretation that is supported by the general absence of any mediating effect for increased courage. Further research on the test-retest reliability of the CM with clinical samples would be helpful in more thoroughly evaluating this interpretation.
A second interpretation of the CM findings that is not necessarily incompatible with the first is that courage scores increased to an equivalent degree for both treatments insofar as each represents a cognitive-behavioral approach as defined more broadly. Perhaps any related intervention that directly addresses fear (in this case, of spiders), such as a modeling-based therapy, would show a similar impact on increased CM scores, whereas alternative approaches that fail to do so, such as insight-oriented psychotherapy, would not. Additional research in which changes in courage scores are tracked over the course of a wider array of therapeutic approaches could help further investigate this possibility.

**Analyses of Macrolevel Processes**

Four measures that were expected to reflect differential therapeutic processes initiated by CBT and ACT were assessed at multiple occasions throughout the course of the study. Three of them - SBQ, DS-R, and the Stroop Task – were administered at pretreatment, posttreatment, and follow-up, while willingness was assessed only at the last two measurement occasions. Strong directional hypotheses were formulated for the two scores derived from the SBQ and the willingness measure. Specifically, because of its emphasis on cognitive restructuring and related supportive findings (Öst, 1989), CBT was expected to yield relatively greater reductions in both anxiety-related beliefs about spiders (SBQI) and one’s ability to cope with them (SBQII), and that such changes would mediate therapeutic improvement for this intervention. Conversely, based on analogue research showing that an acceptance-based protocol increased the willingness of fearful participants to come into contact with spiders more than a control-based approach (Wagener & Zettle, 2011), it was anticipated that ACT participants would report greater increases in willingness at posttreatment and follow-up than their CBT counterparts, and that this process variable would mediate responsivity to treatment. The overall results provided mixed
support for these two strong directional hypotheses. In particular, while willingness as a putative process variable functioned somewhat as expected, the two SBQ measures did not.

**Willingness.** As anticipated, ACT participants reported significantly greater willingness to have a spider crawl in their hair at posttreatment and follow-up than those treated with CBT. One possible reason for these findings could be demand characteristics, an interpretation supported by the absence of any predicted mediational relationship between willingness and any of the outcome measures, particularly for those receiving ACT. While “willingness” was only explicitly mentioned once in the ACT protocol in presenting an “out-of-breath” exercise (see Appendix U), the possibility that doing so unduly influenced how participants responded to the question of having a spider crawl in their hair cannot be completely ruled out. One way of minimizing this concern in future research would be to increase the “demand” placed upon participants by using a behavioral rather than self-report measure of willingness. For example, an actual spider could be presented and participants asked if they would be willing to have it be placed in their hair, as Öst (1989) has done in some of his research.

Consistent with other research with both clinical (Levitt et al., 2004) and nonclinical samples (Eifert & Heffner, 2003; Wagener & Zettle, 2011), willingness was not assessed at pretreatment. In retrospect, this was an unfortunate oversight as it prevented an establishment of equivalence in willingness between the two groups prior to treatment and a determination of possible differential changes in this process variable as a function of treatment. Regardless of whether willingness is assessed behaviorally or by self-report, a pretreatment evaluation of it would be a useful addition to future related research.

**SBQ.** The overall findings concerning willingness provide at least some support for the hypothesis that CBT and ACT are associated with different and conceptually-consistent change
processes. The same cannot be said about changes in beliefs about spiders and one’s ability to cope with them. As expected, CBT participants showed significant reductions in both SBQ measures. However, contrary to our strong directional hypothesis, equivalent improvement was also noted for those treated by ACT, even though the process of change differed somewhat from CBT. In particular as seen in Figure 8 and Figure 9, significant reductions in beliefs for CBT participants occurred from pre to posttreatment with no further improvement evident through the 2 months of follow-up. By contrast, ACT showed a more steady decline in spider-related beliefs from pretreatment through follow-up. Perhaps more importantly, although aggregate change for both conditions was comparable to that reported by Muris et al. (1998) in their treatment of arachnophobia with CBT, reductions in both SBQI and SBQII scores were not correlated in a consistent or meaningful way with any of the outcome measures for either CBT or ACT. Taken together, these two sets of findings suggest that it is more useful to regard the two SBQ scores as further indices, or at least markers, of therapeutic outcome, a view consistent with that of Muris et al., rather than as process variables. As a consequence, alternative process measures that do a better job of capturing the presumed impact of cognitive restructuring may need to be developed.

In contrast to willingness and the SBQ, weaker directional hypotheses were formulated about possible treatment-specific changes and relationships with outcome variables involving the DS-R and Stroop task as macrolevel process measures. The overall expectation that any changes that did emerge on these measures would be greater for CBT than ACT was not met for either.

**DS-R.** Previous research has reported a correlation between reductions in spider-related disgust and increased approach towards a spider among arachnophobics treated with CBT (Huijding & de Jong, 2007). Accordingly, it was generally expected that greater reductions in DS-R scores would occur for CBT than ACT and that such changes would be more highly
correlated with the number of modules required to meet the criterion for treatment termination and other measures of therapeutic outcome for CBT than ACT. Instead, greater reductions in disgust sensitivity were found for ACT rather than CBT, with pre to posttreatment change scores significantly correlated ($r = .95$) with number of modules required to meet termination of treatment. Because pretreatment DS-R scores for ACT participants were not significantly correlated with the number of treatment modules ($r = .63, p = .36$), it appears that the more “doses” of ACT they received, the more their levels of sensitivity to disgust diminished.

It is unclear how to account for this apparent anomalous “dose-response curve” for ACT. One clue emerges from comparing DS-R data from this study with the college student sample that Olatunji, Haidt et al. (2008) used in developing the measure. Not surprisingly, pretreatment DS-R scores for ACT participants ($M = .70, SD = .10$) were significantly higher, $t(91) = 2.37, p = .01$, than this sample ($M = .46, SD = .20$), while those treated with CBT ($M = .51, SD = .16$) were not $t(92) = .54, p = .58$. As a consequence, the overall findings on the DS-R appear to be more attributable to a floor effect with the CBT group than a possible regression-to-the-mean effect for those who received ACT. Pretreatment DS-R scores for ACT participants were elevated sufficiently to be impacted by the treatment they received, whereas those for their CBT counterparts were not. Accordingly, whether CBT might reduce disgust sensitivity to levels equivalent to that obtained for the ACT group in this study and show a similar dose-response curve awaits further research with samples reporting pretreatment DS-R scores more clearly within the clinical range.

The Stroop Task. Clearly the most unexpected set of findings among the macrolevel process measures emerged on the Stroop task. Based on previous work showing a significant reduction in response times to spider-related words by arachnophobics successfully treated with
CBT (Lavy et al., 1993; van den Hout et al., 1997), it was anticipated that CBT participants in this study would show similar changes. The well-established and documented “regular” Stroop effect was obtained as expected for participants in both conditions as they displayed significantly faster response times for neutral words (e.g., the word “ash” printed in blue) than for incompatible words (e.g., the word “red” printed in blue) while controlling for error rates.

Completely unanticipated, however, was the failure to obtain a “spider-specific”/emotional Stroop effect for either group. Beginning at pretreatment, both sets of participants displayed correct response times for spider-related words (e.g., the word “web” printed in blue) that were comparable to those for neutral words, yet significantly shorter than those for incompatible words. Due to apparent practice effects, these relative differences were maintained through posttreatment and follow-up. It should be noted that the results are for correct responses only and consequently cannot be attributed to differential error rates across the three word conditions. Nor can the findings be readily explained by the particular words that were used, as five of the spider-related words matched those presented by Lavy et al. (1993).

The overall findings are also apparently not due to anomalous data for spider-related words as response times for this condition did not significantly differ from similar data reported by Olatunji, Sawchuk, Lee, Lohr, and Tolin (2008) for an arachnophobic sample, \( t(22) = .16, p = .87 \). Olatunji, Sawchuk et al. also included neutral words with their Stroop task administration, but a negative word condition (e.g., “lonely”) was used instead of an incompatible one. Unlike the findings from this study, these researchers obtained an expected significant main effect for word condition with the longest response times occurring for spider-related words and the shortest for neutral ones. These more “Stroop-consistent” findings, coupled with the equivalence in response time data for spider-related words between the two studies, suggests that the failure
to obtain a similar effect in this project may have resulted more from unusually long response times for both the neutral and incompatible conditions than atypically rapid responding to spider-related words. Although neutral condition response times of this study were not significantly greater than those of Olatunji and his colleagues, $t(22) = 1.41$, $p = .17$, this comparison yielded an appreciably larger effect size ($d = .60$) than that for spider-related words ($d = .06$), thereby lending some empirical support for the aforementioned interpretation. Another possible explanation may lie in differences in specific words used in the two neutral conditions. Olatunji, Sawchuk et al. did not match neutral words to spider-related words on frequency of use, citing research suggesting that doing so is unnecessary (Mogg & Marden, 1990), while neutral and spider-related words in this study were matched for both frequency of use and length.

Of greater relative importance than accounting for why expected Stroop effects were not obtained in this study, yet have by many but not all other investigators (e.g., Merckelbach, Kenemans, Dijkstra, & Schouten, 1993; Wenzel & Holt, 1999), is the necessity of establishing a reliable protocol and procedure for producing expected response time differences across word conditions among spider-phobic participants at pretreatment. Developing such a more “proven” Stroop task methodology would at least provide the opportunity to more usefully gauge the relative impact that differing therapeutic approaches may have in reducing an attentional bias for spider-related stimuli. One possibility is to select stimuli for inclusion in a spider-related condition that are more threatening to arachnophobic clients. The words used in this project were compiled by asking a group of undergraduates to nominate words that they associated with “spider.” In retrospect, it appears that it may have been preferable instead to solicit words, such as the names of different types of spiders (e.g., “tarantula” or “black widow”), from those who reported high levels of spider fear, if not clinical arachnophobia, to ensure the stimuli were
sufficiently anxiety-inducing. Another possibility perhaps worthy of further exploratory research may be to develop a Stroop task protocol that uses pictures rather than words, although initial efforts in this area have been fairly disappointing. Although Kindt and Brosschat (1997) reported that an arachnophobic sample found pictures of spiders to be more anxiety-eliciting than spider-related words, they noted no differences in response times between them, and other researchers found no difference in how rapidly arachnophobic participants correctly identified pictures of spiders versus neutral objects (Kolassa, Musial, Mohr, Trippe, & Miltner, 2005).

**Analyses of Microlevel Processes**

The three measures of autonomic arousal (i.e., systolic and diastolic blood pressure plus pulse rate) and subjective ratings of fear (SUDS-F) and (SUDS-D) obtained with each BAT administration were analyzed at both molar and molecular levels. Previous research has documented reductions in both autonomic arousal (Hellström & Öst, 1995; Kamphuis & Telch, 2000; Olatunji et al., 2009; Öst et al., 1991) and levels of subjective distress (Zlomke & Davis III, 2008) associated with improvement in treatment of phobias with CBT. Accordingly, relatively greater changes in all five microlevel process measures were anticipated to occur over the course of this project for those treated with CBT than ACT. These expected molar level findings were at least partially realized for the two subjective ratings, but not for the three measures of autonomic arousal.

**Autonomic arousal.** In general, blood pressure and pulse rate levels did not change to a significant degree from pretreatment through follow-up for either treatment. A possible floor effect cannot account for these findings as pretreatment levels of blood pressure were equivalent to that of other arachnophobic samples (Öst et al., 1991) and pulse rate was significantly higher, t(24) = 2.38, p = .02. Rather, the lack of any significant molar level findings for the three
physiological measures appears to be most parsimoniously attributed individually or collectively to two possible factors. One possibility is simply that both interventions in this study were equally ineffectacious in reducing autonomic arousal. This is not unprecedented as others have also failed to obtain similar findings in treating anxiety disorders with CBT (e.g., Petterson & Cesare, 1996).

The other possible explanatory factor is that the specific physiological variables examined in this study (systolic and diastolic blood pressure as well as pulse rate) were measured in an insensitive manner. This may have occurred because the wrist monitor used to collect these measures may have been insufficiently precise. This device was relatively “low tech” and a more sophisticated system may have yielded more sensitive measures of the three physiological variables. Alternatively, these specific variables may have not been sufficiently sensitive to reflect treatment effects not because of the specific device used in collecting them, but because of the specific autonomic responses that were monitored. For example, skin conductance response in retrospect may have been a better choice, particularly given recent research reporting significant reductions in this measure of emotional arousal among spider-fearful participants following a very brief course of exposure therapy (Kircanski, Lieberman, & Craske, 2012). In short, autonomic responding can occur in multiple ways that, in turn, can be measured with varying devices, and at this stage of clinical psychophysiology, further research appears to be necessary in developing a more uniform protocol for the collection of sufficiently sensitive physiological process variables (Larkin, 2006).

Despite the overall lack of findings at a molar level for reductions in autonomic arousal, a more molecular level of analysis provided at least some supportive evidence that changes in physiological arousal mediated increased approach behavior in a predictable fashion.
Specifically, because it incorporated relaxation training within its modules, it was expected that reductions in levels of autonomic arousal would mediate and precede approach behavior towards the spider for CBT participants only. Such a significant anticipated shift in lagged correlations between two of the autonomic measures (i.e., diastolic blood pressure and pulse rate) and approaching the spider in moving from the baseline to treatment phases occurred for the CBT condition. These same correlations also shifted in the same direction for those treated with ACT, but not to a significant degree.

While these overall findings are thus supportive of the hypothesis that CBT and ACT operate through different and theoretically-consistent mechanisms of change, they must also be viewed cautiously and tentatively given the small number of data points (i.e., 11-16) on which they are based. This was a consequence of analyzing lagged correlations across a small number of participants in both conditions who required a modest number of modules (i.e., 4-6) before reaching the criterion for treatment termination. This shortcoming might be addressed in several different ways in conducting subsequent research necessary to substantiate the suggestive mediational findings of this study. One, more participants could be recruited and even added to the data set from this study, provided the single-subject design component required to permit a fine-grained, temporal analysis of changes in autonomic arousal and approach behavior is retained. Another option perhaps worthy of exploration would be to shorten the length of the modules so that more BATs would likely be administered (and more data points thereby collected) prior to meeting the criterion for treatment termination. A possible third option would be to make the criterion for treatment termination more stringent (e.g., touching the spider for a set length of time) that would also presumably result in the administration of more BATs.
Subjective distress. Subjective ratings of fear and disgust were analyzed at both molar and molecular levels, similar to the autonomic arousal measures. Based on CBT’s ability to induce correlated changes in subjective distress and therapeutic outcomes (Zlomke & Davis III, 2008), it was expected that participants receiving CBT would report greater reductions in levels of both fear and disgust than their ACT counterparts. Because of previous research suggesting that fear is the predominate emotional state that is both elicited and reduced during exposure unless disgust is primed (Olatunji et al. 2009) it was also anticipated that more definitive findings would emerge for SUDS-F than SUDS-D data. Molar level analyses of subjective distress supported both of these expectations. While neither group of participants showed significant reductions in anticipatory (preBAT) fear over the course of this project, only those receiving CBT reported significant reductions in both contact (postBAT) fear (from baseline to posttreatment) and disgust (from baseline through follow-up), with the changes in SUDS-F ratings being more pronounced than those for SUDS-D.

Presumably these findings reflect the impact of the relaxation and cognitive restructuring skills that CBT participants reported using during BATs (see Table 6). By contrast, the mindfulness, acceptance, and defusion exercises and techniques that ACT participants applied did not have a similar impact in reducing molar levels of subjective fear and disgust, despite equivalent therapeutic outcomes between the two groups. Of relatively greater relevance is not that ACT failed to move these subjective process variables, but that CBT did. Because reductions in both fear and disgust were expected for CBT due its overall emphasis in minimizing levels of emotional distress, a failure to find such results would have raised serious questions about the processes through which it effects therapeutic change. By contrast, while similar reductions were not expected for ACT, such findings (had they emerged), would not
necessarily have invalidated the model upon which it is based. In short, the therapeutic model of CBT essentially requires that the molar results that emerged occur for it to be supported, while the model upon which ACT is based does not prohibit them. As a consequence, the molar analyses of distress process measures provide empirical support for the distinction between the two therapeutic models and the differential roles that exposure may play within each.

These differential treatment effects that occurred at a molar level in subjective fear and disgust, however, were not that tightly associated with corresponding mediational effects when correlated changes in distress and approach behavior were examined at a molecular level of analysis. A series of lagged correlations indicated that as levels of contact (postBAT) fear were reduced during treatment, approach behavior increased for both interventions, suggesting a general rather treatment-specific mediational effect. This finding was expected for CBT and lends further support for the model upon which it is based.

While the results pertaining to ACT were not fully anticipated, such findings, as already discussed, are not necessarily incompatible with the model of therapeutic change upon which ACT is based. The fact that SUDS-F scores changed significantly from baseline to treatment for CBT alone, however, suggests that these apparent mediational findings for ACT require a different interpretation than those offered for CBT. Unlike CBT, ACT did not change levels of contact fear, but like CBT, ACT was still able to transform the relationship between it and approaching the spider. Presumably ACT did so through the application of mindfulness and acceptance skills that participants reported using during exposure, although such an interpretation obviously requires additional empirical support. Ideally, it would be necessary to also track increases in mindfulness, acceptance, and defusion across multiple BATs to more fully unpack this possibility. By doing so, it might be possible to determine if expected changes in
these processes themselves preceded and mediated the transformed relationship that apparently occurred between contact fear and approach behavior for those treated with ACT. A related challenge that would have to be solved would be the development of quickly administered measures of mindfulness and acceptance that do not unduly tax participants when added on to all of the other data being collected at each BAT.

The analyses of lagged correlations for disgust further underscore the differential roles that disgust and fear play with exposure. As expected, the relationship between levels of disgust and movement towards the spider was not changed in moving from baseline through treatment for ACT participants. Despite significant reduction in SUDS-D scores from baseline through follow-up for those treated with CBT, what little movement occurred during treatment in the relationship between disgust and approach behavior was in the unexpected direction. This finding may in part be attributable to a significant inverse relationship between the two variables at baseline (r = -.78). It was thus impossible due to such a “ceiling effect” for the correlation to become appreciably more negative which would have suggested that reductions in disgust preceded and mediated increased approach behavior. However, instead of staying where it was during baseline, the lagged correlation between these two variables moved significantly in a positive direction during treatment. This finding suggests that reduced contact fear mediated therapeutic improvement within CBT, while disgust in effect went along for the ride in a way that transformed the relationship it had with approach behavior during the BATs of baseline. The overall molecular analyses of the subjective distress data seem to further reflect the limited impact that disgust reduction has during exposure, relative to fear, unless it is primed (Olatunji et al., 2009).

Study Limitations
A number of limitations of this study have already been recognized and discussed. Somewhat ironically, this study’s greatest limitation is closely related to its greatest strength. Single-subject designs like that used in this project enjoy high levels of internal validity as therapeutic outcome can be unambiguously attributed to the intervention being evaluated. However, as their name implies, such designs, as was the case in this study, typically intensively track changes over time in the behavior of a relatively, small number of participants. Such a small sample size ($N = 9$) carries with it two inherent limitations. Perhaps the most obvious involves restrictions on external validity in being able to generalize the study’s findings to other clinical populations.

The participants in this study potentially differed from those who typically seek treatment for arachnophobia, in particular, and for specific phobias, more generally, in at least two important respects. First, all of the participants were students recruited within a university setting and as such may have been both significantly younger as well as more educated than most other researched samples, even if equivalent to them in their pretreatment levels of arachnophobia. For example, the mean age of participants ($M = 22$) was significantly lower than the predominantly community samples typically studied by Öst and his colleagues ($M = 29.5$, Öst, Ferebee, & Furmark, 1997; $M = 31.5$, Öst et al., 1991), although it is unclear whether such differences are of any consequence. Technically this is an empirical question that could be answered by further research, but justifiably merits rather low priority given the many more pertinent and clinically-relevant matters that await.

The second important respect in which the participants in this study may have been unrepresentative of arachnophobic clients involves the manner in which they were recruited. All of them ended up being college students who responded to advertisements about the project
posted around campus and in surrounding neighborhoods, in a local newspaper, and via word of mouth. Such recruited community samples may differ in several unknown and important respects from outpatients who initiate treatment of arachnophobia. This limitation is hardly unique to this particular project and has been one that has been more broadly leveled repeatedly and for some time at randomized clinical trials that recruit community samples (Seligman & Levant, 1998). Fortunately, it is an issue that can be addressed empirically, and increasing evidence suggests that purported differences between community participants and clinical outpatients may not be as great as commonly assumed (Westen, Stirman, & DeRubeis, 2006).

The second limitation inherent within this study due to its small number of participants is weak statistical power. With the exception of an alternating treatments design, single-subject methodologies are limited to making comparisons within rather than between interventions (Barlow & Hersen, 1984). As a consequence, analyses of possible differences in both process and outcome variables between CBT and ACT of necessity were based exclusively on tests of statistical significance. Because of the small number of participants, nonparametric tests were routinely conducted that have limited power relative to their parametric alternatives (Siegel, 1956). The overall power of the analyses to detect treatment-related differences was thus diminished in two respects; that is, by not only the small sample size itself, but also by the use of nonparametric tests. On the plus side, such limited statistical power suggests that any statistically significant findings that were detected represent substantial effect sizes. On the downside, however, because the probability of committing a Type II error is increased with diminished power, the overall findings of this study likely under-report possible differences in CBT versus ACT. Further research with sufficiently large sample sizes that permit parametric analyses would be required to empirically investigate this possibility.
Implications for Further Research

This study sought to address three related questions or issues. Its primary purpose was to examine the potential differing processes and related mechanisms of action through which exposure contributes to the efficacy of CBT and ACT in the treatment of arachnophobia. Because this issue was itself largely predicated on the two approaches being comparable to each other in therapeutic outcome, it was first necessary to establish such equivalency. Analyses of both statistical and clinical significance detected no differences between CBT and ACT, thereby suggesting that any process-related differences between the two could not be a function of one approach being more efficacious than the other. At the time data were being collected for this project, no randomized clinical trials with sufficiently large samples had yet been published comparing the two approaches. Recently, however, exposure-based CBT and ACT were found to produce similar outcomes in over 100 participants treated for mixed anxiety disorders (Arch et al., 2012). Even though only a small percentage of participants (i.e., 4.7%) were diagnosed with specific phobia and this project only included 9 participants, the equivalence in efficacy between CBT and ACT in treatment of anxiety disorders more generally seems to now have been sufficiently established to allow research to shift away from a comparative outcome question to one more concerned with explicating their potentially differing therapeutic processes.

On this primary focus of this study, the overall results provided some tentative, yet intriguing, findings that seem worthy of further investigation. Molecular analyses of autonomic arousal and subjective distress suggested that change in both sets of process variables mediated movement towards the spider in conceptually-consistent ways. More specifically, as expected according to the therapeutic model on which it is based, reductions in diastolic blood pressure, pulse rate, and contact fear both preceded and predicted increased approach behavior for those
treated with CBT. While it seems fairly clear that different mechanisms of change occurred with ACT, it is less clear whether they were as congruent with the model on which it is based.

Further research necessary to explore this question and also substantiate the suggestive mediational findings concerning CBT would apparently need to meet at least three requirements. First, continued use of single-subject designs are of paramount importance, a recommendation also echoed by Craske (2012) in outlining a further research agenda for identifying the key mechanisms of change in exposure in CBT. It is obviously important to conduct studies in which larger samples are treated with both CBT and ACT, but it would be a shortsighted mistake to resort to large group designs in which both outcome and process measures are only assessed at three or four occasions (e.g., pretreatment, posttreatment, and follow-up) in doing so. Meaningful process research can only be undertaken surrounding therapeutic outcomes that can clearly be attributed to the interventions in question and single-subject designs can accomplish this. For example, defusion from anxiety-related beliefs could not be expected to mediate therapeutic change for those treated with ACT if such improvement was instead due to a placebo effect or extratherapeutic variables. With the comparative outcome question of CBT versus ACT now addressed, there can hopefully be a shift away from a nomothetic focus on large-scale randomized controlled trials to a more intensive idiographic focus on time-series process analyses.

The second requirement for further process research, as mentioned previously, is to produce more data points than this study was able to gather in analyzing the possible mechanisms of action of exposure when contextualized within CBT versus ACT. Running more arachnophobic participants through the protocols of this study would accomplish this, but so would shortening the modules, and/or making the criterion for treatment termination more
stringent. The third and final recommended requirement for additional process research, as also alluded to earlier, is to develop sensitive measures of ACT-related variables, such as acceptance, mindfulness, and defusion, that can be administered quickly and repeatedly.

The final and tertiary purpose of this study was to further investigate the relative importance of fear and disgust reduction as mechanisms of change within exposure. As expected from previous research, reductions in subjective levels of contact fear mediated approach behavior towards the spider for CBT participants alone. By contrast, disgust reduction did not serve as a similar mechanism of change for those treated with CBT, despite significant reductions in SUDS-D scores from baseline through follow-up. Whether these different mediational roles played by fear and disgust within exposure-based CBT could be reversed if disgust were primed is an empirical question with both apparent practical and theoretical implications. On a pragmatic level, knowing whether priming disgust involves it in a way that results in greater therapeutic outcome, especially for arachnophobic clients who display a more pronounced disgust versus fear response to spiders, may help inform treatment decisions. From a more conceptual and theoretical perspective, extending disgust priming to ACT might help further substantiate the differing roles that exposure appears to play in ACT versus CBT. There were no strong indications from this study that reductions in either fear or disgust mediated approach behavior towards the spider for those treated with ACT. A finding that disgust, when primed in CBT, functions much like fear did within this study for those who treated with CBT, but that similar results do not extend to ACT, would provide further evidence of the differing processes that exposure apparently activates within each.

Summary and Conclusions
Exposure has been an integral part of behavior therapy for anxiety disorders since its very inception (Jones, 1924). However, it has only been in approximately the last 5 years that a concerted effort has been undertaken to identify the processes and mechanisms of action through which exposure contributes to therapeutic change (Craske, 2012). The overall results of this study suggest that the role that exposure plays in the successful treatment of anxiety disorders may depend in part upon the particular cognitive-behavioral approach within which it is contextualized. A better understanding of the workings of exposure has both theoretical and clinical implications and it is hoped that this project in some small way may have contributed to this endeavor.
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APPENDIX A

Are you Afraid of Spiders?!  

If you are struggling with fear of spiders and would like FREE treatment, You are in luck!

Please contact Alexandra Wagener, M.A., at The University Counseling Center at awagener@ou.edu or (405)-325-3347 for more information!

The University of Oklahoma is an equal opportunity institution.
APPENDIX B

BACKGROUND INFORMATION QUESTIONNAIRE

1. Age ________________________

2. Gender ________________________

3. Ethnicity/Race
   a. American Indian or Alaska Native
   b. Middle Eastern
   c. Asian
   d. Black or African American
   e. Hispanic or Latino
   f. Native Hawaiian or Other Pacific Islander
   g. White

4. Marital Status __________________________

5. Are you currently receiving any type of treatment for anxiety and/or depression including the use of medication?

6. Have you ever been harmed by a spider? If so, please briefly describe.

7. Do you have any known neurological problems? If so, please describe.

8. How long have you been afraid of spiders?

Subject Number:___________
APPENDIX C

ADIS-IV

SPECIFIC PHOBIA:

I. **Initial Inquiry**

For each situation, make separate ratings for level of fear and degree of avoidance using the following scale:

0-------------1-------------2-------------3-------------4-------------5-------------6-------------7-------------8

<table>
<thead>
<tr>
<th>No fear/</th>
<th>Mild/</th>
<th>Moderate/</th>
<th>Severe/</th>
<th>Very Severe/</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never avoids</td>
<td>Rarely</td>
<td>Sometimes</td>
<td>Often</td>
<td>Always</td>
</tr>
</tbody>
</table>

For each situation, inquire for both current and past episodes:

1. Currently, do you fear or feel a need to avoid such things as:

<table>
<thead>
<tr>
<th>Fear</th>
<th>Avoid</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a) Animals
b) Natural Environment
   - Heights
   - Storms
   - Water
c) Blood/injection/injury: self
   - Blood from minor cut
   - Receiving injections
   - Having blood drawn
d) Blood/injection/injury: others
   - Blood from minor cut
   - Receiving injections
   - Having blood drawn
e) Situational
   - Air travel
   - Elevators/small enclosed spaces
   - Driving
f) Other
   - Dental/medical procedures
   - Choking
   - Vomiting
   - Contracting an illness

II. **Current Episodes**
Complete for each specific fear that is potentially of clinical severity:

Now I want to ask you a series of questions about your CURRENT specific fears.

A. Specific fear #1: _________________________________________________________

1. What are you concerned will happen in this situation?
   ____________________________________________________________

2. Do you experience the anxiety nearly every time you encounter__________?
   
   YES____  NO_____  

3. Does the anxiety occur as soon as you enter the situation or are about to enter the situation, or is the anxiety sometimes delayed or unexpected?
   
   IMMEDIATE___
   
   DELAYED___

4a. Are you anxious about this situation because you are afraid that you will have an unexpected panic attack?
   
   YES____  NO_____  

   If yes,

   b. Other than times when you are exposed to ______, have you experienced an unexpected rush of fear/anxiety?
   
   YES____  NO_____  

5. Panic Attack Symptoms

   Do you experience __________ when you encounter____________?

   0-----------1---------2----------3---------4---------5---------6---------7---------8
   No fear      Mild       Moderate     Severe        Very Severe

   a. Palpitations, pounding heart, or accelerate heart rate ___  
   i. Dizziness, unsteady feelings, lightheadedness, or faintness ___

   b. Sweating ___  
   j. Feelings of unreality or

   c. Trembling or shaking ___  
   being detached from oneself ___
d. Shortness of breath or smothering sensations  
   k. Numbing or tingling sensations  
   e. Feeling of choking  
   l. Fear of dying  
   f. Chest pain or discomfort  
   m. Fear of going crazy  
   g. Nausea or stomach distress  
   n. Fear of doing something uncontrolled  
   h. Chills, hot flushes, or blushing  

6. In what ways has this fear interfered with your life (e.g., daily routine, job, social activities)?; How much are you bothered by this fear?

Rate interference:__________  Distress: __________

0-------------1-------------2-------------3-------------4-------------5-------------6-------------7-------------8
No fear       Mild       Moderate       Severe       Very Severe

6a. When did the anxiety about ______ begin to be a problem in that it caused a lot of distress or interference with your life?

Date of onset_____  Month_____  Year_____  

b. Can you recall anything that might have led to this fear?

B. Specific Fear

#2______________________________________________________________

4. What are you concerned will happen in this situation?

______________________________________________________________

5. Do you experience the anxiety nearly every time you encounter______________?

   YES____  NO____

6. Does the anxiety occur as soon as you enter the situation or are about to enter the situation, or is the anxiety sometimes delayed or unexpected?
IMMEDIATE____
DELAYED____

4a. Are you anxious about this situation because you are afraid that you will have an unexpected panic attack?

YES_____ NO_____  
If yes,  
b. Other than times when you are exposed to ______, have you experienced an unexpected rush of fear/anxiety?

YES_____ NO_____  

5. Panic Attack Symptoms

Do you experience __________ when you encounter __________?

<table>
<thead>
<tr>
<th>0</th>
<th>1</th>
<th>2</th>
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<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>No fear</td>
<td>Mild</td>
<td>Moderate</td>
<td>Severe</td>
<td>Very Severe</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

i. Palpitations, pounding heart, or accelerate heart rate 
j. Sweating 
k. Trembling or shaking 
l. Shortness of breath or smothering sensations 
m. Feeling of choking 
n. Chest pain or discomfort 
o. Nausea or stomach distress 
p. Chills, hot flushes, or blushing 

i. Dizziness, unsteady feelings, or faintness 
j. Feelings of unreality or being detached from oneself 
k. Numbing or tingling sensations 
l. Fear of dying 
m. Fear of going crazy 
n. Fear of doing something 

6. In what ways has this fear interfered with your life (e.g., daily routine, job, social activities)?; How much are you bothered by this fear?

Rate interference:__________ Distress: __________
6a. When did the anxiety about _____ begin to be a problem in that it caused a lot of distress or interference with your life?

<table>
<thead>
<tr>
<th>No fear</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
<th>Very Severe</th>
</tr>
</thead>
</table>

Date of onset_____    Month_____    Year_____  

b. Can you recall anything that might have led to this fear?
APPENDIX D

Spider Phobia Questionnaire

Directions: Please indicate whether the following statements are true (T) or false (F) about yourself.

1. I avoid going to parks or on camping trips because there may be spiders about. _____
2. I would feel some anxiety holding a toy spider in my hand. _____
3. If a picture of a spider crawling on a person appears on the screen during a motion picture, I turn my head away. _____
4. I dislike looking at pictures of spiders in a magazine. _____
5. If there is a spider on the ceiling over my bed, I cannot go to sleep unless someone kills it for me. _____
6. I enjoy watching spiders build their webs. _____
7. I am terrified by the thought of touching a harmless spider. _____
8. If someone says that there are spiders anywhere about, I become alert and edgy. _____
9. I would not go down to the basement to get something if I thought there might be spiders down there. _____
10. I would feel uncomfortable if a spider crawled out of my shoe as I took it out of the closet to put it on. _____
11. When I see a spider, I feel tense and restless. _____
12. I enjoy reading articles about spiders. _____
13. I feel sick when I see a spider. _____
14. Spiders are sometimes useful. _____
15. I shudder when I think of spiders. _____
16. I don’t mind being near a harmless spider if there is someone there in whom I have confidence. _____
17. Some spiders are very attractive to look at. _____
18. I don’t believe anyone could hold a spider without some fear. _____
19. The way spiders move is repulsive. _____
20. It wouldn’t bother me to touch a dead spider with a long stick. _____
21. If I came upon a spider while cleaning the attic I would probably run. _____
22. I’m probably more afraid of spiders than of any other animal. _____
23. I would not want to travel to Mexico or Central America because of the greater prevalence of tarantulas. _____
24. I am cautious when buying fruit because bananas may attract spiders. _____
25. I have no fear of non-poisonous spiders. _____
26. I wouldn’t take a course in biology if I thought I might have to handle live spiders. _____
27. Spider webs are very artistic. _____
28. I think that I’m no more afraid of spiders than the average person. _____
29. I would prefer not to finish a story if something about spiders was introduced into the
30. Not only am I afraid of spiders but millipedes and caterpillars make me feel anxious.

31. Even if I was late for a very important appointment, the thought of spiders would stop me from taking a shortcut through an underpass.
Below you will find a list of statements. Please rate how true each statement is for you by circling a number next to it. Use the scale below to make your choice.

<table>
<thead>
<tr>
<th></th>
<th>1</th>
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<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>never true</td>
<td>very seldom true</td>
<td>seldom true</td>
<td>sometimes true</td>
<td>frequently true</td>
<td>almost always true</td>
<td>always true</td>
</tr>
</tbody>
</table>

1. It’s OK if I remember something unpleasant. 
2. My painful experiences and memories make it difficult for me to live a life that I would value. 
3. I’m afraid of my feelings. 
4. I worry about not being able to control my worries and feelings. 
5. My painful memories prevent me from having a fulfilling life. 
6. I am in control of my life. 
7. Emotions cause problems in my life. 
8. It seems like most people are handling their lives better than I am. 
9. Worries get in the way of my success. 
10. My thoughts and feelings do not get in the way of how I want to live my life.
APPENDIX F

Courage Measure

**Directions:** Courage is defined as persistence or perseverance *despite having fear*. It takes courage to engage and persist in a terrifying activity. By definition, fear is necessary for someone to display courage. Please carefully read each statement and rate how often you would or do behave in that way.

Use the following scale to make your choice.

0---------------- 1-------------- 2---------------- 3-------------- 4---------------- 5-------------- 6------------- 7

Never                     Sometimes                  Always

1. I tend to face my fears.
2. If the thought of something makes me anxious, I usually will avoid it.
3. Even if I feel terrified, I will stay in that situation until I have done what I need to do.
4. If something scares me, I try to get away from it.
5. Other people describe me as courageous.
6. I would describe myself as “chicken”.
7. I will do things even though they seem to be dangerous.
8. I act in a courageous way.
9. If I am worried or anxious about something, I will do or face it anyway.
10. If there is an important reason to face something that scares me, I will face it.
11. Even if something scares me, I will not back down.
12. I will not face something I fear, even if avoiding it will have a negative outcome for me.
APPENDIX G

Disgust Scale-Revised

DS-R Part I: Please circle true or false

1. I might be willing to try eating monkey meat, under some circumstances  False True
2. It would bother me to see a rat run across my path in a park  False True
3. Seeing a cockroach in someone else’s house does not bother me  False True
4. It bothers me to hear someone clear a throat full of mucus  False True
5. If I see someone vomit, it makes me sick to my stomach  False True
6. It would bother me to be in a science class, and see a human hand preserved in a jar  False True
7. It would not upset me at all to watch a person with a glass eye take the eye out of the socket  False True
8. It would bother me tremendously to touch a dead body  False True
9. I would go out of my way to avoid walking through a graveyard  False True
10. I never let any part of my body touch the toilet seat in a public washroom  False True
11. I probably would not go to my favorite restaurant if I found out that the cook had a cold  False True
12. Even if I was hungry, I would not drink a bowl of my favorite soup if it had been stirred with a used but thoroughly washed flyswatter  False True
13. It would bother me to sleep in a nice hotel room if I knew that a man had died of a heart attack in that room the night before  True

DS-R Part II: Please rate how disgusting you would find the following experiences

14. If you see someone put ketchup on vanilla ice cream and eat it
   Not disgusting at all  Slightly disgusting  Very disgusting

15. You are about to drink a glass of milk when you smell that it is spoiled
16. You see maggots on a piece of meat in an outdoor garbage pail

   Not disgusting at all  Slightly disgusting  Very disgusting

17. You are walking barefoot on concrete and step on an earthworm

   Not disgusting at all  Slightly disgusting  Very disgusting

18. While you are walking through a tunnel under a railroad track, you smell urine

   Not disgusting at all  Slightly disgusting  Very disgusting

19. You see a man with his intestines exposed after an accident

   Not disgusting at all  Slightly disgusting  Very disgusting

20. Your friend’s pet cat dies and you have to pick up the dead body with your bare hands

   Not disgusting at all  Slightly disgusting  Very disgusting

21. You accidentally touch the ashes of a person who has been cremated

   Not disgusting at all  Slightly disgusting  Very disgusting

22. You take a sip of soda and realize that you drank from the glass that an acquaintance of yours had been drinking from

   Not disgusting at all  Slightly disgusting  Very disgusting

23. You discover that a friend of yours changes underwear only once a week

   Not disgusting at all  Slightly disgusting  Very disgusting

24. A friend offers you a piece of chocolate shaped like dog-doo

   Not disgusting at all  Slightly disgusting  Very disgusting

25. As part of a sex education class, you are required to inflate a new lubricated condom, using your mouth

   Not disgusting at all  Slightly disgusting  Very disgusting
APPENDIX H

Spider Phobia Beliefs Questionnaire

Part I

Instructions: Listed below are a variety of thoughts that people think about spiders. Please read each thought and please indicate how strongly, if at all, you tend to believe that thought, when it occurs. Please fill in the percentage (0-100%) that you believe that statement is true on the RIGHT side of the sheet.

When there is a spider in my vicinity, I believe that the spider....

<table>
<thead>
<tr>
<th>Item</th>
<th>Degree of Belief</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.) is deadly</td>
<td></td>
</tr>
<tr>
<td>2.) will bite me</td>
<td></td>
</tr>
<tr>
<td>3.) is dangerous</td>
<td></td>
</tr>
<tr>
<td>4.) is poisonous</td>
<td></td>
</tr>
<tr>
<td>5.) will crawl towards my private parts</td>
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<tr>
<td>6.) will attack me</td>
<td></td>
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<tr>
<td>7.) is mean</td>
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<tr>
<td>8.) is vicious</td>
<td></td>
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<tr>
<td>9.) knows that I’m anxious and that I cannot stand it</td>
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</tr>
<tr>
<td>10.) does things on purpose to tease me</td>
<td></td>
</tr>
<tr>
<td>11.) senses that I’m anxious</td>
<td></td>
</tr>
<tr>
<td>12.) wants to come upon me on parts of me I cannot reach</td>
<td></td>
</tr>
<tr>
<td>13.) is spying on me</td>
<td></td>
</tr>
<tr>
<td>14.) will drive me to the wall</td>
<td></td>
</tr>
<tr>
<td>15.) cannot be shaken off once it is on me</td>
<td></td>
</tr>
<tr>
<td>16.) will come towards me</td>
<td></td>
</tr>
<tr>
<td>Item</td>
<td>Degree of Belief</td>
</tr>
<tr>
<td>----------------------------------------------------------------------</td>
<td>-----------------</td>
</tr>
<tr>
<td>17.) will jump onto me</td>
<td></td>
</tr>
<tr>
<td>18.) will control me</td>
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</tr>
<tr>
<td>19.) will drop from the ceiling on me</td>
<td></td>
</tr>
<tr>
<td>20.) is staring at me</td>
<td></td>
</tr>
<tr>
<td>21.) becomes (in my imagination) very large and holds me with its legs</td>
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</tr>
<tr>
<td>22.) will hide itself and pop up unexpectedly 10 times as big, or with other spiders</td>
<td></td>
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<tr>
<td>23.) will settle on my face</td>
<td></td>
</tr>
<tr>
<td>24.) will chase me</td>
<td></td>
</tr>
<tr>
<td>25.) is incalculable</td>
<td></td>
</tr>
<tr>
<td>26.) runs very fast</td>
<td></td>
</tr>
<tr>
<td>27.) is unpredictable</td>
<td></td>
</tr>
<tr>
<td>28.) is very quick</td>
<td></td>
</tr>
<tr>
<td>29.) runs in an elusive way</td>
<td></td>
</tr>
<tr>
<td>30.) is uncontrollable</td>
<td></td>
</tr>
<tr>
<td>31.) is horrible</td>
<td></td>
</tr>
<tr>
<td>32.) will crawl into my clothes</td>
<td></td>
</tr>
<tr>
<td>33.) will settle in spots I do not want, like my bed</td>
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<tr>
<td>34.) hides itself in order to pop up unexpectedly</td>
<td></td>
</tr>
<tr>
<td>Item</td>
<td>Degree of Belief</td>
</tr>
<tr>
<td>---------------------------------------------------------------------</td>
<td>------------------</td>
</tr>
<tr>
<td>35.) especially picks on me because of my fear</td>
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<tr>
<td>36.) will pop up unexpectedly</td>
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<tr>
<td>37.) walks all over me during the night</td>
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<tr>
<td>38.) is dirty</td>
<td></td>
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<tr>
<td>39.) is never alone, there are always more of them</td>
<td></td>
</tr>
<tr>
<td>40.) usually travels in pairs</td>
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<tr>
<td>41.) will become larger</td>
<td></td>
</tr>
<tr>
<td>42.) hides itself</td>
<td></td>
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</tbody>
</table>
## Part II

**Instructions:** Listed below are a variety of thoughts that people think about spiders. Please read each thought and indicate how strongly, if at all, you tend to believe that thought, when it occurs. Please fill in the percentage (0-100%) that you believe that statement is true on the RIGHT side of the sheet.

*If the spider does not go away and crawls on me, I will....*

<table>
<thead>
<tr>
<th>Item</th>
<th>Degree of Belief</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.) get a heart attack</td>
<td></td>
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<tr>
<td>2.) damage my heart</td>
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</tr>
<tr>
<td>3.) beat up someone</td>
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<tr>
<td>4.) jump out of a window or out of a moving car</td>
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<tr>
<td>5.) have to be transported to a hospital or a psychiatric ward</td>
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</tr>
<tr>
<td>6.) want to be dead</td>
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<tr>
<td>7.) vomit</td>
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<tr>
<td>8.) faint</td>
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</tr>
<tr>
<td>9.) die of fear</td>
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</tr>
<tr>
<td>10.) become aggressive (beat, kick, throw)</td>
<td></td>
</tr>
<tr>
<td>11.) dare nothing anymore and be overwhelmed with fear</td>
<td></td>
</tr>
<tr>
<td>12.) cry uncontrollably</td>
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</tr>
<tr>
<td>13.) be unable to think rationally</td>
<td></td>
</tr>
<tr>
<td>14.) be unable to do anything</td>
<td></td>
</tr>
<tr>
<td>15.) be unable to function normally anymore</td>
<td></td>
</tr>
<tr>
<td>16.) lose control of myself</td>
<td></td>
</tr>
<tr>
<td>17.) endanger myself and/or others</td>
<td></td>
</tr>
<tr>
<td>18.) stiffen completely from anxiety</td>
<td></td>
</tr>
<tr>
<td>19.) cause an accident</td>
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<tr>
<td>20.) run away blindly</td>
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<td>---</td>
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</tr>
<tr>
<td>21.) become paralyzed</td>
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<tr>
<td>22.) get nightmares of creepy spiders</td>
<td></td>
</tr>
<tr>
<td>23.) get creepy dreams</td>
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<tr>
<td>24.) come to see spiders everywhere</td>
<td></td>
</tr>
<tr>
<td>25.) become even more afraid of spiders</td>
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<tr>
<td>26.) be unable to sleep for days</td>
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<tr>
<td>27.) be unable to get the animal out of my mind</td>
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<tr>
<td>28.) become crazy because of anxiety</td>
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<tr>
<td>29.) become sick with anxiety</td>
<td></td>
</tr>
<tr>
<td>30.) lash out fiercely</td>
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</tr>
<tr>
<td>31.) scream or yell uncontrollably</td>
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<tr>
<td>32.) not be able to stand it</td>
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</tr>
<tr>
<td>33.) become so anxious that other people will think I’m an idiot</td>
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</tr>
<tr>
<td>34.) panic completely and not know what I’m doing</td>
<td></td>
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<tr>
<td>35.) think of myself as hysterical or as an idiot</td>
<td></td>
</tr>
<tr>
<td>36.) become hysterical</td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX I

Stroop Task Word List

1. Web
2. Hairy
3. Scary
4. Bite
5. Creepy
6. Crawl
7. Legs
8. Poisonous
9. Black
10. Dark
APPENDIX J

Distress Thermometer: Fear

Subject Number _____  Experimenter___________  Date ________  Session________

*Please circle the number (1-10) that best describes how much fear you are currently experiencing.*

**Extreme Fear**

10

1

**No Fear**
APPENDIX K

Distress Thermometer: Disgust

Subject Number ______  Experimenter__________  Date ________  Session________

Please circle the number (1-10) that best describes how much disgust you are currently experiencing.

Extreme Disgust

No Disgust
APPENDIX L

Posttreatment Questionnaire

1. During your interactions with the spider, did you use any of the techniques or suggestions you learned in therapy? If so, which ones?

2. What was the most helpful/beneficial part of the therapy?

3. What was the least helpful part of therapy?

4. How much would you recommend this treatment to a friend or family member who also wished to address their fear of spiders (1 = Not at all, 10 = Most definitely)?

   1--------2--------3--------4--------5--------6--------7--------8--------9--------10
   Not at all                     Somewhat                     Most definitely

5. How willing would you be to come back one week from now and have a spider crawl in your hair (1= Not at all willing, 10 = Very willing)?

   1--------2--------3--------4--------5--------6--------7--------8--------9--------10
   Not at all willing             Somewhat                     Very willing
APPENDIX M

Follow-Up Questionnaire

1. In the past two months, did you use any of the techniques or suggestions you learned in therapy in dealing with spiders? If so, which ones?

2. To what degree have you avoided coming into contact with spiders?

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<th>1</th>
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<th>10</th>
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</thead>
<tbody>
<tr>
<td>Not at all</td>
<td>Somewhat</td>
<td>All the time</td>
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</table>

3. In the past two months, to what degree have you engaged in activities that you initially refrained from doing due to your fear of spiders?

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<thead>
<tr>
<th>1</th>
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<th>8</th>
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<th>10</th>
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<tbody>
<tr>
<td>Not at all</td>
<td>Somewhat</td>
<td>All the time</td>
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4. What was the most helpful/beneficial part of the therapy?

5. What was the least helpful part of therapy?
6. How much would you recommend this treatment to a friend or family member who also wished to address their fear of spiders (1 = not at all, 10 = Most definitely)?

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<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Not at all</td>
<td>Somewhat</td>
<td>Most definitely</td>
<td></td>
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</table>

7. How willing would you be to have a spider crawl in your hair right now (1 = Not at all willing, 10 = Very willing)?

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<th>10</th>
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<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Not at all</td>
<td>Somewhat</td>
<td>Very willing</td>
<td></td>
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University of Oklahoma
Institutional Review Board
Informed Consent to Participate in a Research Study

Project Title: The Mechanisms of Change Associated with Exposure in ACT versus CBT for Treatment of Arachnophobia

Principal Investigator: Alexandra Wagener, M.A.

Department: The University Counseling Center

You are being asked to volunteer for this research study. This study is being conducted at The University of Oklahoma. You are invited to participate in this study based on your responses to the announcements concerning this project. We hope to have around 6-10 other individuals like yourself also eventually participate in this project.

Please read this form and ask any questions that you may have before agreeing to take part in this study.

Purpose of the Research Study

You are invited to participate in a screening process used to evaluate potential participants for a project evaluating two different approaches for alleviating fear of spiders. We hope to learn more about the relative effectiveness of the two approaches, how they work, and about the types of individuals for whom each seems to work best.

Number of Participants

Approximately 6-10 people will take part in the complete study and approximately 100 people will be needed to be screened in order to obtain the 6-10 final participants.

Procedures

If you agree to be in this study, you will be asked to do the following: If you decide to participate in the screening process, you will first be asked to complete two questionnaires. After completing the questionnaires you will be asked to approach a spider contained in a terrarium until you no longer feel comfortable doing so. Measures of heart rate and blood pressure will be taken during this task and you will be asked to answer a few brief questionnaires about the
experience afterwards. Lastly, you will be interviewed by a graduate level clinical psychology student under the supervision of Dr. Karen Vaughn, Clinical Training Director of The University Counseling Center. The questionnaires and interview are designed to obtain some information about your background, your history of anxiety and its treatment, as well as about your current level of anxiety and history of spider phobia. The interview itself should take less than 1 hour and will be audiotaped, with your permission for later review and monitoring of "quality control" issues. Any information you provide during the questionnaires and interview as well as the audiotape of the interview will only be available to Dr. Vaughn and Rob Zettle, Ph.D., Professor, Department of Psychology at Wichita State University.

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**Length of Participation**

If you agree to participate, the length of the screening process is approximately 1 hour. **This study has the following risks:**

Of necessity, a number of the questions you may be asked to answer during the interview will be of a personal and sensitive nature. It is therefore, possible that you may experience some discomfort in responding to such questions. However, such information is necessary to evaluate the degree to which we believe you would be a good candidate for the program and could benefit from your participation in it.

**Benefits of being in the study are**

It should, be noted that there are no clear benefits that you can reasonably expect to receive through your participation during this screening phase of the study. If following this initial evaluation, it appears that you would be a good candidate for the study you will be asked to complete a second and separate consent form that details other phases of this project, including information about the treatment phase. That is, this consent form only covers the screening process, the two questionnaires, approaching a spider, and the interview used to evaluate your initial suitability as a participant in further phases of this project.

**Injury**

In case of injury or illness resulting from this study, emergency medical treatment is available. However, you or your insurance company will be expected to pay the usual charge from this treatment. The University of Oklahoma Norman Campus has set aside no funds to compensate you in the event of injury.

**Confidentiality**

In published reports, there will be no information included that will make it possible to identify you. Research records will be stored securely and only approved researchers will have access to the records.

There are organizations that may inspect and/or copy your research records for quality assurance and data analysis. These organizations include the OU Institutional Review Board.

**Compensation**

You will not be reimbursed for you time and participation in this study.
Voluntary Nature of the Study

Participation in this study is voluntary. If you withdraw or decline participation, you will not be penalized or lose benefits or services unrelated to the study. If you decide to participate, you may decline to answer any question and may choose to withdraw at any time.

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Page 2 of 2

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Audio Recording of Study Activities

To assist with accurate recording of participant responses, interviews may be recorded on an audio recording device. You have the right to refuse to allow such recording without penalty. Please select one of the following options.

I consent to audio recording.  Yes  No.

Contacts and Questions

If you have concerns or complaints about the research, the researcher(s) conducting this study can be contacted at 405-325-3347 or awagener@ou.edu (Alexandra Wagener, M.A.) or Karen Vaughn, Ph.D., 405-325-2700 or kvaugh@ou.edu.

Contact the researcher(s) if you have questions or if you have experienced a research-related injury.

If you have any questions about your rights as a research participant, concerns, or complaints about the research and wish to talk to someone other than individuals on the research team or if you cannot reach the research team, you may contact the University of Oklahoma – Norman Campus Institutional Review Board (OU-NC IRB) at 405-3258110 or irb@ou.edu.

You will be given a copy of this information to keep for your records. If you are not given a copy of this consent form, please request one.

Statement of Consent

I have read the above information. I have asked questions and have received satisfactory answers. I consent to participate in the study.

__________________________________________  __________________________
Signature         Date

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APPENDIX O

University of Oklahoma
Institutional Review Board
Informed Consent to Participate in a Research Study

Project Title: The Mechanisms of Change Associated with Exposure in ACT versus CBT for Treatment of Arachnophobia

Principal Investigator: Alexandra Wagener, M.A.

Department: The University Counseling Center

You are being asked to volunteer for this research study. This study is being conducted at The University of Oklahoma. You were selected as a possible participant in the treatment phase of this study because information you provided in the screening phase suggests that you might benefit from the project. We hope to eventually have around 610 other individuals like yourself participate in the further phases of this project. While we believe that you could benefit from your participation in the treatment phase of the study, we, however, cannot guarantee that this will be the case.

Please read this form and ask any questions that you may have before agreeing to take part in this study.

Purpose of the Research Study

You are invited to participate in the further phases of a project evaluating two different approaches for the treatment of arachnophobia (spider phobia). We hope to learn more about the effectiveness of each approach, how each works, and the type of individuals for whom each seems to work best.

Number of Participants

About 6-10 people will take part in this study.

Procedures

If you agree to be in this study, you will be asked to do the following:

If you decide to participate, you will be offered the opportunity to learn some ways to cope with your fear of spiders in an individual therapy type format. The sessions consist of a number of 20 minute treatment segments where relevant coping techniques and procedures will be presented. As many as 9 of these 20 minute sessions may be offered, lasting up to 3 hours total. Sessions will be conducted by Alexandra Wagener, M.A., under the supervision of Dr. Karen Vaughn, Clinical Training Director of The University Counseling Center. All treatment sessions will be audiotaped, with your permission for further review to ensure “quality control”. These audiotapes, as with those from the screening interview, will only be available to Alexandra Wagener, Dr. Vaughn, and Rob Zettle, Ph.D., Professor, Wichita State University.
You will next be asked to participate in an assessment session prior to scheduling your treatment sessions. It should take about 2-3 hours to complete and consists of you completing several brief questionnaires assessing aspects of your experience of

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anxiety surrounding spiders as well as related concerns. You will also be asked to participate in a computer task concerning spiders, and will be asked several times, as you have already done, to approach a spider contained in a terrarium until you no longer feel comfortable doing so. As during your previous presentation of this task, your heart rate and blood pressure will be monitored and you will be asked to answer a few brief questions about your experience. This pretreatment assessment session will be completed immediately after this consent form is reviewed and signed.

**Length of Participation**

The Pretreatment assessment session will last about 2-3 hours. Following the pretreatment session you will be asked to return one week later for the treatment session, lasting up to 3 hours. The next week you will be asked to return for a posttreatment session, lasting approximately 2 hours. Finally, you will be asked to return 2 months after your posttreatment assessment session for a follow-up session, lasting about 2 hours.

**This study has the following risks:**

It is also possible that you may experience some emotional and psychological discomfort during the treatment sessions. Prior to each treatment session, you will be asked to again participate in the task of approaching the spider in the terrarium, with an ultimate goal of placing your hand within it for at least 30 seconds. The experience of anxiety itself is often closely related to issues and concerns of a personal and sensitive nature. Learning how to cope more effectively with anxiety and fear of spiders, therefore, may necessitate focus upon and considerable discussion of such issues and concerns. It is our hope, however, that the potential benefit you may derive from participating in this project will help compensate for any discomfort you might experience during it.

**Benefits of being in the study are**

We have reason to believe that both approaches for coping with fear of spiders being evaluated in this project will be equally effective overall, but it is necessary to conduct research like this in order to more fully investigate this issue and whether or not some individuals may respond better to one approach versus the other. Although we, therefore, also have reason to believe that you may learn how to better cope with your fear of spiders by your participation in this project, we cannot guarantee that this will be the case. Your participation, however, in any event should help us learn more about effective strategies for coping with fear of spiders for others even if you do not benefit personally from your participation.

**Injury**
In case of injury or illness resulting from this study, emergency medical treatment is available. However, you or your insurance company will be expected to pay the usual charge from this treatment. The University of Oklahoma Norman Campus has set aside no funds to compensate you in the event of injury.
Confidentiality

In published reports, there will be no information included that will make it possible to identify you. Research records will be stored securely and only approved researchers will have access to the records.

There are organizations that may inspect and/or copy your research records for quality assurance and data analysis. These organizations include the OU Institutional Review Board.

Compensation

You will not be reimbursed for your time and participation in this study.

Voluntary Nature of the Study

Participation in this study is voluntary. If you withdraw or decline participation, you will not be penalized or lose benefits or services unrelated to the study. If you decide to participate, you may decline to answer any question and may choose to withdraw at any time.

Audio Recording of Study Activities

To assist with accurate recording of participant responses, interviews may be recorded on an audio recording device. You have the right to refuse to allow such recording without penalty. Please select one of the following options.

I consent to audio recording. ___ Yes ___ No.

Contacts and Questions

If you have concerns or complaints about the research, the researcher(s) conducting this study can be contacted at 405-325-3347 or awagener@ou.edu (Alexandra Wagener, M.A.) or Karen Vaughn, Ph.D., 405-325-2700 or kvaughn@ou.edu.

Contact the researcher(s) if you have questions or if you have experienced a research-related injury.

If you have any questions about your rights as a research participant, concerns, or complaints about the research and wish to talk to someone other than individuals on the research team or if you cannot reach the research team, you may contact the University of Oklahoma – Norman Campus Institutional Review Board (OU-NC IRB) at 405-3258110 or irb@ou.edu.
Statement of Consent

I have read the above information. I have asked questions and have received satisfactory answers. I consent to participate in the study.

__________________________  __________________
Signature                  Date

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APPENDIX P

SCL-90-R

Directions: Below is a list of problems and complaints that people sometimes have. Please read each one carefully. After you have done so, please write the number that best describes HOW MUCH DISCOMFORT THAT PROBLEM HAS CAUSED YOU DURING THE PAST WEEK INCLUDING TODAY. Indicate only one number for each problem and do not skip any items. If you change your mind, erase the first number carefully.

0 = Not at all,    1 = A little bit,    2 = Moderately,    3 = Quite a bit,    4 = Extremely

How much were you distressed by:

____ 1. Headaches
____ 2. Nervousness or shakiness inside
____ 3. Repeated unpleasant thoughts that won’t leave your mind
____ 4. Faintness or dizziness
____ 5. Loss of sexual interest or pleasure
____ 6. Feeling critical of others
____ 7. The idea that someone else can control your thoughts
____ 8. Feeling that others are to blame for most of your troubles
____ 9. Trouble remembering things
____ 10. Worried about sloppiness or carelessness
____ 11. Feeling easily annoyed or irritated
____ 12. Pains in heart or chest
____ 13. Feeling afraid in open spaces or on the streets
____ 14. Feeling low in energy or slowed down
____ 15. Thoughts of ending your life
____ 16. Hearing voices that other people do not hear
____ 17. Trembling
____ 18. Feeling that most people cannot be trusted
____ 19. Poor appetite
____ 20. Crying easily
____ 21. Feeling shy or uneasy with the opposite sex
____ 22. Feelings of being trapped or caught
____ 23. Suddenly scared for no reason
____ 24. Temper outbursts that you could not control
____ 25. Feeling afraid to go out of your house alone
____ 26. Blaming yourself for things
____ 27. Pains in lower back
____ 28. Feeling blocked in getting things done
____ 29. Feeling lonely
____ 30. Feeling blue
____ 31. Worrying too much about things
____ 32. Feeling no interest in things
____ 33. Feeling fearful
____ 34. Your feelings being easily hurt
____ 35. Other people being aware of your private thoughts
____ 36. Feeling others do not understand you or are unsympathetic
37. Feeling that people are unfriendly or dislike you
38. Having to do things very slowly to insure correctness
39. Heart pounding or racing
40. Nausea or upset stomach
41. Feeling inferior to others
42. Soreness of your muscles
43. Feeling that you are watched or talked about by others
44. Trouble falling asleep
45. Having to check and double-check what you do
46. Difficulty making decisions
47. Feeling afraid to travel on buses, subways, or trains
48. Trouble getting your breath
49. Hot or cold spells
50. Having to avoid certain things, places, or activities because they frighten you
51. Your mind going blank
52. Numbness or tingling in parts of your body
53. A lump in your throat
54. Feeling hopeless about the future
55. Trouble concentrating
56. Feeling weak in parts of your body
57. Feeling tense or keyed up
58. Heavy feelings in your arms or legs
59. Thoughts of death or dying
60. Overeating
61. Feeling uneasy when people are watching or talking about you
62. Having thoughts that are not your own
63. Having urges to beat, injure, or harm someone
64. Awakening in the early morning
65. Having to repeat the same actions such as touching, counting, or washing
66. Sleep that is restless or disturbed
67. Having urges to break or smash things
68. Having ideas or beliefs that others do not share
69. Feeling very self-conscious with others
70. Feeling uneasy in crowds, such as shopping or at a movie
71. Feeling everything is an effort
72. Spells of terror or panic
73. Feeling uncomfortable about eating or drinking in public
74. Getting into frequent arguments
75. Feeling nervous when you are left alone
76. Others not giving you proper credit for your achievements
77. Feeling lonely even when you are with people
78. Feeling so restless you couldn’t sit still
79. Feelings of worthlessness
80. The feeling that something bad is going to happen to you
81. Shouting and throwing things
82. Feeling afraid you will faint in public
83. Feeling that people will take advantage of you if you let them
84. Having thoughts about sex that bother you a lot
85. The idea that you should be punished for your sins
86. Thoughts and images of a frightening nature
87. The idea that something serious is wrong with your body
88. Never feeling close to another person
89. Feelings of guilt
90. The idea that something is wrong with your mind
APPENDIX Q

Self-Evaluation Questionnaire

Directions: A number of statements which people have used to describe themselves are given below. Read each statement and then write in the appropriate number to the right of the statement to indicate how you generally feel. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe how you generally feel.

Almost Never = 1, Sometimes = 2, Often = 3, Almost Always = 4

1. I feel pleasant ________________________________________________________________
2. I feel nervous and restless ___________________________________________________
3. I feel satisfied with myself __________________________________________________
4. I wish I could be as happy as others seem to be ______________________________
5. I feel like a failure __________________________________________________________
6. I feel rested ______________________________________________________________
7. I am “calm, cool, and collected” _____________________________________________
8. I feel that difficulties are piling up so that I cannot overcome them ______________
9. I worry too much over something that really doesn’t matter ______________________
10. I am happy________________________________________________________________
11. I have disturbing thoughts __________________________________________________
12. I lack self-confidence ______________________________________________________
13. I feel secure ______________________________________________________________
14. I make decisions easily _____________________________________________________
15. I feel inadequate __________________________________________________________
16. I am content ______________________________________________________________
17. Some unimportant thought runs through my mind and bothers me ______________
18. I take disappointments so keenly that I can’t put them out of my mind ____________
19. I am a steady person _________________________________________________________
20. I get in a state of tension or turmoil as I think over my recent concerns____________
APPENDIX R

Rosenberg Self-Esteem Scale

Please record the appropriate answer for each item, depending on whether you
Strongly agree, agree, disagree, or strongly disagree with it.

1 = Strongly agree
2 = Agree
3 = Disagree
4 = Strongly disagree

_____ 1. On the whole, I am satisfied with myself.
_____ 2. At times I think I am no good at all.
_____ 3. I feel that I have a number of good qualities.
_____ 4. I am able to do things as well as most other people.
_____ 5. I feel I do not have much to be proud of.
_____ 6. I certainly feel useless at times.
_____ 7. I feel that I'm a person of worth.
_____ 8. I wish I could have more respect for myself.
_____ 9. All in all, I am inclined to think that I am a failure.
_____ 10. I take a positive attitude toward myself.
APPENDIX S

NEO-FFI

Please read each item carefully and circle whether you strongly disagree, disagree, neutral, agree, or strongly agree with each statement.

SD = Strongly Disagree     D= Disagree     N= Neutral     A= Agree     SA= Strongly Agree

1. I am not a worrier.       SD  D  N  A  SA
2. I find it easy to smile and be outgoing with strangers.   SD  D  N  A  SA
3. I have a very active imagination.   SD  D  N  A  SA
4. Often, people aren’t as nice as they seem to be.   SD  D  N  A  SA
5. I am efficient and effective at my work.   SD  D  N  A  SA
6. I often get angry at the way people treat me.   SD  D  N  A  SA
7. I prefer jobs that let me work alone without being bothered by other people.   SD  D  N  A  SA
8. I’m not really interested in the arts.   SD  D  N  A  SA
9. I’m not crafty or sly.   SD  D  N  A  SA
10. I don’t mind a little clutter in my room.   SD  D  N  A  SA
11. I rarely feel lonely or blue.   SD  D  N  A  SA
12. I am dominate, forceful, and assertive.   SD  D  N  A  SA
13. I experience a wide range of emotions or feelings.   SD  D  N  A  SA
14. I’m not known for my generosity.   SD  D  N  A  SA
15. I try to go to work or school even when I’m not feeling well.   SD  D  N  A  SA
16. When I’m around people, I worry that I’ll make a fool of myself.   SD  D  N  A  SA
17. I have a laid-back style in work and play.   SD  D  N  A  SA
18. I’m pretty set in my ways.   SD  D  N  A  SA
19. When I’ve been insulted, I just try to forgive and forget.   SD  D  N  A  SA
20. I don’t feel like I’m driven to get ahead.   SD  D  N  A  SA
21. I seldom give in to my impulses.   SD  D  N  A  SA
22. I like to be where the action is.   SD  D  N  A  SA
23. I often enjoy playing with theories or abstract ideas.  
24. I don’t mind bragging about my talents and accomplishments.  
25. I’m pretty good about pacing myself so as to get things done on time.  
26. I often feel helpless and want someone else to solve my problems.  
27. I have never literally jumped for joy.  
28. I believe we should look to our religious authorities for decisions on moral issues.  
29. When making laws and social policies, we need to think about who might be hurt.  
30. Over the years I’ve done some pretty stupid things.  
31. I am easily frightened.  
32. I don’t get much pleasure from chatting with people.  
33. I try to keep all my thoughts directed along realistic lines and avoid flights of fancy.  
34. I believe that most people are basically well-intentioned.  
35. I sometimes act thoughtlessly.  
36. I’m an even-tempered person.  
37. I like to have a lot of people around me.  
38. I am sometimes completely absorbed in music I am listening to.  
39. If necessary, I am willing to manipulate people to get what I want.  
40. I keep my belongings neat and clean.  
41. Sometimes I feel completely worthless.  
42. I don’t find it easy to take charge of a situation.  
43. I rarely experience strong emotions.  
44. I go out of my way to help others if I can.
45. Sometimes I’m not as dependable or reliable as I should be.  
   SD D N A SA

46. I feel comfortable in the presence of my teachers or bosses.  
   SD D N A SA

47. My life is fast-paced.  
   SD D N A SA

48. I believe variety is the spice of life.  
   SD D N A SA

49. If someone starts a fight, I’m ready to fight back.  
   SD D N A SA

50. I strive to achieve all I can.  
   SD D N A SA

51. I have trouble resisting my cravings.  
   SD D N A SA

52. I wouldn’t enjoy vacationing in Las Vegas.  
   SD D N A SA

53. I find philosophical arguments boring.  
   SD D N A SA

54. I’d rather not talk about myself or my achievements.  
   SD D N A SA

55. I have trouble making myself do what I should do.  
   SD D N A SA

56. I’m pretty stable emotionally.  
   SD D N A SA

57. I have felt overpowering joy.  
   SD D N A SA

58. I believe that laws and social policies should change to reflect the needs of a changing world.  
   SD D N A SA

59. I have no sympathy for beggars.  
   SD D N A SA

60. I rarely make hasty decisions.  
   SD D N A SA
APPENDIX T

CBT Protocol

[Note: This protocol follows guidelines for the implementation of CBT derived from the Manual for the 1-session treatment of specific phobias by Lars-Goran Öst (1997). Any page citations included make reference to this manual.]

The treatment sessions within the CBT protocol are organized around modules designed to gain knowledge about and address factors that maintain spider phobic behavior in participants. These modules include providing a rationale for the CBT treatment, the identification and restructuring of catastrophic beliefs surrounding spiders, and relaxation training.

Module I: Introduction

The overall objectives of this module are two-fold. The first is to provide participants with a rationale for the treatment. Participants are told that the purpose of the treatment is to expose the participant to spiders in a controlled way as a means of challenging his/her dysfunctional thoughts about the consequences of engaging in that behavior and to provide an opportunity to learn how to better manage any discomforting feelings and sensations in the presence of spiders. Participants are given a handout of “The anxiety curve” (see end of protocol for a copy) that helps illustrate what happens to their overall level of anxiety when they encounter a spider. Participants are also encouraged to approach treatment in a team-like fashion along with the therapist. The participant is the expert in his/her phobic thoughts and reactions and the therapist is an expert on the treatment method being used.

The second major objective of this module is to acquaint participants with the cognitive and affective dimensions of spider phobia. Based upon what we know more generally about what happens when humans come into contact with phobic objects, our bodies, as well as our minds,
react to spiders in certain ways. Participants are presented with the following information about what our bodies do when they naturally react in times of stress. Whenever we encounter a stressful event such as a spider, both our minds and our bodies react quickly to help us deal with the situation. This is an automatic stress response, also called the *fight-or-flight reaction*. This stress response is helpful in true emergency situations, which helps us to either leave or flee the situation (flight) or, alternatively, to stay and take on the fearful event (fight). However, when it’s activated on a frequent basis and especially by objects or situations that do not constitute an actual danger or threat to our physical well being, it puts a strain on both mind and body. When you confront an unwanted and fearful situation, such as encountering a spider, the way our minds and bodies react can actually increase our stress level and anxiety, which in turn, increases our current fear of that situation. In what follows, we will introduce and describe to you some strategies to help better manage both your mind and body’s reaction to stressful and frightening situations. We’ll first talk about how your mind acts when you encounter a spider and then we will move on to how your body reacts.

This initial module concludes by obtaining information about the participant’s catastrophic beliefs concerning spiders and bodily reactions to the spider. Participants are asked to imagine encountering a spider, what thoughts they have, and how much they believe those thoughts while doing so. They are also asked to identify what their physiological reactions and responses are to such phobic stimuli. This information is discussed in detail in the modules presented later on in treatment.

**Module II: Cognitive restructuring**
Participants are asked to conceptualize the treatment as acquiring skills with which they can handle phobic reactions to spiders. Our minds very quickly size up the perceived risk of a fearful situation and our ability to cope with and manage it. Psychological research has found that our minds tend to overestimate the potential risk of situations we find fearful. Our minds take these stressful events and exaggerate the degree to which they may be dangerous. In order to more rationally evaluate the level of risk you are encountering, it may be useful to ask yourself some questions. These questions are also known as self-instructions and simply involve learning a different way to talk to yourself about your fears. These self-instructions can help calm your mind down by focusing on the present and taking things as they come rather than being preoccupied with negative future consequences. The following are typical of negative things you may tell yourself in a stressful situation, “This is going to harm me”; “This is a very dangerous situation”; or “I might have a panic attack or die from this”. You can try replacing these thoughts with more positive and realistic ones such as, “This may be frightening but it’s not dangerous”; “I’m not in a dangerous situation”; or “Look for positives, don’t jump to conclusions”. The participants are asked about their own negative thoughts they have about encountering a spider. They are asked to share those thoughts and any other thoughts they have when they think about approaching the spider in the BAT. The client is asked to see if those thoughts and predictions are true when they approach the spider in the BAT.

As mentioned previously, our minds also distort our perceived ability to cope with the stressful situation. This also often elevates our fears and anxiety. In general, our minds tend to underestimate our capabilities we have to deal with the feared event. Some stressful thoughts we often have that reflect this are, “I cannot cope”; “I cannot handle this”; or “I am so overwhelmed that I may have a nervous breakdown”. It can be useful to calm your mind down by saying
alternative things to yourself, such as “I can manage this”; “Although the anxiety may be unpleasant, it will not hurt me”; or “I can meet this challenge”. The participants are asked to reflect on what happened during the BAT and what that suggests to them about the accuracy of their thoughts about spiders and their ability to cope with their fear of them.

**Module III: Progressive muscle relaxation**

These sessions involve being introduced to the relaxation technique of progressive muscle relaxation. When presented with a fearful situation, our bodies stimulate hormones that engage the sympathetic branch of the autonomic nervous system. All those changes evolve and assist the body in responding to an actual crisis by either fighting off a physical threat or running away from it. For instance, the eyes dilate to improve vision, the pulse rate increases to circulate blood more quickly to vital organs, respiration increases to provide increased oxygen to the rapidly circulating blood, the muscles tense in the arms and legs in order to move quickly and precisely. However, these physiological reactions are often undesirable when we are not confronted with an actual physical threat and can not only maintain the current fear but amplify it. One way to help calm our bodies down is to relax. Relaxation is an active coping skill and has been found to decrease the stress and anxiety one feels when encountering a negative object, like a spider. Relaxation helps you to take control over the anxiety as it is impossible for our bodies to be both relaxed and tense at the same time. There are a number of different ways of learning how to relax. The particular technique we would like to teach you is called progressive muscle relaxation (PMR; Craske & Barlow, 2006; Jacobson, 1938). Researchers and scientists have found that PMR is a valid and extremely helpful tool for reducing anxiety in people. This technique can be implemented just about anywhere and anytime the participants need to relax.
Each session of PMR focuses on certain muscle groups within the body. The first session focuses on the participant’s hands, biceps, stomach, and shoulders.

**Modules IV-IX**

Participants are asked to further identify and analyze their cognitions regarding spiders and their predictions of what will happen when they encounter a spider. They are asked to continue working on restructuring those thoughts and other muscle groups normally included in PMR are addressed. For example, the following muscle groups are included in the subsequent sessions. These include sessions that focused on their head, face, and neck, and also on their lower body consisting of their quadriceps, calves, feet, and overall body.
The Anxiety Curve
APPENDIX U

ACT Protocol

[Note: This protocol follows guidelines for the implementation of ACT derived from Acceptance and commitment therapy: An experiential approach to behavior change by Hayes et al. (1999), Acceptance and commitment therapy for anxiety disorders: A practitioner’s treatment guide to using mindfulness, acceptance, and values-based behavior change strategies by Eifert and Forsyth (2005), and Get out of your mind and into your life: The new acceptance and commitment therapy by Hayes and Smith (2005). Any page citations included make reference to portions of these three books.]

The treatment session(s) with the ACT approach are organized around the six major processes that ACT attempts to target in helping clients become more psychologically flexible. Treatment is not administered in the exact sequence listed here to create and maintain a flexible approach to it. For example, the two different fusion interventions that are detailed are presented flexibly in different sessions.

Module I: Introduction

The overall approach participants are introduced to is a different way to actively cope with and approach their fears. It is most useful to think of it as learning alternative ways to respond to the distress and discomfort so that it is not made worse and does not stand in the way of doing what is important to you. For example, individuals who feel a great deal of discomfort around spiders may go to great lengths to avoid coming into contact with them and in doing so may limit where they can go and what they can do. This may affect what activities you participate in outdoor settings or may restrict you from even going into certain places in your own home, like your basement, or attic because a spider might be present. This avoidance due to your fear of spiders may be keeping you from leading a life that is important to you and from engaging in certain activities that have value to you. The approach that is offered is one that seeks to put the client back in control of his or her life rather than their anxiety and discomfort.
The first task is to obtain information about the nature and function of normal fear and anxiety. A discussion of what makes fear and anxiety “disordered” is completed and how anxiety has become a problem within the client’s life is explored.

**Modules II-III: Experiential avoidance/acceptance**

Participants are introduced to the idea that their efforts to control and avoid coming into contact with spiders in order to reduce or manage their anxiety is actually part of their problem.

**Tug-of-war with a monster.** To help illustrate this, participants are presented with the Tug-of-War with a Monster metaphor and exercise (Hayes et al., 1999, p. 109). Participants are asked to do something the opposite of what they usually do in a struggle. Participants are presented with a hand towel and are asked to play tug-of-war with the therapist who is playing the role of the participant’s “anxiety monster”. The client attempts to pull on the towel and the anxiety monster simply pulls back. Acting out this exercise helps illustrate how physically taxing it can be to attempt to beat the monster or keep it away. The participants are asked to notice how much energy and focus they are exerting during this struggle and also how anxiety can tie up their hands and feet, preventing them from engaging in other activities that they may find valuable.

**Feeding-the-anxiety-tiger.** To further emphasize the costs of the participants’ control efforts to avoid or manage their anxiety, the feeding-the-anxiety-tiger metaphor (Eifert & Forsyth, 2005, p. 138) is presented. This metaphor helps show the participants that they cannot control their anxiety by trying to appease it (e.g., by giving in to a hungry tiger by feeding him to quiet him down). It also shows that over time, larger portions of the participants’ time, resources,
and life get taken up by their efforts to control and avoid their anxiety (e.g., the tiger grows and it takes more food and energy to keep him quiet).

**Additional acceptance techniques.** If additional sessions are needed, the following are additional techniques that may also be presented in order to weaken experiential avoidance and strengthen acceptance:


c. Two Scales Metaphor (Hayes et al., 1999 pp. 133-134).

**Modules IV-V: Fusion/cognitive defusion**

The second technique that may help the participant cope with their anxiety by learning how to respond to it differently is presented. That technique is cognitive defusion. Cognitive defusion is learning how to restate negative thoughts in ways that enable us to see how they are merely words and not literal facts. Through the use of language, we can take a word such as “anxiety” and make it into this scary and fearful thing. We may then be more likely to attribute most of our negative experiences to anxiety. The word “anxiety” takes on a whole new literal meaning. But what if those words that we find so scary and that make us think and dwell on stressful and unpleasant experiencing are restated in a new way?

**“Milk, milk, milk” exercise.** The “milk, milk, milk” exercise (Hayes et al., 1999, p. 154) is adapted into the “spider, spider, spider” exercise which helps to provide the participant with an experience that allows them to hear the word for what it is rather than the meaning they attach to it. It helps strip away those anxiety-eliciting functions and leaves only the word. The participants are asked to repeat the word “spider” out loud for 30 seconds. Afterwards the participants are
asked to reflect on what happened to the word and their relationship to the word “spider” as they repeated it out loud.

**Altered voice exercise.** Another defusion exercise presented to the participants asks them to articulate their scary thoughts in an altered voice. They are asked to think about a spider trying to bite them or that spiders are dangerous, which evoke certain negative and unwanted thoughts and feelings. The participants are asked to say the phrase “The spider is going to bite me” and say it with a cartoon voice or speeded up or slowed down. Changing how we say it can make the feelings associated with the words not as stressful. It helps the participants detach from and respond differently to their anxiety-eliciting thoughts about spiders.

**Additional defusion techniques.** If additional sessions are needed, the following are additional techniques that may also be presented in order to help participants respond differently to their anxiety related thoughts and feelings.

a. Your Mind is Not Your Friend Intervention (Hayes et al., 1999, pp. 151-152). Ask the participant to think about their mind being mindless; then ask them, what would they trust, their mind or their experiences.

b. Finding a Place to Sit Metaphor (Hayes et al., 1999, pp.153). Illustrates the futility of descriptions and evaluations, emphasizes the need to evaluate their own experiences as evidence.


**Modules VI: Future focused/mindfulness**
Participants are introduced to the concept of mindfulness consistent with how it has been defined by Kabat-Zinn (2005), as making direct contact with present experiences with acceptance, compassion, and without judgment. Mindfulness is presented as not another control strategy, but as a way to allow private events to come and go while watching them and noticing them as they occur in the present moment.

**Acceptance of anxiety exercise.** The acceptance of anxiety exercise (Eifert & Forsyth, 2005, p. 163) is presented to help participants focus on becoming more aware of their anxiety-related thoughts, feelings, and other experiences by allowing them to be and to create space for them without trying to fix or change them.

**The soldiers in the parade exercise.** The Soldiers in the Parade Exercise (Hayes et al., 1999, pp. 159-161) is a mindfulness exercise to increase awareness and acceptance of automatic thoughts with openness and nonjudgment.

**Raisin exercise.** To further emphasize mindfulness, participants are presented with the raisin exercise (Hayes & Smith, 2005, pp. 110-111). This exercise asks participants to hold, examine, and notice with a nonjudgmental attitude all the different stimulus features and characteristics of a raisin. Participants are then asked to link that awareness of the raisin to their awareness of their anxiety towards spiders.

**Additional mindfulness techniques.** If additional sessions are needed, the following are additional techniques that may also be presented in order to help participants make direct contact with their present experiences with an open and nonjudgmental attitude. These include:

a. Take Your Mind for a Walk Exercise (Hayes et al., 1999, p.163). Provides an experience of how busy and evaluative minds can be.
b. Be mindful of your feet while you read this (Hayes & Smith, 2005, p.114).

Module VII: Fusion with self-as-concept/self-as-context

Participants are introduced to the concept of self-as-context and asked to view themselves as not their thoughts or take their thoughts as “literal truths,” but rather as merely thoughts they are having. Helping clients gain a different perspective on their thoughts is emphasized during this session.

The chessboard metaphor and exercise. To help strengthen perspective taking participants are presented with the Chessboard Metaphor and exercise (Hayes et al., 1999, pp. 190-191). Participants are asked to envision themselves as the chessboard that holds the pieces (their thoughts, feelings, emotions). The participants are asked to view the battle that is occurring on the board without getting involved and it is pointed out that they can still move.

Additional self-as-context techniques. If additional sessions are needed the following are additional techniques that may also be presented in order to help participants strengthen their perspective taking. These include:

a. Mental Polarity Exercise (Hayes et al., 1999, p. 190). Allows clients to begin noticing the process of consciousness and sense of perspective.


Module VIII: Dysfunctional rule-following/valuing
Participants are asked to explore their values and what living life to the fullest means to them. Participants are asked to think about what their life would like if their anxiety-monster about spiders did not rule them.

**My valued life epitaph.** To assist in making this point, the “epitaph” (see end of protocol for a copy) and “What do you want your life to stand for” exercises adapted from Hayes et al. (1999, pp. 215-218) and Eifert and Forsyth (2005, p. 158) are presented. Participants are given a piece of paper with a tombstone on it and asked to write in the inscription what they want engraved on the gravestone to capture the essence of their life.

**Additional valuing techniques.** If additional sessions are needed, the following are additional techniques that may also be presented in order to help participants identify and clarify what matters to them most. These include


b. The Path Up the Mountain Metaphor (Hayes et al., 1999, p. 222).

c. Have clients choose between two things: Right/Left Hand, Coke and 7-up, Two Types of Food (Hayes et al., 1999, p. 213). Assess reason-giving behaviors. Define choices and have clients make a simple one. Then ask why? If there is any content based answer, repeat.

**Module IX: Impulsivity and dysfunctional persistence/committed action**

Once participants have identified and clarified their values, they are asked to select a specific course of committed action that will support and move them in the direction of those values.
The passengers on the bus metaphor. The Passengers on the Bus metaphor (Hayes et al., 1999, p. 157) is adapted by asking participants to respond to scary private events about spiders as passengers on a bus they are driving. It helps illustrate how language works and what the cost is in terms of impeding movement in a valued direction.

Additional committed action techniques. If additional sessions are needed, the following are additional techniques that may also be presented in order to help participants strengthen their perspective taking. These include


c. Joe the Bum Metaphor (Hayes et al., 1999, p. 240). Illustrates that when clients try hard to stop ones reaction, other undesirable reactions follow right behind.
My Valued Life Epitaph
### Glossary of Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tr>
<td>AAQ-II</td>
<td>Acceptance and Action Questionnaire-II</td>
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<td>ACT</td>
<td>Acceptance and Commitment Therapy</td>
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<td>ADIS-IV</td>
<td>Anxiety Disorders Interview Schedule</td>
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<td>APA</td>
<td>American Psychological Association</td>
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<tr>
<td>BAT</td>
<td>Behavioral Avoidance Test</td>
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<td>CBGT</td>
<td>Cognitive-Behavioral Group Therapy</td>
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<td>Courage Measure</td>
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<td>Conditioned Response</td>
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<td>CS</td>
<td>Conditioned Stimulus</td>
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<td>DS-R</td>
<td>Disgust-Scale Revised</td>
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<td>DSM-IV-TR</td>
<td>Diagnostic and Statistical Manual for Mental Disorders IV-Text Revision</td>
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<tr>
<td>NEO-FFI</td>
<td>The NEO Five-Factor Inventory</td>
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<td>OCD</td>
<td>Obsessive-Compulsive Disorder</td>
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<td>RC</td>
<td>Reliability Change Index</td>
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<td>RFT</td>
<td>Relational Frame Theory</td>
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<td>RSE</td>
<td>Rosenberg Self-Esteem Scale</td>
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<td>SBQ</td>
<td>Spider Phobia Beliefs Questionnaire</td>
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<td>SCL-90-R</td>
<td>Symptom Checklist-90-Revised</td>
</tr>
<tr>
<td>SPQ</td>
<td>Spider Phobia Questionnaire</td>
</tr>
<tr>
<td>STAI-Y-2</td>
<td>The State-Trait Anxiety Inventory, State Form Y-2</td>
</tr>
<tr>
<td>SUDS</td>
<td>Subjective Units of Disturbance</td>
</tr>
<tr>
<td>SUDS-D</td>
<td>Subjective Units of Disturbance-Disgust (Subjective Levels of Disgust)</td>
</tr>
<tr>
<td>SUDS-F</td>
<td>Subjective Units of Disturbance-Fear (Subjective Levels of Fear)</td>
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<td>UCS</td>
<td>Unconditioned Stimulus</td>
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Table 2

List of Measures

**Pretreatment Screening Measures**

Background Information Questionnaire: Demographic and historical information
Anxiety Disorder Interview Schedule-IV (ADSI-IV): Diagnostic verification
Spider Phobia Questionnaire (SPQ): Level of arachnophobia; also administered at posttreatment and follow-up

**Moderating Measures:** Administered pretreatment, posttreatment, and follow-up

Acceptance and Action Questionnaire-II (AAQ-II): Psychological flexibility
Courage Measure (CM): Courageousness

**Macrolevel Process Measures:**

Administered pretreatment, posttreatment, and follow-up

- Disgust Scale-Revised (DS-R): Disgust sensitivity
- Spider Phobia Beliefs Questionnaire (SBQ): Beliefs about spiders
- Stroop Task: Emotional information processing

Administered posttreatment and follow-up

- Willingness Measure: Openness to have contact with spiders

**Within Session/Microlevel Process Measures:** Administered during each BAT

Blood pressure/heart rate
Distress Thermometer: Subjective fear (SUDS-F) and disgust (SUDS-D)

**Outcome Measures**

Spider Phobia Questionnaire (SPQ)
Modules to successful treatment criterion
Recommendation of treatment to a friend or family member
Continued Avoidance
Activity Engagement

**Posttreatment Measure**

Posttreatment Questionnaire

**Follow-Up Measure**

Follow-up Questionnaire
Table 3

Demographic and Background Information of Participants

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**Supplemental Questionnaire Data**

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*Note.* SCL-90-R = Symptom Checklist- 90-Revised; STAI-Y-2 = State Trait Anxiety Inventory, Form Y-2; RSE = Rosenberg Self-Esteem Scale.
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Table 6

Posttreatment and Follow-Up Questionnaire Responses

1. Treatment Utilization

Posttreatment: During your interactions with the spider, did you use any of the techniques or suggestions you learned in therapy? If so, which ones?

**CBT Participants**

P1 I would use the replacement thoughts and relaxation method

P2 I to some degree forgot to use the PMR techniques mostly because of my anxiety. But, having more positive thoughts and feelings in control helped.

P3 Yes, I used the relaxation technique and the repetition of counter statements

P7 Cognitive self statements and relaxation techniques

P9 Yes, I used the relaxation exercise and self-statements

**ACT Participants**

P4 Yes, I started talking in a funny voice to relieve anxiety, which worked.

P5 Yes, I found it helpful to keep repeating things in my head. I also kept thinking about the fact that there was no real reason to be scared, it’s just my anxiety.

P6 I would breathe and try to be mindful. I tried to visualize and focus on my fear.

P8 Yes, I thought accepting my feelings of fear/anxiety instead of trying to fight them was the most helpful technique.

Follow-Up: In the past two months, did you use any of the techniques or suggestions you learned in therapy in dealing with spiders? If so, which ones?

**CBT Participants**

P1 Yes. Visited an animal refuge and went into a building I thought might display spiders. I reframed and told myself they were in cages, couldn't hurt me, etc

P2 I used self-statements to some degree and reminded myself of the realismness of my fears.

P3 I was able to face insects and spiders more readily using the positive statement method.

P7 Yes, telling myself calming thoughts when I saw a spider
P9  Self-statements and muscle relaxation

**ACT Participants**

P4  Not running away when I feel nervous about spiders or social situations. Talking in a funny voice/cracking jokes to ease my nerves.

P5  Yes, although it wasn't used directly towards live spiders I used the technique of repeating a word over and over until it just became a word that held no meaning with pictures of spiders.

P6  The funny voices/diffusion and slept in the back bedroom and spider zoo

P8  Acceptance techniques and being still with my thoughts and feelings

2. **Helpful Therapeutic Components:** What was the most helpful/beneficial part of the therapy?

**Posttreatment**

**CBT Participants**

P1  The relaxation method

P2  Challenging beliefs helped a lot.

P3  Being able to find counter statements to the negative thoughts that flash in my mind

P7  Cognitive self statements

P9  Learning to counteract irrational thoughts and to calm down my body’s natural reactions to fear. Putting tools to use with the spider

**ACT Participants**

P4  It gave me tools to work with my phobia that I wouldn't have thought of that work. Opposites of what I originally thought to do.

P5  I think the most helpful part was being able to know the difference between fear and anxiety. It helped me see a different perspective and not get caught in being afraid of my anxiety.
P6 Just talking about my fears and why I am afraid. It also helped me see what I am putting off because of my fear.

P8 Talking through the feelings I have and making space for them in my life without trying to fight them.

**Follow-Up**

**CBT Participants**

P1 Reframing and clenching and releasing fists

P2 Challenging my beliefs/self-statements, building confidence/sense of control.

P3 All the techniques were useful

P7 Getting tips on what to think IP say to myself when I come into contact with a spider

P9 Learning how to cope with fear through self-statements and muscle relaxation

**ACT Participants**

P4 Learning how to handle and diffuse fear

P5 I think the most helpful part was just receiving information & techniques to “be with” my fears. Every part of therapy helped me look at my fears in a new perspective.

P6 Talking about and knowing my fear in general is not going to hurt me unless I let it and knowing I’m not the only one with fear. I am normal.

P8 Acceptance of my fears and anxiety

**3. Unhelpful Therapeutic Components:** What was the least helpful part of therapy?

**Posttreatment**

**CBT Participants**

P1 N/A

P2 Learning about PRM was helpful and made me realize that I can control my anxiety. I found it was helpful because it was empowering, but I don’t use it.

P3 The word-color test

P7 None
The therapy did not give any insight into why I am afraid of spiders, which I always wanted to understand.

All were helpful but some were less helpful like the relaxation techniques. Practicing the relaxation technique once helped me feel more in control & confident, but I can’t see myself using them often.

Nothing

There was not one

Defusion exercise in character voice
### Table 7

**Data for Outcome Measures**

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*Data for Outcome Measures (continued)*

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<sup>a</sup> Modules = Number of modules needed to reach successful treatment termination  
<sup>b</sup> Recommendation = “How much would you recommend this treatment to a friend or family member who also wished to address their fear of spiders (1 = Not at all, 10 = Most definitely)?”  
<sup>c</sup> Avoidance = “To what degree have you avoided coming into contact with spiders (1= Not at all, 10 = All the time)?”  
<sup>d</sup> Engagement = “In the past two months, to what degree have you engaged in activities that you initially refrained from doing due to your fear of spiders (1= Not at all, 10 = All the time)?”
Table 8

Clinical Status of Participants at Posttreatment and Follow-up: SPQ Scores

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<td>P4, P5, P8</td>
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*Data for Moderating Measures at Pretreatment, Posttreatment, and Follow-up*

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Table 10

Summary of Spearman Rank Correlations Between Pretreatment AAQ-2 and Outcome Measures

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* \( p \leq .05 \).
Table 11

*Summary of Spearman Rank Correlations Between CM Change Scores and Outcome Measures*

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* \( p \leq .05 \).
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Table 13  
*Summary of Spearman Rank Correlations Between DS-R Change Scores and Outcome Measures*

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* p ≤ .05.
Table 14

Summary of Spearman Rank Correlations Between SBQI Change Scores and Outcome Measures

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* p ≤ .05.
Table 15

*Summary of Spearman Rank Correlations Between SBQII Change Scores and Outcome Measures*

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<td>Post Tx Recommendation</td>
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<td>-.90</td>
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<td>FU Recommendation</td>
<td>-.90*</td>
<td>-.74</td>
</tr>
<tr>
<td>Spider Avoidance</td>
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<td>.10</td>
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<tr>
<td>Activity Engagement</td>
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<td>.10</td>
</tr>
<tr>
<td>Pre to Follow-up Change</td>
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<td></td>
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<tr>
<td>Pre-FU SPQ Change</td>
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<td>.20</td>
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<td>FU Recommendation</td>
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<td>-.95*</td>
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<td>Spider Avoidance</td>
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<tr>
<td>Activity Engagement</td>
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* $p \leq .05$. 
Table 16

Stroop Task Error Rates

<table>
<thead>
<tr>
<th>Word Condition</th>
<th>CBT Participants</th>
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</tr>
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<tr>
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<td>.04</td>
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<tr>
<td>Post</td>
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<tr>
<td>FU</td>
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<tr>
<td>Pre</td>
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<td>.24</td>
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<td>Post</td>
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<td>.04</td>
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<tr>
<td>FU</td>
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<td>.06</td>
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<tr>
<td>Spider</td>
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<tr>
<td>Pre</td>
<td>.02</td>
<td>.04</td>
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<tr>
<td>Post</td>
<td>.03</td>
<td>.04</td>
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<tr>
<td>FU</td>
<td>.11</td>
<td>.04</td>
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<td>Word Condition</td>
<td>CBT Participants</td>
<td>ACT Participants</td>
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<td>------------------</td>
</tr>
<tr>
<td>Neutral</td>
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<td></td>
</tr>
<tr>
<td>Pre</td>
<td>573 793 784 741 654</td>
<td>709.00 (93.84)</td>
</tr>
<tr>
<td>Post</td>
<td>659 558 608 505 958</td>
<td>657.60 (177.42)</td>
</tr>
<tr>
<td>FU</td>
<td>636 584 640 496 844</td>
<td>640.00 (127.97)</td>
</tr>
<tr>
<td>Incompatible</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre</td>
<td>657 831 783 889 730</td>
<td>778.00 (89.60)</td>
</tr>
<tr>
<td>Post</td>
<td>728 630 639 550 1153</td>
<td>740.00 (239.33)</td>
</tr>
<tr>
<td>FU</td>
<td>710 688 621 549 1026</td>
<td>718.80 (182.90)</td>
</tr>
<tr>
<td>Spider</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre</td>
<td>575 749 696 731 600</td>
<td>670.20 (78.40)</td>
</tr>
<tr>
<td>Post</td>
<td>653 588 574 506 873</td>
<td>638.80 (140.95)</td>
</tr>
<tr>
<td>FU</td>
<td>662 569 586 496 844</td>
<td>608.80 (88.32)</td>
</tr>
<tr>
<td>Neutral</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre</td>
<td>506 1186 647 551</td>
<td>722.50 (314.55)</td>
</tr>
<tr>
<td>Post</td>
<td>494 492 642 634</td>
<td>656.50 (83.80)</td>
</tr>
<tr>
<td>FU</td>
<td>501 484 640 613</td>
<td>559.50 (78.50)</td>
</tr>
<tr>
<td>Incompatible</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre</td>
<td>522 1377 695 584</td>
<td>794.50 (394.90)</td>
</tr>
<tr>
<td>Post</td>
<td>494 513 665 727</td>
<td>599.75 (114.25)</td>
</tr>
<tr>
<td>FU</td>
<td>520 487 718 648</td>
<td>593.25 (108.34)</td>
</tr>
<tr>
<td>Spider</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre</td>
<td>495 1215 652 532</td>
<td>723.50 (334.45)</td>
</tr>
<tr>
<td>Post</td>
<td>471 493 655 585</td>
<td>551.00 (85.12)</td>
</tr>
<tr>
<td>FU</td>
<td>482 495 568 574</td>
<td>529.75 (47.99)</td>
</tr>
</tbody>
</table>
Table 18

*Willingness to Have a Spider Crawl in One’s Hair*

<table>
<thead>
<tr>
<th>Assessment</th>
<th>P1</th>
<th>P2</th>
<th>P3</th>
<th>P7</th>
<th>P9</th>
<th>M (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Posttreatment</td>
<td>4</td>
<td>1</td>
<td>4</td>
<td>3</td>
<td>4</td>
<td>3.2 (1.3)</td>
</tr>
<tr>
<td>Follow-Up</td>
<td>4</td>
<td>1</td>
<td>4</td>
<td>2</td>
<td>3</td>
<td>2.8 (1.3)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Assessment</th>
<th>P4</th>
<th>P5</th>
<th>P6</th>
<th>P8</th>
<th>M (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Posttreatment</td>
<td>6</td>
<td>4</td>
<td>5</td>
<td>4</td>
<td>4.75 (.96)</td>
</tr>
<tr>
<td>Follow-Up</td>
<td>7</td>
<td>5</td>
<td>6</td>
<td>6</td>
<td>6.00 (.82)</td>
</tr>
</tbody>
</table>

*Note.* 0 = Not at all willing; 10 = Extremely willing.
Table 19

Summary of Spearman Rank Correlations Between Willingness to Have a Spider Crawl in One’s Hair and Outcome Measures

<table>
<thead>
<tr>
<th>Measures</th>
<th>CBT</th>
<th>ACT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Posttreatment Willingness</td>
<td>$r_s$</td>
<td>$r_s$</td>
</tr>
<tr>
<td>Pre-Post SPQ Change</td>
<td>-.78</td>
<td>-.11</td>
</tr>
<tr>
<td>Pre-FU SPQ Change</td>
<td>-.30</td>
<td>-.11</td>
</tr>
<tr>
<td>No. of Modules</td>
<td>.50</td>
<td>-.06</td>
</tr>
<tr>
<td>Post Recommendation</td>
<td>.30</td>
<td>-.94*</td>
</tr>
<tr>
<td>FU Recommendation</td>
<td>.13</td>
<td>-1.00**</td>
</tr>
<tr>
<td>Spider Avoidance</td>
<td>-1.00**</td>
<td>.50</td>
</tr>
<tr>
<td>Activity Engagement</td>
<td>.11</td>
<td>.05</td>
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</tbody>
</table>

Follow-up Willingness

<table>
<thead>
<tr>
<th></th>
<th>CBT</th>
<th>ACT</th>
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</thead>
<tbody>
<tr>
<td>Pre-FU SPQ Change</td>
<td>-.50</td>
<td>.32</td>
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<tr>
<td>FU Recommendation</td>
<td>.50</td>
<td>-.83</td>
</tr>
<tr>
<td>Spider Avoidance</td>
<td>-.91*</td>
<td>.15</td>
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<tr>
<td>Activity Engagement</td>
<td>.33</td>
<td>.33</td>
</tr>
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* $p \leq .05$
** $p \leq .01.$
Table 20

*Autonomic Arousal and Subjective Fear Data Across Phases*

<table>
<thead>
<tr>
<th></th>
<th><strong>Baseline Phase</strong></th>
<th></th>
<th><strong>Treatment Phase</strong></th>
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<th><strong>Posttreatment Phase</strong></th>
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<th><strong>Follow-Up Phase</strong></th>
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<tr>
<td></td>
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<td><strong>ACT</strong></td>
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<td><strong>CBT</strong></td>
<td><strong>ACT</strong></td>
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<td><strong>CBT</strong></td>
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<td></td>
<td><strong>PreBAT</strong></td>
<td><strong>PostBAT</strong></td>
<td><strong>PreBAT</strong></td>
<td><strong>PostBAT</strong></td>
<td><strong>PreBAT</strong></td>
<td><strong>PostBAT</strong></td>
<td><strong>PreBAT</strong></td>
</tr>
<tr>
<td>Systolic- BP</td>
<td>121.39 (4.03)</td>
<td>125.03 (4.50)</td>
<td>117.40 (13.90)</td>
<td>122.90 (15.70)</td>
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</tr>
<tr>
<td>Diastolic- BP</td>
<td>75.05 (7.20)</td>
<td>76.60 (8.20)</td>
<td>66.34 (3.72)</td>
<td>71.40 (4.30)</td>
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<tr>
<td>Pulse Rate</td>
<td>81.13 (5.02)</td>
<td>90.30 (4.60)</td>
<td>72.04 (8.80)</td>
<td>79.30 (7.10)</td>
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</tr>
<tr>
<td>SUDS-F</td>
<td>3.00 (1.38)</td>
<td>6.43 (1.25)</td>
<td>5.00 (2.40)</td>
<td>6.90 (1.20)</td>
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<tr>
<td>Systolic- BP</td>
<td>123.73 (9.21)</td>
<td>125.64 (10.10)</td>
<td>122.90 (11.13)</td>
<td>128.20 (11.13)</td>
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<tr>
<td>Diastolic- BP</td>
<td>76.95 (7.97)</td>
<td>77.40 (9.80)</td>
<td>75.10 (5.10)</td>
<td>76.80 (2.90)</td>
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<tr>
<td>Pulse Rate</td>
<td>82.33 (6.54)</td>
<td>84.23 (6.61)</td>
<td>72.54 (6.20)</td>
<td>77.60 (6.20)</td>
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<tr>
<td>SUDS-F</td>
<td>2.04 (1.39)</td>
<td>4.42 (1.91)</td>
<td>4.33 (2.40)</td>
<td>7.00 (1.75)</td>
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</tr>
<tr>
<td>Systolic- BP</td>
<td>123.00 (13.80)</td>
<td>121.80 (11.30)</td>
<td>123.00 (10.71)</td>
<td>122.50 (13.72)</td>
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<tr>
<td>Diastolic- BP</td>
<td>71.00 (3.93)</td>
<td>69.80 (6.42)</td>
<td>65.50 (6.45)</td>
<td>70.50 (11.33)</td>
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<tr>
<td>Pulse Rate</td>
<td>80.80 (7.52)</td>
<td>80.20 (7.98)</td>
<td>74.50 (9.70)</td>
<td>81.00 (11.20)</td>
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<tr>
<td>SUDS-F</td>
<td>1.60 (.55)</td>
<td>2.40 (1.67)</td>
<td>3.25 (2.63)</td>
<td>4.75 (3.60)</td>
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</tr>
<tr>
<td>Systolic-BP</td>
<td>115.00 (7.25)</td>
<td>126.80 (11.25)</td>
<td>119.00 (19.40)</td>
<td>121.75 (18.93)</td>
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</tr>
<tr>
<td>Diastolic-BP</td>
<td>68.60 (6.31)</td>
<td>68.40 (8.99)</td>
<td>65.00 (7.90)</td>
<td>65.00 (11.70)</td>
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<tr>
<td>Pulse Rate</td>
<td>84.00 (10.20)</td>
<td>86.2 (17.70)</td>
<td>87.75 (9.20)</td>
<td>91.80 (8.85)</td>
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<td></td>
</tr>
<tr>
<td>SUDS-F</td>
<td>2.00 (.71)</td>
<td>3.20 (1.30)</td>
<td>3.50 (3.31)</td>
<td>5.25 (3.30)</td>
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</table>

*Note.* Nonparenthetical data are means; parenthetical data are standard deviations.
Table 21

*Subjective Disgust Data Across Phases*

<table>
<thead>
<tr>
<th>Phase</th>
<th>CBT Mean (SD)</th>
<th>ACT Mean (SD)</th>
<th>U</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
<td>5.08 (3.62)</td>
<td>7.00 (2.70)</td>
<td>5</td>
<td>.21</td>
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<tr>
<td>Treatment</td>
<td>4.51 (2.70)</td>
<td>6.89 (2.82)</td>
<td>4</td>
<td>.14</td>
</tr>
<tr>
<td>Posttreatment</td>
<td>3.40 (2.60)</td>
<td>5.75 (4.03)</td>
<td>6</td>
<td>.31</td>
</tr>
<tr>
<td>Follow-up</td>
<td>3.20 (2.86)</td>
<td>5.25 (3.50)</td>
<td>6</td>
<td>.31</td>
</tr>
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</table>
Table 22
*Summary of Spearman Rank Time Lagged Correlations Between Within-Session Mediating Variables and Approach Behavior During Baseline and Treatment Phase BATs*

<table>
<thead>
<tr>
<th>Measures</th>
<th>CBT $(n = 16)$</th>
<th>ACT $(n = 12)$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$r_s$</td>
<td>$r_s$</td>
</tr>
<tr>
<td><strong>Baseline</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PostSystolic BP</td>
<td>-.26</td>
<td>.40</td>
</tr>
<tr>
<td>PostDiastolic BP</td>
<td>.61**</td>
<td>.29</td>
</tr>
<tr>
<td>PostPulse</td>
<td>.29</td>
<td>.46</td>
</tr>
<tr>
<td>Post SUDS-F</td>
<td>.13</td>
<td>.44</td>
</tr>
<tr>
<td>SUDS-D</td>
<td>-.78**</td>
<td>-.47</td>
</tr>
<tr>
<td><strong>Treatment</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PostSystolic BP</td>
<td>-.49</td>
<td>.39</td>
</tr>
<tr>
<td>PostDiastolic BP</td>
<td>-.08</td>
<td>-.18</td>
</tr>
<tr>
<td>PostPulse</td>
<td>-.42</td>
<td>-.33</td>
</tr>
<tr>
<td>Post SUDS-F</td>
<td>-.58</td>
<td>-.68*</td>
</tr>
<tr>
<td>SUDS-D</td>
<td>-.11</td>
<td>-.37</td>
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** $p \leq .01$.  
* $p \leq .05$.  

*198*
Table 23

Summary of Major Findings

<table>
<thead>
<tr>
<th>Class of Variables</th>
<th>Key Findings</th>
</tr>
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<tbody>
<tr>
<td>Outcome Measures</td>
<td>Equivalent statistically and clinically significant improvement for CBT and ACT maintained through follow-up.</td>
</tr>
<tr>
<td>Moderating Measures</td>
<td>Participants lower in experiential avoidance more responsive to both interventions.</td>
</tr>
<tr>
<td>Macrolevel Process Measures</td>
<td>Greater reductions in disgust and increases in willingness for ACT than CBT.</td>
</tr>
<tr>
<td>Within Session/Microlevel Measures</td>
<td>Diastolic blood pressure and pulse rate mediated approach towards the spider for CBT alone; subjective fear mediated approach behavior for both groups.</td>
</tr>
</tbody>
</table>
Figure 1. Flow of Participants Through Each Stage of the Study

Study Inquiries ($n=16$)

Pretreatment Assessment ($n=9$)

Phase I: Screened for and met eligibility ($n=9$)
- Background Information Questionnaire
- SPQ
- BAT I
- ADIS-IV

Phase II: Administration of moderating and macrolevel process measures
- AAQ-II
- CM
- DS-R
- SBQ
- Stroop Task
- BAT 2

Phase III: Collection of additional BATs and supplemental measures
- SCL-90-R
- STAI-Y-2

CBT ($n=5$)

ACT ($n=4$)

P2
P1 and P9
BAT 3

P3 and P7
BAT 3

P5
P4 and P8
BAT 3

P6
BAT 3

Additional Supplemental Measures: RSE and NEO-FFI

Treatment Phase: Last baseline BAT, treatment modules, and additional BATS

Posttreatment Assessment: BAT, AAQ-II, CM, DS-R, SBQ, SPQ, Stroop, Willingness measure, and Posttreatment Questionnaire

Follow-up Assessment: BAT, same measures as posttreatment assessment, and Follow-up Questionnaire
Figure 2. Mean SPQ Scores for Treatment Groups Across Assessment Occasions
Figure 3. Approach Behavior of CBT Participants Towards the Spider
Figure 4. Approach Behavior of ACT Participants Towards the Spider

Baseline | Treatment
---|---

Number of BATS

Feet Towards Spider

0 2 4 6 8 10 12 14 16 18 20 22 24

0 2 4 6 8 10 12 14 16 18 20 22 24

0 2 4 6 8 10 12 14 16 18 20 22 24

0 2 4 6 8 10 12 14 16 18 20 22 24

0 1 2 3 4 5 6 7 8 9 10 11 12

P5

P4

P8

P6
Figure 5. Percentage of Change in Approach Behavior Between BATS for CBT Participants

Baseline vs Treatment graph for participants P1, P2, P3, P7, and P9.
Figure 6. Percentage of Change in Approach Behavior Between BATS for ACT Participants

Successive BATS
Figure 7. Mean DS-R Scores for Treatment Groups Across Assessment Occasions

[Graph showing the mean DS-R scores for CBT and ACT across pre, post, and follow-up assessment occasions.]
Figure 8. Mean SBQI Scores for Treatment Groups Across Assessment Occasions
Figure 9. Mean SBQII Scores for Treatment Groups Across Assessment Occasions
Figure 10. Response Times by Stroop Task Word Conditions Across Assessment Occasions
Figure 11. Mean Pre and PostBAT Levels of Fear for Treatment Groups Across Phases
Figure 12. Mean SUDS-F Change Scores for Treatment Groups Across Phases
Figure 13. Mean SUDS-D Levels for Treatment Groups Across Phases