EXAMINING THE RELATIONSHIP BETWEEN EXPERIENTIAL AVOIDANCE AND ATTENTIONAL BIAS USING EYE-TRACKING

A Thesis
by
KERRY C. KELSO

Submitted to the Graduate School
at Appalachian State University
in partial fulfillment of the requirements for the degree of
MASTER OF ARTS IN CLINICAL PSYCHOLOGY

May 2017
Department of Psychology

EXAMINING THE RELATIONSHIP BETWEEN EXPERIENTIAL AVOIDANCE AND ATTENTIONAL BIAS USING EYE-TRACKING

A Thesis
by
KERRY C. KELSO
May 2017

APPROVED BY:

Joshua J. Broman-Fulks, Ph.D.
Chairperson, Thesis Committee

Christopher A. Dickinson, Ph.D.
Member, Thesis Committee

John Paul Jameson, Ph.D.
Member, Thesis Committee

James C. Denniston, Ph.D.
Chairperson, Department of Psychology

Max C. Poole, Ph.D.
Dean, Cratis D. Williams School of Graduate Studies

Abstract

EXAMING THE RELATIONSHIP BETWEEN EXPERIENTIAL AVOIDANCE AND ATTENTIONAL BIAS USING EYE-TRACKING

Kerry C. Kelso
B.A., University of North Carolina at Chapel Hill
M.A., Appalachian State University

Chairperson: Joshua J. Broman-Fulks, Ph.D.

Anxiety disorders are highly prevalent and associated with chronic and recurrent courses, high disability rates, and diminished quality of life. Cognitive models of anxiety disorders propose that attentional biases serve as a key contributor to the development and maintenance of anxiety pathology, and a large body of research has accumulated demonstrating that anxious individuals exhibit consistent attentional biases for threat-relevant information. Recent research has also suggested that individuals with known cognitive vulnerabilities for anxiety disorders (e.g., anxiety sensitivity) exhibit similar attentional biases for threat, and interventions that attenuate biases for threatening stimuli can lead to reductions in anxiety among clinically anxious and vulnerable samples. Experiential avoidance (EA), or the unwillingness to experience uncomfortable cognitive, emotional, or sensory experiences, has been proposed to serve as a core vulnerability factor for emotional disorders in some recent models of psychopathology, and several lines of correlational and longitudinal research appears to support this assertion. Although preliminary research suggests that EA is characterized by biased processing, researchers have yet to examine the

association between EA and attentional biases. Using eye tracking technology, the present study examined whether EA predicted attentional vigilance to, fixation on, and subsequent avoidance of negative-emotion and anxiety-related stimuli in 141 undergraduate students. Contrary to hypotheses, EA was not significantly related to any eye-tracking outcomes beyond a negative association with vigilance to neutral stimuli. Results are framed within the context of the anxiety attentional bias literature and directions for future research are discussed.

Keywords: anxiety disorders, transdiagnostic, experiential avoidance, attentional bias

Acknowledgments

First, I would like to thank my mentor, Dr. Joshua J. Broman-Fulks, for his support throughout my post-baccalaureate and graduate studies. Without his assistance, I would not have accrued an extensive knowledge-base of anxiety and pertinent transdiagnostic mechanisms or be fortunate enough to attend a clinical psychology doctoral program later this year. I also want to extend my gratitude to the two other members of my thesis committee, Dr. Christopher A. Dickinson, particularly for his responsiveness and aid in guiding me through using the eye-tracker and preparing the relevant data for analysis, and Dr. John Paul Jameson, for flexibly joining my committee at a late juncture. Further, I am indebted to my program director, Dr. Lisa A. Curtin, for her consistent encouragement and direction. Likewise, I am appreciative of my cohort member, Brittany Kirschner, for her unwavering friendship. Lastly, and most importantly, I want to thank my parents for their unconditional love; I owe all of my accomplishments to them.

Table of Contents

List of Tables

Examining the Relationship between Experiential Avoidance and Attention Bias using Eye-Tracking

Anxiety disorders are among the most prevalent psychological disorders, affecting nearly 30% of Americans at some point in their lives. Clinical anxiety typically develops in childhood, with 11 years old as the median age-of-onset (Kessler et al., 2005), and often exhibits a chronic course. Among a sample of 907 mixed anxious individuals, roughly 60% reported moderate to severe chronic symptoms over the course of two years (Batelaan, Rhebergen, Spinhoven, van Balkom, & Penninx, 2014). Even when individuals successfully overcome clinical anxiety, a sizable portion will have their difficulties reemerge or develop new anxiety disorders. In a sample of 429 individuals with a remitted anxiety disorder, 23.5% experienced a reoccurrence and 32.7% qualified for an additional anxiety diagnosis at two years from baseline (Scholten et al., 2013).

Clinical anxiety is related to functional impairment and is the sixth leading cause of disability worldwide (Baxter, Vos, Scott, Ferrari, & Whiteford, 2014). Similarly, anxiety disorders are linked to reduced life satisfaction. A meta-analytic review of 23 studies revealed clinically anxious individuals report substantially worse quality of life than their healthy counterparts, yielding a large overall effect size (d = 1.31) (Olatunji, Cisler, & Tolin, 2007). Anxiety disorders are also associated with marked financial burden, both for sufferers and society as a whole. Data from the 2009 and 2010 Medical Expenditure Panel Survey suggested the annual healthcare cost for clinical anxiety was approximately $1,657.52 per affected individual or $33.71 billion (Shirneshan et al., 2013). Considering anxiety disorders' high prevalence, early onset, chronic and recurrent course of disability, poor quality of life,

and financial hardship for both those directly and indirectly affected, research aimed at elucidating the structure and successful treatment of anxiety disorders is critical.

Numerous theoretical models have been developed to conceptualize the etiology and maintenance of anxiety pathology. From the cognitive perspective, one of the more prominent models has been a schema-based model advanced by Beck and Clark (1997), who proposed that individuals' perceptions (i.e., "automatic thoughts" surrounding feared stimuli) influence their emotions and behavior, and can lead them to experience marked distress and impairment. The model proposes that information is processed in three stages, and individuals who exhibit specific patterns of cognitive processing, such as biases for threat-relevant information, are at an increased risk for anxiety pathology. In Stage I of the model, or the orienting mode, a stimulus is registered as threatening and information is processed quickly, involuntarily, and pre-attentively. Stage I processing functions as an assignment of attentional priority to incoming information. In Stage II, or immediate preparation, primal threat mode or anxious responding is activated and processing is both automatic and strategic. Stage II processing is rapid, involuntary, and inflexible, and functions as a means of survival for the individual. In turn, automatic anxious thoughts and biased cognitive processing stem from activation of this primal threat mode. Stage III, or secondary elaboration, entails the activation of additional related semantic processing or "other schemas representing the current concerns and personal issues of the individual" (Beck & Clark, 1997, p.57). Stage III functions as a reconsideration of the feared stimulus, including the availability and value of coping resources. In turn, processing is conscious and effortful during this stage, driven by existing schemas. If the primal threat mode remains hyperactive during secondary elaboration, then activation of more effective reappraisal processes will be

prevented, further exacerbating anxiety. Therefore, successful treatment of anxiety should seek to weaken the automatic activation of primal threat mode and strengthen more productive reappraisal (and therefore, coping) in secondary elaboration (Beck & Clark, 1997).

Williams, Watts, MacLeod, and Mathews (1997) proposed an additional information-processing model of anxiety. Initially, a pre-attentive affective decision mechanism gauges the threat value of stimuli. Once the affective decision mechanism assesses threat levels, the cognitive resource allocation mechanism determines the mental energy to devote to stimuli. Williams et al. proposed that persons with high state anxiety have more sensitive affective decision mechanisms and are more likely to perceive stimuli as threatening and in turn, devote more resources to them. Further, if high-state anxious individuals are under stress, they will most likely devote even more cognitive energy to stimuli evaluated as threatening. Overall, Williams and colleagues' model suggests attentional bias serves as a vulnerability factor for development of clinical anxiety using a diathesis-stress framework and maintains heightened anxiety by prolonging emotional disturbances (Williams et al., 1997).

Meanwhile, Eysenck also proposed a cognitive theory of anxiety in which hyper-vigilance serves as a risk and maintenance factor for anxiety psychopathology. Hyper-vigilance includes the tendencies to attend to threatening over non-threatening stimuli, to be more distractible, to environmentally scan, and to have a restricted attentional scope once a threat has been identified. Eysenck identified hyper-vigilance as a latent vulnerability factor, using a diathesis-stress perspective where hyper-vigilant persons are predisposed to perceive more threat in their environments and thus view their environments as more threatening. In

turn, anxiety psychopathology is maintained through the positive feedback loops between cognitive biases and state anxiety (Eysenck, 1992, 1997).

In 1998, Mogg and Bradley introduced a cognitive-motivational analysis of anxiety including a valence evaluation system and a goal engagement system. Much like Williams and colleagues' dual mechanisms, the valence evaluation system assesses the threat level of a stimulus while the goal engagement system devotes attention and cognitive faculties towards processing the perceived threat. Hypersensitivity of the valence evaluation system confers risk for and may perpetuate clinical anxiety. Moreover, once a stimulus is gauged as a threat, maladaptive coping, namely avoidance, will further maintain anxiety. Additionally, Mogg and Bradley postulated that those with high trait anxiety more readily perceive threat and are therefore more likely to view their environments as threatening, which could further exacerbate their anxiety (Mogg & Bradley, 1998).

More recently, a few integrative models have been introduced combining aspects of prior cognitive perspectives of anxiety. In 2007, Bar-Haim, Lamy, Pergamin, Bakermans-Kranenburg, and Van Ijzendoorn proposed a four system model. First, a pre-attentive threat evaluation system assesses threat value of stimuli followed by a resource allocation system which results in physiological arousal, disruption of ongoing activity, and attentional orienting toward stimuli. Next, a guided threat evaluation system compares the current stimuli with learning history while context and coping mechanisms are considered. Finally, a conscious goal engagement system is activated where the pursuit of present goals is disrupted and a person's primary drive is to alleviate his or her anxiety. Bar-Haim et al. concluded that hypersensitivity of the resource allocation system is both a vulnerability and maintenance factor in clinical anxiety (Bar-Haim et al., 2007).

In 2009, Ouimet, Gawronski, and Dozois introduced an integrative multi-process model, utilizing a dual-systems approach based on social-cognitive research. Dual-systems models involve associative and rule-based information processing systems, where the former entails activation of related concepts through spreading activation and the latter includes rational examination of activated concepts to inform deductive reasoning. A key factor in dual-systems models is that both systems operate in tandem and are continuously influencing one another. Ouimet et al.'s model is informed by individual differences in the associative and rule-based systems and includes four processes: orientation, interpretation, engagement, and validation and avoidance. When encountering a stimulus, the associative system is activated and if threat associations are activated, an individual will immediately orient to the threatening stimulus. Interpretation involves determining if a stimulus is a threat through input from both the associative and rule-based systems. Occurring alongside interpretation is conscious attentional engagement in which considerable cognitive resources are devoted to the threatening stimulus. Once a stimulus is perceived as threatening, the threat is affirmed, negated, or reinterpreted through rule-based validation processes. Affirming or negating the threat value of a stimulus increases fearful responses whereas reinterpretation decreases activation of threat-related associations. Impaired disengagement results from conflict between the dual systems where enhanced engagement responses evoked in the associative system clash with avoidance strategies generated by the rule-based system. Ouimet and colleagues concluded that vulnerability and maintenance of anxiety result from impaired disengagement. Further, impaired disengagement is associated with strong threat-related associations, high levels of arousal linked with threatening stimuli, and decreased levels of motivation and cognitive capacity (Ouimet, Gawronski, & Dozois, 2009).

In sum, the six aforementioned cognitive models of anxiety all use information-processing approaches which include both voluntary and involuntary attentional components. Most models identify an early involuntary phase or phases where an individual encounters a stimulus and evaluates it as threatening (e.g., orienting mode, affective decision mechanism, valence evaluation system, threat evaluation system, orientation and interpretation) and a subsequent elaboration phase, which includes both voluntary and involuntary processes, and involves the allocation of cognitive resources to the threatening stimulus (e.g., immediate preparation, cognitive resource allocation mechanism, resource allocation system, engagement). Some of the models also include a final voluntary phase or phases where coping and reactionary behaviors are considered (e.g., secondary elaboration, guided threat evaluation and conscious goal engagement systems, avoidance/validation and disengagement). Finally, the majority of the models propose that hypersensitivity to threat evaluation and allocation of cognitive resources during one or a combination of conjectured phases confers risk for and helps to maintain anxiety psychopathology while only some of the models note the contribution of strategic consideration of rules and coping (Van Bockstaele et al., 2014).

Supporting cognitive theories, research has repeatedly documented that individuals with clinical anxiety exhibit attentional biases toward threating stimuli. A 2007 meta-analysis of 172 studies utilizing an array of attentional assessment paradigms demonstrated a consistent threat-related bias among anxious individuals, but not in their non-anxious counterparts, with a medium effect size (d = 0.45; Bar-Haim et al., 2007; Cohen, 1988). Moreover, biases for threat-relevant information are consistent across anxiety disorders, with effect sizes ranging from 0.36 to 0.59 among studies that examined threat stimuli specific to

particular diagnoses, including generalized anxiety disorder, obsessive-compulsive disorder, panic disorder, post-traumatic stress disorder, social anxiety disorder, and specific phobia. Thus, an attentional bias toward threatening stimuli appears to be specific to those with anxiety disorders and may serve as a transdiagnostic vulnerability factor for the development and/or maintenance of anxiety pathology (Bar-Haim et al., 2007). Although the evidence supporting a bias for threat among anxious individuals appears consistent, there is debate regarding whether such attentional biases represent a facilitated orienting towards threat or a difficulty disengaging from threat, also known at the vigilance and maintenance hypotheses (Mogg & Bradley, 2005; Weierich, Treat, & Hollingworth, 2008).

The vigilance hypothesis proposes anxious persons sense threat faster and direct their attention to threat more often. The vigilance hypothesis places an emphasis on stimulus-driven, exogenous shifts of attention, where "unattended, motivationally-relevant" threatening cues are detected through automatic shifts in attention (Mogg & Bradley, 1998). In contrast, the maintenance hypothesis proposes anxious persons struggle to direct their focus away from threat. The maintenance hypothesis places an emphasis on goal-driven, endogenous shifts of attention, where attention to threatening cues is based on ongoing plans and exogenous shifts to distracting cues are inhibited (Weierich, Treat, & Hollingworth, 2008).

The vigilance and maintenance hypotheses have somewhat different implications for attentional bias as a vulnerability and maintenance factor for clinical anxiety. The vigilance hypothesis implies that attentional biases towards threat increase state anxiety via an increased sensitivity to threat overall, which lead anxious individuals to perceive themselves as more vulnerable to threat. In contrast, the maintenance hypothesis infers that attentional

biases increase state anxiety through continued devotion of cognitive resources to threat, which may compromise daily functioning through mental fatigue. While the vigilance and maintenance hypotheses are typically presented as competing, they are not necessarily mutually exclusive and thus, may both confer risk and continuance of anxiety psychopathology (Armstrong & Olatunji, 2012).

A qualifying factor of the maintenance hypothesis is attentional avoidance, where anxious persons have been observed to direct their attention away from threat after extended viewing. Attentional avoidance is viewed as voluntary and strategic, unlike the vigilance and maintenance hypotheses which are viewed as involuntary and relatively automatic (Cisler & Koster, 2010). Attentional avoidance is posited to function like behavioral avoidance as anxious individuals experience short-term anxiety relief initially but thwart reappraisal of threatening stimuli and maintain their danger associations in the long-term (Mogg, Mathews, & Weinman, 1987). Avoidance-based strategies for interacting with fear-inducing stimuli have been a common focus of theories of anxiety for decades. For example, Mowrer's (1947) two-stage model of fear proposed that fears are acquired through classical conditioning and maintained through operantly conditioned avoidance of fear cues (Mowrer, 1947). The importance of avoidance behaviors in the conceptualization of pathological anxiety has been retained by many modern cognitive and behavioral models of anxiety, which often assert that avoidance of fear-relevant stimuli prevents extinction, inhibitory learning, and/or cognitive reappraisal of feared stimuli (e.g., Bouton, Mineka & Barlow, 2001; Hofmann, 2008; Mineka & Zinbarg, 2006). Although most cognitive and behavioral models perceive avoidance behaviors as serving primarily a maintenance role in the perpetuation of anxiety disorders,

some theories assert that avoidant patterns of interacting with aversive private events may serve as a core vulnerability for the development of anxiety disorders.

Acceptance and Commitment Therapy is a "third-wave" CBT approach that maintains psychological disorders stem largely from experiential avoidance (EA). EA is conceptualized as the unwillingness to remain in contact with aversive private events, such as unpleasant thoughts, emotions, memories and bodily sensations, and actions taken to modify aversive experiences or stimuli that provoke them (Hayes, Wilson, Gifford, Follette, & Strosahl, 1996). EA is not necessarily problematic and can be adaptive depending on its function within a given context. EA is thought to become a disordered process when it is applied inflexibly or when the individual dedicates excessive time and/or energy to controlling unwanted private events, thereby compromising their ability to contact the present moment and lead a values-consistent life (Kashdan, Barrios, Forsyth, & Steger, 2006). Ironically, although EA entails attempts to reduce negative thoughts, feelings, and bodily sensations, research suggests that efforts to avoid unpleasant private events often serves to increase the frequency of such private events (Gross, 1998, 2002; Wegner, 1994).

Various lines of research appear to support the assertion that EA represents a general vulnerability to psychological disorders. For example, EA has been shown to be positively associated with measures of overall psychopathology in clinical and non-clinical samples (Hayes, 2004) and is correlated with measures of anxiety (Forsyth, Parker, & Finlay, 2003; Marx & Sloan, 2005; Roemer, Salters, Raffa, & Orsillo, 2005; Tull, Gratz, Salters, & Roemer, 2004). Further, research indicates EA is predictive of anxiety beyond the respective contributions of other known cognitive vulnerability factors, including anxiety sensitivity and intolerance of uncertainty. Multiple studies have found EA and intolerance of uncertainty

uniquely predict worry and repetitive negative thinking among non-clinical samples (Akbari, Roshan, Fata, Shabani, & Zarghami, 2014; Buhr & Dugas, 2012). Additionally, research has demonstrated EA explains additional variance on measures of anxiety, panic, emotional distress, social anxiety, and post-traumatic stress symptoms beyond anxiety sensitivity in clinical and non-clinical samples (Bardeen, 2015; Bardeen & Fergus, 2015; Bardeen, Fergus, & Orcutt, 2014; Epkins, 2015) . Moreover, EA predicts greater panic response and perceived uncontrollability to CO_2 inhalation and hyperventilation tasks (Feldner, Zvolensky, Eifert, & Spira, 2003). These results suggest EA is a unique underlying mechanism. Further, findings indicate EA is not merely a byproduct of clinical anxiety as it also exacerbates anxious symptoms among individuals without a history of anxiety psychopathology.

In addition to correlational research, longitudinal evidence demonstrates EA is a risk factor for developing clinical anxiety. In a 2014 study, 2,136 participants both with and without a history of anxiety and mood disorders completed measures of EA and diagnostic interviews at two (T2) and four years (T4) from baseline. EA scores at T2 predicted the occurrence, reoccurrence, and persistence of distress and anxiety disorders, including generalized anxiety disorder, social anxiety disorder, panic disorder, and agoraphobia at T4. While cause cannot be inferred from longitudinal data, such results support EA as a prospective transdiagnostic vulnerability and maintenance factor for anxiety disorders, as opposed to a mere byproduct of anxiety psychopathology (Spinhoven, Drost, de Rooij, van Hemert, & Penninx, 2014).

As EA is a factor in clinical anxiety, but a relatively new construct, little research has been conducted examining EA in relation to attentional biases. A 2010 study by Pickett and Kurby investigated the association between self-reported levels of EA and emotional

inferences made during the processing of narratives. Ninety-eight undergraduate participants completed a language comprehension task in which they read stories one-line-at-a-time implying either negative or positive content without explicitly identifying emotions until the final line. For half the stories, the identified emotion was consistent with the content or a "match", while the identified emotion for the other half was counter to the content or a "mismatch". With language comprehension tasks, reading times are faster for match narratives and slower for mismatch narratives (Gernsbacher, Goldsmith, & Robertson, 1992). The mismatch effect suggests readers inferred emotions based on content and the increased reading time is purported to demonstrate a processing difficulty arising from conflict with activated emotional associations. Results showed participants with higher EA had significantly faster reading times for the negative match condition than the negative mismatch condition while there was no marked difference between match and mismatch conditions for positive stories. In contrast, participants with lower EA had significantly faster reading times for the positive match condition than the positive mismatch condition while there were not significant differences between match and mismatch conditions for negative stories. These findings suggest bias towards activating negative emotional knowledge among those with high EA, while exhibiting a non-normative response to positive emotional knowledge (Pickett & Kurby, 2010).

The present study aims to extend research on the patterns of cognitive processing associated with EA by examining the prospective relation between cognitive biases and EA using eye-tracking technology. Given that EA is a risk factor for anxiety pathology, which is associated with attentional biases towards threatening stimuli, it is expected individuals with high EA will also exhibit attentional biases for threat-related stimuli. Specifically, given that

EA concerns avoidance of aversive private behaviors, including emotions, thoughts, and sensations, it is hypothesized that EA will predict attentional vigilance to and maintenance on negative-emotion stimuli. Though these phenomena can be operationalized in various ways, vigilance will be assessed by examining direction and latency of initial orienting and how frequently threatening stimuli captured initial fixations. Maintenance will be gauged by measuring duration of an initial fixation on a word. In addition, based on cognitive models of anxiety indicating that once the strategic or conscious, effortful processes are engaged, individuals with anxiety disorders often attempt to avoid contact with threatening stimuli, it is hypothesized that, following initial orientation to and focus on negative-emotion and anxiety-related words, individuals with high EA will exhibit attentional avoidance of threatening stimuli which will be examined by the number of times each word was inspected, excluding the first fixation.

Method

Participants

A sample of 187 undergraduate psychology students were recruited through an online system facilitating research participation for course credit. To qualify for the study, participants had to be at least 18 years old and report English as their native language. Fourteen participants were excluded because they were unable to complete the eye tracking calibration and validation processes due physiological constraints or visual problems. Also, the data of 30 participants was excluded due to warning logs generated by the eye-tracker. The present study's warning logs were generated when the eye-tracker was not able to successfully collect data continuously and display changes did not occur at the appropriate time. Additionally, two participants were excluded for only fixating once during trials.

Ultimately, valid data was analyzed for 141 participants. The sample was 63.1% female, 96.5% non-Hispanic or Latino, and 87.2% Caucasian and largely comprised of young adults (M = 21.45, SD = 1.59).

Materials

Acceptance and Action Questionnaire-II (AAQ-II; Bond et al., 2011). The AAQ-II is the second version of a self-report measure of EA. The AAQ-II is designed to address instability in the factor structure of the original form (AAQ; Hayes, 2004). The AAQ-II is a 10-item, unidimensional measure that uses a 7-point Likert-type scale ranging from 1 (*never true*) to 7 (*always true*), with higher scores indicating greater levels of EA. The AAQ-II has demonstrated acceptable internal consistency (Cronbach's α values ranging from .78-.88) and test-retest reliability (3-month: r = .81 and 12-month: r = .79). Further the AAQ-II and the AAQ appear to measure the same concept with an r = .97.

State-Trait Anxiety Inventory (STAI; Spielberger, 1983). The STAI is a 40-item self-report measure of trait anxiety (20 items) and state anxiety (20 items), with higher scores indicating higher anxiety. Each item is rated on a 4-point Likert scale from 0 (almost never) to 3 (almost always). State anxiety items concern anxiety in the present moment, whereas trait anxiety items concern dispositional anxiety. The STAI has demonstrated good to excellent internal consistency with alphas ranging from .86-.95. Further, its test-retest reliability has ranged from .69-.89, with lower values representing STAI State and higher values representing STAI Trait. Additionally, the STAI has shown concurrent and divergent validity with the STAI Trait differentiating clinical from not clinical samples and the STAI State differentiating participants in high stressful situations from control counterparts.

Apparatus. A free viewing task was presented using the EyeLink 1000, a video-based eye tracking system that calculates whether eye are fixated, saccading, or blinking by calculating pupil position at a rate of 500 Hz. Participants were asked to remove any eye makeup or glasses prior to engaging in the eye-tracking protocol as they may interfere with the EyeLink 1000's ability to gauge the movement of their pupils. Each participant's head was kept immobile using a chin and head rest throughout the task. A 24-inch LCD screen with a screen resolution of 1,920 x 1,080 pixels was used to present stimuli at a distance of 73 cm from the participant. Participant eye movements were calibrated through a nine-point calibration process, which covered all the main central and peripheral aspects of the screen. After the calibration process, eye-movements were validated through a similar process where error was calculated for each pupil relative to a fixation point. To proceed, for at least one eye, average error had to be less than 0.40 and maximum error had to be less than 0.75.

Word stimuli. Visual stimuli consisted of 100 words (Table 1), evenly divided among four categories: positive-emotion, negative-emotion, anxiety-related and neutral words. Positive-emotion, negative-emotion, and neutral words were selected from Affective Norms for English Words (ANEW) list based on valence (Bradley & Lang, 1999). Anxiety-related words were selected from previous studies (Hunt, Keogh, & French, 2006; Keogh, Dillon, Georgiou, & Hunt, 2001) and those related to items on the Anxiety Sensitivity Index-III (ASI-III; Taylor et al., 2007). Words were counterbalanced for length and frequency of use in American English (Kucera & Francis, 1967). All letters were 0.81° in height, and words ranged from 2.70° to 8.49° in length. The number of letters ranged from 4 to 12. With an average length of 7.87.

Free viewing task. Participants completed a free viewing task in which they were asked to focus on a central fixation point before pressing the spacebar on a keyboard placed in front of them. Upon pressing the spacebar, they were shown an array of the four types of word stimuli for ten seconds. Placement of word stimuli were randomized and counterbalanced across trials. With respect to the four stimulus location used, which were four corners of an invisible square, the center of each word was located 8.55° from the display's center. After the ten second duration, the screen went blank, another central fixation point was presented and participants pressed the spacebar to initiate another trial.

Memory word recognition task. Participants completed a memory word recognition task on a computer, which required them to identify words they recognize from the free-viewing task from a list of 96 words. The list contained 48 previously viewed words and 48 novel words (12 fitting each of the four word-type categories) not used in the free-viewing task.

Procedure

Upon arrival to the lab, participants completed the informed consent process, followed by a demographic questionnaire (age, gender, race, ethnicity, and native language), the AAQ-II, and the STAI. The demographic questionnaire and self-report measures were completed using Qualtrics, a provider of online survey software. An experimenter then led an initial nine-point calibration process to ascertain the accuracy and range of participant eye movements relative to moving fixation points followed by a validation process. Participants were encouraged to attend to the words carefully and informed they would complete a memory word recognition task following the eye-tracking task. Participants subsequently completed 25 free-viewing trials. Following the free-viewing trials, they completed the

memory word recognition task. Finally, they were thanked for their involvement and awarded participation credit. All study procedures were approved by the University's institutional review board.

Results

Descriptives.

Means and standard deviations for self-report, eye-tracking, and memory task variables are presented in Table 2.

Zero-order Correlations.

Zero-order correlations were generated between AAQ-II scores and initial fixation direction, initial fixation latency, initial fixation duration, and frequency of re-fixations for each of the four types of word stimuli (Table 3). Of the 16 eye-tracking correlations, only the negative relationship between the AAQ-II and proportion of first fixations on neutral words reached significance ($r = –.19$, $p < .05$). Further, tests of the strength of dependent correlations with one variable in common (Steiger, 1980) demonstrated that the correlation between EA and proportion of first fixation on neutral words was significantly stronger than the relationship between EA and proportion of first fixation on negative-emotion ($z = –2.00$, $p < .05$) and anxiety-related words ($z = –2.06$, $p < .05$). However, the correlation between EA and proportion of first fixations on neutral words was not markedly different from the association between EA and proportion of first fixation on positive-emotion words ($z = –1.57$, $p = .12$).

Zero-order correlations were also generated between AAQ-II scores and proportion of correctly identified old words and proportion of correctly identified new words by type (Table 3). Of the eight memory task correlations generated, a positive correlation between

EA and correctly identified old negative words reached significance ($r = .18$, $p < .05$). The correlation between EA and correctly identified old negative words was significantly stronger than the correlation between EA and correctly identified anxiety ($z = 2.18$, $p < .05$) but not neutral ($z = 0.55$, $p = .58$) or positive words ($z = 0.63$, $p = .53$).

Partial Correlations.

When controlling for the contribution of state anxiety, partial correlations were generated between AAQ-II scores and fixation direction, latency, duration, and frequency for each of the four words types. As shown in Table 4, none of the correlations reached statistical significance. Likewise, correlations were not significant between AAQ-II scores and eye-tracking outcomes when controlling for trait anxiety, as seen in Table 5.

Partial correlations were also generated between EA and proportion of correctly identified words and proportion of incorrectly identified words by type while controlling for state and trait anxiety. As seen in Tables 4 and 5, none of the correlations reached statistical significance.

Discussion

Results revealed largely null findings concerning EA's prediction of three attentional biases characteristic of clinically anxiety: vigilance to, maintenance on, and attentional avoidance of threatening stimuli. The present study's threatening stimuli included negative-emotion and anxiety-related words in the context of positive-emotion and neutral words. The only significant finding occurred for vigilance outcomes, which should not be surprising considering that this is the most robust phenomena in the clinical anxiety attentional bias literature with nearly a medium effect size ($g = .47$, $p < .001$; Armstrong & Olatunji, 2012). Nevertheless, none of the hypotheses were supported by the data collected.

For the direction criterion of vigilance, results revealed an inverse relationship between levels of EA and the proportion of first fixations on neutral words. This finding is not unanticipated as neutral words should theoretically be perceived as less threatening when presented alongside emotionally-laden and anxiety-related words, particularly so as experiential avoidance increases. Thus, one would expect that the more experientially avoidant a person is, the less likely they will initially fixate on something non-threatening in the context of comparatively more threatening stimuli.

EA did not predict greater proportion of first fixations on anxiety or negative-emotion relevant words. Further, the relationship between EA and proportion of fixations on neutral words was significantly stronger than the relationships for negative-emotion and anxiety-related, but not positive-emotion words. Given that EA is conceptualized as difficulty experiencing aversive private events in general, perhaps the presentation of two words relevant to these difficulties simultaneously may have led to a competition for attentional resources. If an individual is less able to fully accept aversive emotional or anxiety-related experiences, stimuli relevant to both may be automatically perceived as comparably threatening, preventing the allocation of one's initial attention to one over the other (Desimone, 1999). Similarly, as the AAQ-II does not specify the type of experience one is avoiding, it may be that negative emotion words were processed as more threatening for some participants while anxiety-related words were more threatening for others.

Regarding the latency criterion of vigilance, EA did not significantly correlate with any of the four word types. This null result may have stemmed from participants not following instructions in maintaining their gaze on the central fixation point prior to the presentation of word stimuli. On average, 16% of trials (approximately 4/25) were excluded

per participant. While the present study required participants to stare at the central fixation point in order to advance to word trials, participants may have preemptively looked away from the central fixation point (during the interim) in anticipation of the upcoming stimuli, precluding any measurement of latency and analysis of affected trials in assessing vigilance. On the whole, for both direction and latency criteria, evidence did not support the hypothesis that EA would be associated with vigilance to negative-emotion or anxiety-related stimuli.

Likewise, evidence did not support the second hypothesis that EA would predict maintenance of gaze on threatening word stimuli. Therefore, no links were made between AAQ-II scores and sustaining fixations on negative-emotion or anxiety-related words. The lack of significant associations is relatively consistent with the literature on maintenance as this attentional bias is less strongly and consistently evinced in the literature than vigilance. In particular, task design could have influenced outcomes. Free-viewing tasks, like the one employed in the present study, inconsistently find evidence of sustained fixation on threat ($g = –.17$, $p = .26$), while significant findings are found more reliably using visual search tasks ($g = .54$, $p < .01$), where participants are asked to detect a neutral target among an array of threatening distractors. Additionally, previous research has indicated evidence for maintenance on threat is moderated by anxiety diagnosis with significant evidence for difficulty disengaging from threat for PTSD, mixed findings for social anxiety disorder and contamination-based obsessive-compulsive disorder, and faster disengagement for spider phobia and generalized anxiety disorder (Armstrong & Olatunji, 2012). Another explanation for the weaker maintenance evidence base is the potential interference of attentional avoidance, which is entirely effortful and therefore, could have confounded the voluntary component of maintenance.

Lastly, EA did exhibit any significant relationships with total number of fixations on any type of word stimuli throughout the duration of the trials. Therefore, AAQ-II scores did not predict attentional avoidance of negative-emotion or anxiety-related words as hypothesized. Trial length could have negatively affected the present study's ability to gauge attentional avoidance. As participants were only able to view word sets for 10 seconds, the task may have introduced a floor effect. Previous research has assessed attentional avoidance using scales as high as 180 seconds. Additionally, researchers have proposed the voluntary component of maintenance may interfere or conflict with attention avoidance. Whether an individual sustains or averts his or her gaze on threat may reflect an effortful decision to allocate attention based on a cost-benefit analysis of attending versus not attending to a threat based on level of perceived danger (Armstrong & Olatunji, 2012).

Beyond zero-order correlations, partial correlations controlling for state and trait anxiety, did not reveal any significant relationships between EA and any eye-tracking outcomes. Considering that only one significant and small correlation between EA and an eye-tracking outcome was found before controlling for the influence of STAI scores, this result is not surprising. Further as the STAI state ($r = .63$, $p < .001$) and trait ($r = .75$, $p < .001$) scores demonstrated large correlations with the AAQ-II, which is consistent with previous research (Mahmud Aliloo, Mousavi Moghadam, & Imani, 2016; Mahoney, Segal, & Coolidge, 2015), it is understandable that any significant correlations between AAQ-II and eye-tracking outcomes would be weakened when accounting for constructs strongly related to EA.

Altogether, the present study's null findings could be explained by an incompatibility between the voluntary and involuntary nature of attention and self-reported EA. As

previously noted, the various attentional biases characteristic of clinical anxiety encompass both unconscious and conscious components. Specifically, vigilance is theorized to be entirely automatic while maintenance is thought to include involuntary and voluntary eye movements and attentional avoidance is considered completely purposeful. Considering that EA was assessed through a self-report measure, which requires responses based on awareness of one's own behaviors and effortful ones at that, it may be difficult and unlikely to detect relationships between EA and both vigilance and the involuntary side of maintenance.

A mismatch between EA and word stimuli in general also could have resulted in the lack of significant outcomes. As EA entail avoidance of aversive private events, it may be that individual words do not engender the negative thoughts, feelings, and sensations they are meant to represent. Perhaps other types of stimuli, like images or meaningful strings of words such as sentences or paragraphs, would more accurately provoke these negative experiences and ultimately result in biases of attention. Further, the present study has conceptualized EA from an anxiety perspective, but perhaps the words employed provoked different reactions than fear (such as disgust or dislike) or were not perceived as threatening and therefore anxiety attentional biases may have not been appropriate to apply to them.

The aforementioned study by Pickett and Kurby (2010) revealed individuals high in EA process negative-emotional information faster and positive-emotional information slower than their counterparts low in EA. In the discussion of their findings, the authors suggest exploring how an EA cognitive bias could be informed by other aspects of processing beyond attention, including memory and interpretation. Regarding the present study's memory task, one zero-order correlation revealed that EA significantly predicted correct identification of

previously viewed negative words and this relationship was markedly stronger than the association between EA and correct identification of previously viewed anxiety, but not neutral or positive-emotion words. This could suggest that EA is characterized by a memory bias for negative-emotion words which is consistent with the construct. However, as the current study was designed to assess attentional bias primarily and the memory task was intended to function as an incentive for attending to word trials, further research specifically drafted to assess memory bias is needed to draw any definitive conclusions. Interpretation bias is defined as a tendency to perceived ambiguous stimuli in a negative manner and is typically assessed using sentences and paragraphs as stimuli (Hallion & Ruscio, 2011), counter to the single words used in the present study. Overall, if memory and/or interpretation biases are sole or factoring contributors to processing deficits characteristic of EA, then the design of the present study lacked the ability to assess these phenomena.

Limitations.

The display of stimuli in the present study's free-viewing task may have hindered assessment of vigilance to threat. Participants disproportionately fixated on the upper-left quadrant initially (on average, 94% or nearly 24/25 trials), and as vigilance is partially assessed through direction of orienting for the first fixation, the ability to detect this outcome was likely affected. Though studies with comparable four-word free viewing tasks did not provide information concerning a bias for the upper-left quadrant, the tendency to do so may have been present but not reported. Further, considering how reading in the English language moves from top-down and left-to-right, excessively fixating on the upper-left word would be anticipated.

Another design limitation to vigilance stemmed from participants inconsistently following instructions regarding maintaining their gaze on the central fixation point prior to the presentation of word stimuli, which limited the number of trials with valid latencies to first fixation, the other key metric of vigilance. While the present study required participants to stare at the central fixation point in order to advance to word trials, participants may have preemptively looked away from the central fixation point during the interim in anticipation of the upcoming stimuli.

The task paradigm may have also limited the present study's ability to detect maintenance of gaze on threat. While free viewing and visual search tasks produce comparable results supporting the vigilance hypothesis, the latter design is more favorable in evaluating the maintenance hypothesis (Armstrong & Olatunji, 2012). Attentional avoidance was likely impacted by the design of the task as well, specifically the duration of trials. There may have not been enough time for participants to demonstrate avoidance by repeatedly looking at some word types and not others, rendering the metric of fixation frequency by word type over time impractical.

The word stimuli may have also dampened findings, specifically anxiety and neutral words. Unlike the positive- and negative-emotion words, the anxiety words were not drawn from normed word lists. Rather, anxiety words were selected from previous anxiety-related cognitive bias studies which employed words relevant to the experience of anxiety and found significant evidence for vigilance. Yet both studies used dot-probe paradigms and most importantly, anxiety sensitivity to predict these biases (Hunt et al., 2006; Keogh et al., 2001), which is a construct with greater specificity for anxiety symptomatology than EA (Berman, Wheaton, McGrath, & Abramowitz, 2010). Additionally, while neutral words were selected

based on their neutral valence, they were not conceptually related to one another like the three other word types, which could have influenced results. For example, individual participants may have specific learning histories or relationships with the neutral words selected which could have led to corresponding differences in their eye-tracking data. If neutral words had been selected from a category like household items, particular subjects who exhibited outlying fixation outcomes could have been excluded from data analysis.

Beyond the potential confounding nature of self-reported EA, the AAQ-II, in particular, may have also influenced the results of the present study. The AAQ-II has been routinely criticized for its operationalization of the construct and internal consistency. Major criticisms regarding construct operationalization, include whether the AAQ-II assesses neuroticism or negative affect as opposed to EA and if the measure confuses the process with the outcome of EA (Wolgast, 2014). Initial psychometric research found that the AAQ-II exhibits only satisfactory alphas (Bond et al., 2011). Considering the disadvantages of the AAQ-II, the current study may have not been able to accurately assess EA, let alone determine its predictive quality of attentional biases.

The present study's sample may have also been problematic for results. Several previous studies examining the impact of transdiagnostic mechanisms on attentional biases have utilized participants with scores standard deviations above the normative average (e.g., Hunt et al., 2006; Keogh et al., 2001; Rossignol, Campanella, Bissot, & Philippot, 2013). It may be that clinical or at least disproportionately subclinical samples are required to detect attentional biases. If so, the present sample's average (AAQ-II M = 17.40, SD =8.26) was comparable to undergraduate norms (M = 17.34, SD = 4.37) but more than a standard deviation below clinical norms for the AAQ-II (M = 28.34, SD = 9.92). The range of scores

for the present study was 7 to 45. However, only 31/141 participants in the present study scored at or above AAQ-II clinical cut-off scores (24-28; Bond et al., 2011). Further, as the sample was comprised of undergraduate students, findings may not be generalizable to the greater population due to a restricted range in terms of age and race.

Future Directions.

Regarding future attentional research and EA, several suggestions can be made including the type and design of the task, task instructions, word stimuli, placement of stimuli, construct measures**,** and sample employed. Such changes may yield significant results, supporting a connection between attentional biases characteristic of anxiety psychopathology with experiential avoidance. Further, it may be beneficial to examine how memory and interpretation tendencies inform an EA cognitive bias.

A visual search, as opposed to a free viewing task, may be preferable in assessing both vigilance to and maintenance on threat. In addition to the type of eye-tracking paradigm, specific adjustments could be made to the present study's free viewing task. First, as many participants did not maintain their gaze on the central fixation point prior to the presentation of words, eliminating latency data for numerous trials, it may be useful to include a central fixation point in word trials where participants are required to fixate on it for a brief period of time before freely viewing stimuli. Second, attentional avoidance may have been detected if the duration of trials had been extended.

As negative-emotion and anxiety-related words may have competed with one another for attentional resources, potentially confounding outcomes, it may valuable to examine their influences in isolation from one another. As neutral words were not conceptually related in the present study, it may be useful to use non-emotionally laden stimuli that fall within the

same category like some previous studies (e.g., Fergus, Bardeen, & Wu, 2013; Koster, De Raedt, Goeleven, Franck, & Crombez, 2005). Further, it would be helpful to have a normed database of words rated on their relevance to the experience of anxiety and panic like the ANEW for affective words. Further, while the ANEW rates words in terms of emotional valence, arousal, and dominance, it would also be useful to have a subset database of words conceptually-relevant to particular emotional states.

Additionally, considering the upper-left initial fixation bias in the present study, future research should potentially employ different designs entailing alternative placement of words, possibly having words or letters transposed counter to how they are typically read to combat this tendency. Still, in doing so, involuntary processing of words may be hindered, which would also seemingly weaken the detection of biases entailing automaticity.

Moving forward, the assessment of EA is also important. The present study would have benefited from a behavioral measure of EA, which may have eliminated some of the voluntary aspects of the construct, though it remains unknown to what degree EA is voluntary versus involuntary. Additionally, considering the aforementioned criticisms of the AAQ-II, future research should consider using alternative measures of the construct, such as the Multidimensional Experiential Avoidance Questionnaire (MEAQ) as it was designed to address the shortcomings of AAQ-II (Gámez, Chmielewski, Kotov, Ruggero, & Watson, 2011).

Concerning the sample itself, the attentional biases assessed in the current study stem from studies on clinically anxious individuals and those examining the relationship between risk and/or maintenance factors and these biases often use samples comprised of participants high and low in these constructs. Therefore, it may be beneficial to use either clinical

subjects or larger number of subclinical individuals in order to detect these relationships. Lastly, a more representative sample in terms of age, gender, race, and education-level would produce findings more generalizable to greater population, rendering more definitive results and conclusions.

In addition to suggestions for the future assessment of EA's prediction of attentional biases, it would also be beneficial to gauge how memory and interpretation biases contribute to processing inclinations characteristic of EA. It may that one of or a combination of these components, including attention, informs an EA cognitive bias.

References

Akbari, M., Roshan, R., Fata, L., Shabani, A., & Zarghami, F. (2014). The role of cognitive, behavioral, emotional and metacognitive factors in predicting repetitive negative thinking: A transdiagnostic approach. *Iranian Journal of Psychiatry and Clinical Psychology*, *20*, 233–242.

Armstrong, T., & Olatunji, B. O. (2012). Eye tracking of attention in the affective disorders: A meta-analytic review and synthesis. *Clinical Psychology Review*, *32*, 704–723. http://doi.org/10.1016/j.cpr.2012.09.004

Bardeen, J. R. (2015). Short-term pain for long-term gain: The role of experiential avoidance in the relation between anxiety sensitivity and emotional distress. *Journal of Anxiety Disorders*, *30*, 113–119. http://doi.org/10.1016/j.janxdis.2014.12.013

Bardeen, J. R., & Fergus, T. A. (2015). Emotional distress intolerance, experiential avoidance, and anxiety sensitivity: The buffering effect of attentional control on associations with posttraumatic stress symptoms. *Journal of Psychopathology and Behavioral Assessment*. http://doi.org/10.1007/s10862-015-9522-x

Bardeen, J. R., Fergus, T. A., & Orcutt, H. K. (2014). The moderating role of experiential avoidance in the prospective relationship between anxiety sensitivity and anxiety. *Cognitive Therapy and Research*, *38*, 465–471. http://doi.org/10.1007/s10608-014-9614-z

Bar-Haim, Y., Lamy, D., Pergamin, L., Bakermans-Kranenburg, M. J., & Van IJzendoorn, M. H. (2007). Threat-related attentional bias in anxious and nonanxious individuals: A meta-analytic study. *Psychological Bulletin*, *133*, 1–24. http://doi.org/10.1037/0033-2909.133.1.1

Batelaan, N. M., Rhebergen, D., Spinhoven, P., van Balkom, A. J., & Penninx, B. W. J. H. (2014). Two-year course trajectories of anxiety disorders: Do DSM classifications matter? *Journal of Clinical Psychiatry*, *75*, 985–993. http://doi.org/10.4088/JCP.13m08837

Baxter, A. J., Vos, T., Scott, K. M., Ferrari, A. J., & Whiteford, H. A. (2014). The global burden of anxiety disorders in 2010. *Psychological Medicine*, *44*, 2363–2374. https://doi.org/10.1017/S0033291713003243

Beck, A. T., & Clark, D. A. (1997). An information processing model of anxiety: Automatic and strategic processes. *Behaviour Research and Therapy*, *35*, 49–58. http://doi.org/10.1016/S0005-7967(96)00069-1

Berman, N. C., Wheaton, M. G., McGrath, P., & Abramowitz, J. S. (2010). Predicting anxiety: The role of experiential avoidance and anxiety sensitivity. *Journal of Anxiety Disorders*, *24*, 109–113. https://doi.org/10.1016/j.janxdis.2009.09.005

Bond, F. W., Hayes, S. C., Baer, R. A., Carpenter, K. M., Guenole, N., Orcutt, H. K., … Zettle, R. D. (2011). Acceptance and Action Questionnaire II. *PsycTESTS*. http://doi.org/10.1037/t11921-000

Bouton, M. E., Mineka, S., & Barlow, D. H. (2001). A modern learning theory perspective on the etiology of panic disorder. *Psychological Review*, *108*, 4–32.

Bradley, M. M., & Lang, P. J. (1999). Affective norms for English words (ANEW): Instruction manual and affective ratings (Technical Report C-1). Gainesville, FL: The Center for Research in Psychophysiology, University of Florida.

Buhr, K., & Dugas, M. J. (2012). Fear of emotions, experiential avoidance, and intolerance of uncertainty in worry and generalized anxiety disorder. *International Journal of Cognitive Therapy*, *5*, 1–17. http://doi.org/10.1521/ijct.2012.5.1.1

Cisler, J. M., & Koster, E. H. W. (2010). Mechanisms of attentional biases towards threat in anxiety disorders: An integrative review. *Clinical Psychology Review*, *30*, 203–216. http://doi.org/10.1016/j.cpr.2009.11.003

Cohen, J. (1988). *Statistical Power Analysis for the Behavioral Sciences*. L. Erlbaum Associates.

Desimone, R. (1999). Visual attention mediated by biased competition in extrastriate visual cortex. In G. W. Humphreys, J. Duncan, A. Treisman, G. W. Humphreys, J. Duncan, & A. Treisman, *Attention, space, and action: Studies in cognitive neuroscience.* (pp. 13–30). New York, NY, US: Oxford University Press.

Epkins, C. C. (2015). Experiential avoidance and anxiety sensitivity: Independent and specific associations with children's depression, anxiety, and social anxiety symptoms. *Journal of Psychopathology and Behavioral Assessment*. http://doi.org/10.1007/s10862-015-9502-1

Eysenck, M. W. (1992). *Anxiety: The cognitive perspective*. Hillsdale, NJ, England: Lawrence Erlbaum Associates, Inc.

Eysenck, M. W. (1997). *Anxiety and cognition: A unified theory*. Hillsdale, NJ, England: Lawrence Erlbaum Associates, Inc.

Feldner, M. T., Zvolensky, M. J., Eifert, G. H., & Spira, A. P. (2003). Emotional avoidance: an experimental test of individual differences and response suppression using

biological challenge. *Behaviour Research and Therapy*, *41*, 403–411. http://doi.org/10.1016/S0005-7967(02)00020-7

Fergus, T. A., Bardeen, J. R., & Wu, K. D. (2013). Intolerance of uncertainty and uncertainty-related attentional biases: Evidence of facilitated engagement or disengagement difficulty? *Cognitive Therapy and Research*, *37*, 735–741. https://doi.org/10.1007/s10608-012-9509-9

Forsyth, J. P., Parker, J. D., & Finlay, C. G. (2003). Anxiety sensitivity, controllability, and experiential avoidance and their relation to drug of choice and addiction severity in a residential sample of substance-abusing veterans. *Addictive Behaviors*, *28*, 851–870.

Gámez, W., Chmielewski, M., Kotov, R., Ruggero, C., & Watson, D. (2011). Multidimensional Experiential Avoidance Questionnaire. *PsycTESTS*. https://doi.org/10.1037/t03734-000

Gernsbacher, M. A., Goldsmith, H. H., & Robertson, R. R. (1992). Do readers mentally represent characters' emotional states? *Cognition and Emotion*, 6, 89–111. http://doi.org/10.1080/02699939208411061

Gross, J. J. (1998). Antecedent- and response-focused emotion regulation: Divergent consequences for experience, expression, and physiology. *Journal of Personality and Social Psychology*, *74*, 224–237. http://doi.org/10.1037/0022-3514.74.1.224

Gross, J. J. (2002). Emotion regulation: Affective, cognitive, and social consequences. *Psychophysiology*, *39*, 281–291. http://doi.org/10.1017/S0048577201393198

Hallion, L. S., & Ruscio, A. M. (2011). A meta-analysis of the effect of cognitive bias modification on anxiety and depression. *Psychological Bulletin*, *137*, 940–958. http://doi.org/10.1037/a0024355

Hayes, S. C. (2004). Acceptance and Action Questionnaire. *PsycTESTS*. http://doi.org/10.1037/t04346-000

Hayes, S. C., Wilson, K. G., Gifford, E. V., Follette, V. M., & Strosahl, K. (1996). Experimental avoidance and behavioral disorders: a functional dimensional approach to diagnosis and treatment. *Journal of Consulting and Clinical Psychology*, *64*, 1152–1168.

Hofmann, S. G. (2008). Cognitive processes during fear acquisition and extinction in animals and humans. *Clinical Psychology Review*, *28*, 199–210. http://doi.org/10.1016/j.cpr.2007.04.009

Hunt, C., Keogh, E., & French, C. C. (2006). Anxiety sensitivity: The role of conscious awareness and selective attentional bias to physical threat. *Emotion*, *6*, 418–428. https://doi.org/10.1037/1528-3542.6.3.418

Kashdan, T. B., Barrios, V., Forsyth, J. P., & Steger, M. F. (2006). Experiential avoidance as a generalized psychological vulnerability: Comparisons with coping and emotion regulation strategies. *Behaviour Research and Therapy*, *44*, 1301–1320. http://doi.org/10.1016/j.brat.2005.10.003

Kessler, R. C., Berglund, P., Demler, O., Jin, R., Merikangas, K. R., & Walters, E. E. (2005). Lifetime prevalence and age-of-onset distributions of DSM-IV disorders in the National Comorbidity Survey Replication. *Archives of General Psychiatry*, *62*, 593–602. http://doi.org/10.1001/archpsyc.62.6.593

Keogh, E., Dillon, C., Georgiou, G., & Hunt, C. (2001). Selective attentional biases for physical threat in physical anxiety sensitivity. *Journal of Anxiety Disorders*, *15*, 299–315. https://doi.org/10.1016/S0887-6185(01)00065-2

Koster, E. H. W., De Raedt, R., Goeleven, E., Franck, E., & Crombez, G. (2005). Mood-congruent attentional bias in dysphoria: Maintained attention to and impaired disengagement from negative information. *Emotion, 5*, 446–455. https://doi.org/10.1037/1528-3542.5.4.446

Kucera, H., & Francis, W. N. (1967). Computational Analysis of Present-Day American English. Brown University Press.

Mahmud Aliloo, M., Mousavi Moghadam, S. A., & Imani, T. (2016). The role of emotion intensity and experiential avoidance in predicting trait anxiety. *Iranian Journal of Psychiatry and Clinical Psychology*, *22*, 103–111.

Mahoney, C. T., Segal, D. L., & Coolidge, F. L. (2015). Anxiety sensitivity, experiential avoidance, and mindfulness among younger and older adults: Age differences in risk factors for anxiety symptoms. *The International Journal of Aging & Human Development*, *81*, 217–240. https://doi.org/10.1177/0091415015621309

Marx, B. P., & Sloan, D. M. (2005). Peritraumatic dissociation and experiential avoidance as predictors of posttraumatic stress symptomatology. *Behaviour Research and Therapy*, *43*, 569–583. http://doi.org/10.1016/j.brat.2004.04.004

Mineka, S., & Zinbarg, R. (2006). A contemporary learning theory perspective on the etiology of anxiety disorders: it's not what you thought it was. *The American Psychologist*, *61*, 10–26. http://doi.org/10.1037/0003-066X.61.1.10

Mogg, K., & Bradley, B. P. (1998). A cognitive-motivational analysis of anxiety. *Behaviour Research and Therapy*, *36*, 809–848.

Mogg, K., & Bradley, B. P. (2005). Attentional bias in generalized anxiety disorder versus depressive disorder. *Cognitive Therapy and Research*, *29*, 29–45. http://doi.org/10.1007/s10608-005-1646-y

Mogg, K., Mathews, A., & Weinman, J. (1987). Memory bias in clinical anxiety. *Journal of Abnormal Psychology*, *96*, 94–98. http://doi.org/10.1037/0021-843X.96.2.94

Mowrer, O. H. (1947). On the dual nature of learning—a re-interpretation of "conditioning" and "problem-solving." *Harvard Educational Review*, *17*, 102–148.

Olatunji, B. O., Cisler, J. M., & Tolin, D. F. (2007). Quality of life in the anxiety disorders: A meta-analytic review. *Clinical Psychology Review*, *27*, 572–581. http://doi.org/10.1016/j.cpr.2007.01.015

Ouimet, A. J., Gawronski, B., & Dozois, D. J. A. (2009). Cognitive vulnerability to anxiety: A review and an integrative model. *Clinical Psychology Review*, *29*, 459–470. http://doi.org/10.1016/j.cpr.2009.05.004

Pickett, S. M., & Kurby, C. A. (2010). The impact of experiential avoidance on the inference of characters' emotions: Evidence for an emotional processing bias. *Cognitive Therapy and Research*, *34*, 493–500. http://doi.org/10.1007/s10608-009-9262-x

Roemer, L., Salters, K., Raffa, S. D., & Orsillo, S. M. (2005). Fear and avoidance of internal experiences in GAD: Preliminary tests of a conceptual model. *Cognitive Therapy and Research*, *29*, 71–88. http://doi.org/10.1007/s10608-005-1650-2

Rossignol, M., Campanella, S., Bissot, C., & Philippot, P. (2013). Fear of negative evaluation and attentional bias for facial expressions: An event-related study. *Brain and Cognition*, *82*, 344–352. https://doi.org/10.1016/j.bandc.2013.05.008

Scholten, W. D., Batelaan, N. M., van Balkom, A. J. L. M., Penninx, B. W. J. H., Smit, J. H., & van Oppen, P. (2013). Recurrence of anxiety disorders and its predictors. *Journal of Affective Disorders*, *147*, 180–185. http://doi.org/10.1016/j.jad.2012.10.031

Shirneshan, E., Bailey, J., Relyea, G., Franklin, B. E., Solomon, D. K., & Brown, L. M. (2013). Incremental direct medical expenditures associated with anxiety disorders for the U.S. adult population: evidence from the Medical Expenditure Panel Survey. *Journal of Anxiety Disorders*, *27*, 720–727. http://doi.org/10.1016/j.janxdis.2013.09.009

Spielberger, C. D. (1983). State-Trait Anxiety Inventory for Adults. *PsycTESTS*. http://doi.org/10.1037/t06496-000

Spinhoven, P., Drost, J., de Rooij, M., van Hemert, A. M., & Penninx, B. W. (2014). A longitudinal study of experiential avoidance in emotional disorders. *Behavior Therapy*, *45*, 840–850. http://doi.org/10.1016/j.beth.2014.07.001

Steiger, J. H. (1980). Tests for comparing elements of a correlation matrix. *Psychological Bulletin*, *87*, 245–251. https://doi.org/10.1037/0033-2909.87.2.245

Taylor, S., Zvolensky, M. J., Cox, B. J., Deacon, B., Heimberg, R. G., Ledley, D. R., … Cardenas, S. J. (2007). Anxiety Sensitivity Index-3. PsycTESTS. http://doi.org/10.1037/t00034-000

Tull, M. T., Gratz, K. L., Salters, K., & Roemer, L. (2004). The role of experiential avoidance in posttraumatic stress symptoms and symptoms of depression, anxiety, and somatization. *The Journal of Nervous and Mental Disease*, *192*, 754–761.

Van Bockstaele, B., Verschuere, B., Tibboel, H., De Houwer, J., Crombez, G., & Koster, E. H. W. (2014). A review of current evidence for the causal impact of attentional bias

on fear and anxiety. *Psychological Bulletin, 140*, 682–721. http://doi.org/10.1037/a0034834

Wegner, D. M. (1994). Ironic processes of mental control. *Psychological Review*, *101*, 34–52. http://doi.org/10.1037/0033-295X.101.1.34

Weierich, M. R., Treat, T. A., & Hollingworth, A. (2008). Theories and measurement of visual attentional processing in anxiety. *Cognition and Emotion*, *22*, 985–1018. http://doi.org/10.1080/02699930701597601

Williams, J. M. G., Watts, F. N., MacLeod, C., & Mathews, A. (1997). *Cognitive psychology and emotional disorders* (2nd ed.). Oxford, England: John Wiley & So

Wolgast, M. (2014). What does the acceptance and action questionnaire (AAQ-II) really measure? *Behavior Therapy*, *45*, 831–839. https://doi.org/10.1016/j.beth.2014.07.00

Table 1.

Word groups used in free viewing task

Negative-Emotion	Positive-Emotion	Anxiety-Related	Neutral
Insecure	Upbeat	Jittery	Taxicab
Devastating	Appreciative	Intimidate	Interviewer
Worthless	Euphoria	Heartbeat	Tighten
Shamed	Amuse	Scare	Beaver
Humiliating	Thrilling	Agitation	Backwoods
Incompetence	Triumphant	Terrifying	Antiquated
Heartbreak	Flourish	Pounding	Sophomore
Sadness	Terrific	Confuse	Traverse
Sorrow	Zeal	Sweaty	Strand
Discontent	Skillful	Blackout	Invisible
Loneliness	Blessing	Neurotic	Unchanged
Unsuccessful	Comforting	Apprehension	Reservation
Grief	Merry	Choke	Induce
Misfortune	Marvelous	Frightening	Interstate
Depressed	Hopeful	Collapse	Linguist
Upset	Succeed	Tense	Pulley
Hopeless	Optimism	Insane	Observer
Misery	Satisfy	Shake	Episode
Helpless	Competent	Nervous	Numerical
Unhappy	Grateful	Anxious	Testament
Suffer	Pleasant	Worried	Context
Guilt	Harmony	Crazy	Forty
Tragedy	Valuable	Dangerous	Contain
Defeated	Embrace	Restless	Semester
Loveless	Flawless	Shiver	Loosen

Table 2.

Descriptives of study variables

Variable	Mean	Standard Deviation
Acceptance and Action Questionnaire-II	17.40	8.26
State-Trait Anxiety Inventory- State	39.61	10.98
State-Trait Anxiety Inventory- Trait	41.22	11.27
Proportion of first fixations, neutral	.25	.06
Proportion of first fixations, anxiety	.25	.06
Proportion of first fixations, negative emotion	.25	.06
Proportion of first fixations, positive emotion	.26	.05
Latency to first fixation, neutral (ms)	243.52	66.20
Latency to first fixation, anxiety (ms)	245.49	48.55
Latency to first fixation, negative emotion (ms)	241.58	84.85
Latency to first fixation, positive emotion (ms)	243.71	56.71
Duration of first fixation on neutral (ms)	762.17	249.96
Duration of first fixation on anxiety (ms)	693.70	248.03
Duration of first fixation on negative emotion (ms)	690.80	236.25
Duration of first fixation on positive emotion (ms)	719.70	258.58
Number of total fixations on neutral	2.32	.79
Number of total fixations on anxiety	2.27	.77
Number of total fixations on negative emotion	2.30	.82
Number of total fixations on positive emotion	2.28	.78
Proportion of correctly identified old neutral	.68	.17
Proportion of correctly identified old anxiety	.72	.18
Proportion of correctly identified old negative	.70	.17
Proportion of correctly identified old positive	.70	.19
Proportion of valid trials	.83	.20
Proportion of first fixations, upper-left quadrant	.95	.08

Table 3.

Zero–order correlations among study variables

Variable	Acceptance and Action Questionnaire–II	State–Trait Anxiety Inventory–State	State–Trait Anxiety Inventory–Trait
Acceptance and Action Questionnaire–II	–		
State–Trait Anxiety Inventory– State	.63**	–	
State–Trait Anxiety Inventory– Trait	.75**	.79**	–
Proportion of first fixations, neutral	–.19*	–.11	–.14
Proportion of first fixations, anxiety	.10	.01	.08
Proportion of first fixations, negative emotion	.08	.10	.02
Proportion of first fixations, positive emotion	.02	.03	.06
Latency to first fixation, neutral	–.03	–.09	–.12
Latency to first fixation, anxiety	.04	–.01	–.04
Latency to first fixation, negative emotion	–.01	.06	.03
Latency to first fixation, positive emotion	.06	.02	–.06
Duration of first fixation on neutral	–.05	–.07	–.05
Duration of first fixation on anxiety	–.02	–.05	–.05
Duration of first fixation on negative emotion	–.09	–.12	–.10
Duration of first fixation on positive emotion	–.07	–.09	–.09
Number of total fixations on neutral	.07	.11	.11
Number of total fixations on anxiety	.05	.10	.09
Number of total fixations on negative emotion	.07	.09	.11
Number of total fixations on positive emotion	.04	.08	.07
Proportion of correctly identified old neutral	.13	.09	.08
Proportion of correctly identified old anxiety	01	.04	–.00
Proportion of correctly identified old negative	.18*	.19*	.17*
Proportion of correctly identified old positive	.13	.05	.13
Proportion of incorrectly identified new neutral	.05	–.10	–.06
Proportion of incorrectly identified new anxiety	–.01	–.01	–.03
Proportion of incorrectly identified new negative	.01	–.06	–.10
Proportion of incorrectly identified new positive	–.08	–.15	–.10

N = 141. ** $p < .01$; * $p < .05$ (two–tailed).

Table 4.

Partial correlations controlling for overlap with state anxiety

Variable	Acceptance and Action Questionnaire–II partial *r*
Proportion of first fixations, neutral	−.16
Proportion of first fixations, anxiety	.11
Proportion of first fixations, negative emotion	.05
Proportion of first fixations, positive emotion	.03
Latency to first fixation, neutral	.03
Latency to first fixation, anxiety	.06
Latency to first fixation, negative emotion	−.06
Latency to first fixation, positive emotion	.06
Duration of first fixation on neutral	−.00
Duration of first fixation on anxiety	.02
Duration of first fixation on negative emotion	−.02
Duration of first fixation on positive emotion	−.02
Number of total fixations on neutral	.02
Number of total fixations on anxiety	−.01
Number of total fixations on negative emotion	.02
Number of total fixations on positive emotion	−.01
Proportion of correctly identified old neutral	.09
Proportion of correctly identified old anxiety	−.03
Proportion of correctly identified old negative	.07
Proportion of correctly identified old positive	.11
Proportion of incorrectly identified new neutral	.12
Proportion of incorrectly identified new anxiety	−.05
Proportion of incorrectly identified new negative	.04
Proportion of incorrectly identified new positive	−.00

N = 141. ** $p < .01$; * $p < .05$ (two–tailed).

Table 5.

Partial correlations controlling for overlap with trait anxiety

Variable	Acceptance and Action Questionnaire–II partial *r*
Proportion of first fixations, neutral	−.14
Proportion of first fixations, anxiety	.02
Proportion of first fixations, negative emotion	.13
Proportion of first fixations, positive emotion	−.01
Latency to first fixation, neutral	.09
Latency to first fixation, anxiety	.11
Latency to first fixation, negative emotion	−.04
Latency to first fixation, positive emotion	.16
Duration of first fixation on neutral	−.01
Duration of first fixation on anxiety	.02
Duration of first fixation on negative emotion	−.03
Duration of first fixation on positive emotion	−.01
Number of total fixations on neutral	−.00
Number of total fixations on anxiety	−.02
Number of total fixations on negative emotion	−.02
Number of total fixations on positive emotion	−.01
Proportion of correctly identified old neutral	.10
Proportion of correctly identified old anxiety	.01
Proportion of correctly identified old negative	.07
Proportion of correctly identified old positive	.03
Proportion of incorrectly identified new neutral	.10
Proportion of incorrectly identified new anxiety	−.03
Proportion of incorrectly identified new negative	.11
Proportion of incorrectly identified new positive	−.04

N = 141. ** $p < .01$; * $p < .05$ (two–tailed).

Appendix A

IRB <irb@appstate.edu> Mon, Mar 14, 2016 at 8:37 AM
To: kelsokc@appstate.edu
Cc: bromanfulksj@appstate.edu, kirkpatrickjs@appstate.edu, ruizn@appstate.edu, thomask@appstate.edu

To: Kerry Kelso
CAMPUS EMAIL

From: Dr. Lisa Curtin, Institutional Review Board Chairperson
Date: 3/14/2016
RE: Notice of IRB Approval by Expedited Review (under 45 CFR 46.110)

STUDY #: 16-0171
STUDY TITLE: Examining the Relationship between Experiential Avoidance and Attentional Bias using Eye-Tracking
Submission Type: Initial
Expedited Category: (4) Collection of Data through Noninvasive Procedures Routinely Employed in Clinical Practice,(6) Collection of Data from Recordings made for Research Purposes,(7) Research on Group Characteristics or Behavior, or Surveys, Interviews, etc.
Approval Date: 3/14/2016
Expiration Date of Approval: 3/13/2017

The Institutional Review Board (IRB) approved this study for the period indicated above. The IRB found that the research procedures meet the expedited category cited above. IRB approval is limited to the activities described in the IRB approved materials, and extends to the performance of the described activities in the sites identified in the IRB application. In accordance with this approval, IRB findings and approval conditions for the conduct of this research are listed below.

Regulatory and other findings:

The IRB determined that this study involves minimal risk to participants.

Approval Conditions:

Appalachian State University Policies: All individuals engaged in research with human participants are responsible for compliance with the University policies and procedures, and IRB determinations.

Principal Investigator Responsibilities: The PI should review the IRB's list of PI responsibilities. The Principal Investigator (PI), or Faculty Advisor if the PI is a student, is

ultimately responsible for ensuring the protection of research participants; conducting sound ethical research that complies with federal regulations, University policy and procedures; and maintaining study records.

Modifications and Addendums: IRB approval must be sought and obtained for any proposed modification or addendum (e.g., a change in procedure, personnel, study location, study instruments) to the IRB approved protocol, and informed consent form before changes may be implemented, unless changes are necessary to eliminate apparent immediate hazards to participants. Changes to eliminate apparent immediate hazards must be reported promptly to the IRB.

Approval Expiration and Continuing Review: The PI is responsible for requesting continuing review in a timely manner and receiving continuing approval for the duration of the research with human participants. Lapses in approval should be avoided to protect the welfare of enrolled participants. If approval expires, all research activities with human participants must cease.

Prompt Reporting of Events: Unanticipated Problems involving risks to participants or others; serious or continuing noncompliance with IRB requirements and determinations; and suspension or termination of IRB approval by an external entity, must be promptly reported to the IRB.

Closing a study: When research procedures with human subjects are completed, please log into our system at https://appstate.myresearchonline.org/irb/index_auth.cfm and complete the Request for Closure of IRB review form.

Websites:

1. PI responsibilities: http://researchprotections.appstate.edu/sites/researchprotections.appstate.edu/files/PI%20Responsibilities.pdf

2. IRB forms: http://researchprotections.appstate.edu/human-subjects/irb-forms

CC:
Joshua Broman-Fulks, Psychology
Jamie Kirkpatrick
Nathalia Ruiz
Kelsey Thomas

Appendix B

Consent to Participate in Research
Information to Consider About this Research

Eye-tracking in College Students
Principal Investigator: Kerry C. Kelso
Faculty Advisor: Joshua Broman-Fulks
Department: Psychology
Contact Information: kelsokc@gmail.com, bromanfulksj@appstate.edu
828-262-2726

What is the purpose of this research?
The purpose of this study is to examine the relationship between psychological constructs and attention using eye-tracking in college students.

Why am I being invited to take part in this research?
You must be 18 years old to participate in this study and a native English speaker. If you volunteer to take part in this study, you will be one of approximately 150 people to do so.

What will I be asked to do?
If you choose to take part in this study, you will be asked to complete a session consisting of a series of questionnaires and tasks that will last approximately 60 minutes. After initial questionnaires, you will be asked to perform eye-tracking and word recognition memory tasks. The eye-tracking task will consist of validation and calibration processes to assure your eyes can be accurately tracked and you can properly move through the task. You may be asked to remove your glasses and/or eye makeup should they hinder the validation and calibration process. If you are unable to complete the validation and calibration processes as well as the practice trials, you may be excluded from further participation, but you will still be awarded one ELC for your involvement. You will subsequently be asked to complete 25 trials and your eye movements will be recorded during these trials. Of note, though your eye movements will be recorded during these trials, there will not be a separate recording of the session itself. Following the eye-tracking task, you will be asked to complete a memory word recognition task. Finally, you will be awarded participation credit.

When the study is complete and the results have been analyzed, the researcher will attempt to contact all participants of the study to invite them to come in for a debriefing session. In this session, participants will be informed of the findings of the study and given the opportunity to ask questions concerning these findings.

At any time for any reason, you may stop the procedure and withdraw from the study without penalty. You will be monitored at all times to ensure your safety, and the researcher may decide to discontinue the procedure if you display signs of distress.

What are possible harms or discomforts that I might experience during the research?

The potential risks involved in the study are minimal.

The video camera used by the EyeLink 1000 eye tracker to record and track the locations of your gaze requires that the eyes are illuminated. To accomplish this, the video camera assembly includes light-emitting diodes (LEDs) that emit infrared (IR) radiation at a wavelength of 890 nm (considered in the range of Class A IR radiation). The EyeLink CL illuminators are compliant with the IEC-60825-1 LED safety standard as a Class 1 LED device. This standard has been or is in the process of being adopted by most countries, and regulates many aspects of LED and laser eye safety, including retinal, corneal and skin safety. Class 1 products are "safe under reasonably foreseeable conditions of operation, including the use of optical instruments for intrabeam viewing" (EyeLink 1000 User Manual version 1.4.0, Copyright © 2005–2008, SR Research Ltd). The amount of radiant energy used to illuminate each eye has been calculated to be less than 1 mW/cm2. This amount of IR radiation conforms to the standards set forth by numerous organizations (see attached Declaration of Conformity from SR Research, Inc.). The amount of radiant energy emitted by the IR LEDs is less than the recommended maximum exposure level, which suggests that the radiant energy from these IR LEDs poses no health risks to observers. EyeLink video-based eye tracking systems have been in use since 1995 without any reports of adverse effects and are used in laboratories worldwide

You may experience some distress filling out the questionnaires as they touch upon uncomfortable thoughts, emotions, sensations, and psychological experiences. If you report marked distress during or following this process, you will be referred to the ASU Counseling Center in order for a counselor to assess and/or treat you.

To the best of our knowledge, the risk of harm and discomfort from participating in this research study is no more than you would experience in everyday life.

What are possible benefits of this research?
There are no direct benefits to individuals who participate in this study. However, the information that you provide in this study may enable researchers to improve their understanding of factors associated with psychopathology. This will be discussed with you further after you complete the study.
Will I be paid for taking part in the research?
You will not be paid for your participation in this study. However, you can earn up to two ELC credits for your participation. You will receive one ELC credit for each 30 minutes of your participation in this study. Other research and non-research options for obtaining course credit, such as completing article critiques, are available. Please see your class instructor for more information about alternate ELC credit options.

How will you keep my private information confidential?
All information obtained during this study is confidential. That is, we protect the privacy of subjects by withholding their names and other identifying information from all persons not connected with this study. The researcher will code all questionnaires and data by number and store them in a locked and secure area, and you will not be linked to your assigned code number in any way. Data that we may report in scientific journals or presentations will not

include any information that identifies you as a participant in this study. Five years after the final publication of this study, all information and records will be destroyed.

Whom can I contact if I have a question?
The people conducting this study will be available to answer any questions concerning this research, now or in the future. You may contact Dr. Josh Broman-Fulks at 828-262-2272 Ext. 411. If you have questions about your rights as someone taking part in research, contact the Appalachian Institutional Review Board Administrator at 828-262-2692 (days), through email at irb@appstate.edu or at Appalachian State University, Office of Research and Sponsored Programs, IRB Administrator, Boone, NC 28608.

Do I have to participate?
Your participation in this research is entirely voluntary. You will not be penalized in any way if you choose not to volunteer, and you can withdraw your consent to participate at any time without penalty. You will not lose any benefits or rights you would normally have if you do not participate in the study.

This research project has been approved on 03/14/2016 by the Institutional Review Board (IRB) at Appalachian State University. This approval will expire on 03/13/2017 unless the IRB renews the approval of this research.

I have decided I want to take part in this research. What should I do now?
If you have read this form, had the opportunity to ask questions about the research and received satisfactory answers, and want to participate, then sign the consent form and keep a copy for your records.

_____

Participant's Name (PRINT) Signature Date

By proceeding with the activities described above, you acknowledge that you have read and agreed to the descriptions and terms outlined in this consent form, and voluntarily agree to participate in this research.

Vita

Kerry Corvey Kelso was born in Houston, TX, to David Mark and Patricia Corvey Kelso. She graduated from the University of North Carolina at Chapel Hill in August 2012 with Bachelor of Arts degrees in Psychology and Studio Art. Kerry commenced work toward a Master of Arts degree in Clinical Psychology at Appalachian State University in the fall of 2014. Beginning later this year, she will attend a Doctorate of Philosophy in Clinical Psychology program at George Mason University.