UNDERSTANDING EAST-WEST DIFFERENCES IN SOCIAL ANXIETY: THE ROLES OF CULTURALLY-TUNED ATTENTIONAL PROCESSES

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Abstract

Abundant research has shown that Asian Americans and Japanese nationals tend to score higher on standardized measures of social anxiety than do European Americans. The current study examined two cultural differences that may help explain higher scores of social anxiety among people of East Asian-heritage: selective attention toward social threat and independent/interdependent construal of the self in relation to others. Study 1 found cultural group mean differences among 310 Asian Americans, 249 Japanese nationals, and 212 European Americans in social anxiety, selective attention, and independent self-construal. Differences in interdependent self-construal were only found between Asian Americans and European Americans. A series of structural equation models were also fit in order to test for the statistical mediation of the cultural group differences in social anxiety through selective attention and self-construal. A model containing a double mediation of selective attention through independent self-construal successfully partially mediated cultural group differences. Study 2 re-examined the assertions of Study 1 by examining the mediation of selective attention through quasi-experimental manipulation. 42 Asian Americans, 34 Japanese nationals, and 28 European Americans were randomly assigned to an attention training condition where they were trained to attend to a threatening face or a non-threatening face. A general linear model provided mixed evidence for partial mediation with only two of eight interaction effects statistically significant in post-experimental measures of self-report, physiological, and behavioral indicators of social anxiety. The findings of this study may help raise cultural awareness of mental health professionals who may otherwise misinterpret or even pathologize experiences that may be rather normative in non-Western cultural contexts.

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Introduction

Social anxiety refers to the experience of intense anxiety and fear related to social interaction or performance (Good & Kleinman, 1985; Mesquita & Frijda, 1992). Social anxiety is characterized by the persistent fear of social situations in which one's behavior may be scrutinized by others, an experience that often leads to anticipation of embarrassment or humiliation (American Psychiatric Association, 2013). Symptoms of social anxiety include high physiological arousal (e.g., shortness of breath, sweating) in feared situations, self-defeating cognitions regarding one's own social performance and others' evaluation, as well as avoidance of feared situations (American Psychiatric Association, 2013; Richard G Heimberg, Brozovich, & Rapee, 2010). Social anxiety is associated with both occupational and social impairment (Aderka, Nickerson, Bøe, & Hofmann, 2012; Wittchen & Beloch, 1996), carrying great cost at both the individual and societal level.

The experience of social anxiety appears to be relatively common with 25-33% of adults reporting intense anxiety and/or avoiding certain social situations at some point in their lives (Kessler, Stein, & Berglund, 1998; Ruscio et al., 2008). Social phobia, the most severe, clinically-significant form of social anxiety, has a 12-month prevalence rate of 7.9%, and lifetime prevalence of 13.3% (American Psychiatric Association, 2013; Kessler et al., 2005), making it the third most prevalent psychological disorder in the U.S.

There is evidence to suggest that the expression of social anxiety differs between European Americans and other cultural groups, particularly individuals of Asian heritage (e.g., Hsu et al., 2012; Krieg & Xu, 2015; Lau, Fung, Wang, & Kang, 2009; Okazaki, 1997). The results of two recent meta-analyses (Krieg & Xu, 2015; Woody, Miao, & Kellman-McFarlane, 2015) indicated that Asian Americans and Asian nationals consistently reported higher social

anxiety overall compared to European Americans, and this difference was relatively robust despite demographic differences and methodological variations in prior studies.

Given the significant cultural group difference in social anxiety between individuals of Asian and European heritage, it is important to understand *why* Asian Americans and Asian nationals tend to report higher social anxiety than their European American counterparts. In a preliminary meta-mediation analysis based on the previously published work, Krieg and Xu (2015) found that the cultural differences in self-construals (Markus & Kitayama, 1991), or more precisely a tendency to view oneself as less independent or autonomous, partly explained why East Asian and Asian American individuals reported higher social anxiety than European Americans. However, the results of their mediation analysis (Krieg & Xu, 2015) also showed that the group differences in social anxiety cannot be fully accounted for by the cultural differences in self-construals—additional variables or mechanisms may help further explain the higher social anxiety among East Asian and Asian American individuals.

While the previous literature tended to focus on cultural *group differences* in independent and interdependent self-construals, limited attention has been paid to neuro-cognitive mechanisms of social anxiety, particularly selective attention toward social threat, that have been shown to play a key role in *individual differences* in social anxiety (Amir, Weber, Beard, Bomyea, & Taylor, 2008; Bar-Haim et al., 2010; Heeren, Reese, McNally, & Philippot, 2011). More recent evidence suggests a possible culturally-influenced attention toward social threat among East Asian nationals (Chiao et al., 2008; Nisbett, Peng, Choi, & Norenzayan, 2001), providing another plausible explanation for higher social anxiety as compared to their European American counterparts. Therefore, the overall purpose of the proposed study was to explore cultural group differences in selective attention toward social threat between individuals of Asian

and European heritages, and to examine how these differences, along with cultural group differences in self-construals, may explain why East Asian and Asian American individuals tended to report higher social anxiety than their European American counterparts.

An Overview

In the following sections, I first discussed three theoretical models of social anxiety. Second, I introduced the construct of selective attention toward social threat in the context of the neurological basis of anxiety, and reviewed two cognitive models of selective attention, with a particular emphasis on the relation between selective attention and *individual* differences in social anxiety. Third, I summarized the literature on the cultural *group* differences in social anxiety between individuals of Asian and European heritages as well as the self-construal model that has been used to explain these group differences. Fourth, I reviewed the literature on the cultural *group* differences in selective attention, with a specific emphasis on selective attention toward threatening social stimuli. Finally, I attempted to link cultural group differences in selective attention toward social threat to cultural group differences in social anxiety, and proposed a model that integrates cultural group differences in both self-construal and selective attention toward social threat, in relation to cultural group differences in social anxiety.

Conceptual Models of Social Anxiety

Various models of social anxiety have been proposed to describe the experience and observable behaviors associated with this syndrome. Below, I examined models that have been posited to explain the etiology and maintenance of social anxiety at *individual* level.

The Self-Presentation Model of Social Anxiety. This model traces its theoretical roots back to sociologist, Erving Goffman (1959), and his work on self-presentation as an overarching explanation of social behavior. Schlenker and Leary (1982) connect this perspective with the

concept of self-schemas and others-schemas, and assert that a main social goal is to maximize one's positive image and minimize one's negative image by controlling the image of the self before a real or imagined audience. Receiving the anticipated reaction from this audience indicates to the actor that s/he was successful in conveying the desired image of the self. In the context of this model, social anxiety arises in social situations (both real and imagined) where people doubt their ability to make the desired impression and is exacerbated as the discrepancy between the perceived audience reaction and the anticipated reaction increases (Schlenker & Leary, 1982). Schlenker and Leary (1982) placed the idea of fear of negative evaluation as the centerpiece of this model, differentiating social anxiety from other types of anxiety by the extent that interpersonal evaluation is present (or imagined) and by the degree of social/non-social components in the anxiety-provoking situation. Other factors that play a part in the maintenance of this negative cognitive cycle and heightened physiological arousal include self-attention (inwardly directed self-consciousness that increases the impact of fear of negative evaluation), low outcome expectancy (the persistent sense of uncertainty on whether or not social goals can be attained), and impaired behavioral performance (behaviors such as nervous responses, disaffiliation/avoidance, and social image protection that co-occur with social anxiety) (Schlenker & Leary, 1982).

The Tripartite Model. Originally proposed by Clark and Watson (1991), the tripartite model of anxiety and depression posits a signal factor common to both anxiety and depression (negative affect) as well as two additional factors that are unique to one or the other; physiological hyperarousal for anxiety, and low positive affect/anhedonia for depression. As described by Anderson and Hope (2008, p. 278), "Negative affect (NA) represents the extent to which an individual feels upset or unpleasantly engaged, rather than peaceful… Positive affect

(PA) represents pleasurable engagement with the environment, and the extent to which a person feels a zest for life, enthusiastic, alert, and active… [and] physiological hyperarousal (PH) includes somatic tension, short of breath, dizziness, lightheadedness, and dry mouth...” The tripartite factors are believed to have a strong biological/temperamental basis that is either intensified or attenuated by influences from the environment (i.e., a product of gene-environment interactions). NA and PH are hypothesized to be related to some of the cognitive symptoms of anxiety and depression, such as attribution biases and cognitive distortions. In addition, physiological hyperarousal is seen as being related to some of the physiological and behavioral symptoms of anxiety (Clark & Watson, 1991). These three factors have been used to differentiate among specific types of anxiety disorders (e.g., separation anxiety, panic disorder, social phobia, etc.), providing divergent validity for these important clinical constructs (e.g., Brown, Chorpita, & Barlow, 1998). In regards to social anxiety, Brown et al., (1998) identified low positive affect or anhedonia as specifically related to social anxiety. Expanding these findings, Hughes, Heimberg, & Coles (2006) found that when social performance anxiety, such as anxiety when giving a speech before an audience, and social interaction anxiety, such as anxiety when meeting someone for the first time, were separated, the relations with specific tripartite factors became more complicated. Specifically, individuals with more of the social interaction anxiety were more characterized by low positive affect, whereas individuals with more of social performance anxiety were more characterized by increased hyperarousal (Hughes et al., 2006). Thus, according to this model, biological risk factors that predispose an individual to experience negative emotions and high physiological arousal in situations that involve social interactions and social performance, respectively, increase the likelihood of experiencing the cluster of symptoms that define social anxiety.

The Cognitive/Cognitive-Behavioral Model of Social Anxiety. This very influential model by Clark and Wells (1995; Clark, 2001) divides the experience of social anxiety into three chronological phases: prior to entering the feared situation, entering the feared situation, and after leaving the feared situation. Before entering a feared social situation, the socially anxious individual's cognitive processes are dominated by ruminations about potential failure, a negative self-image, memories of prior failures, and predictions of poor upcoming social performance. This serves only to heighten the sense of anxiety and anticipation of a negative outcome and to detract cognitive resources from processes that would be more beneficial in preparing for the event. As this socially anxious individual enters the situation, s/he has excessively high standards for adequate social performance, catastrophizes the consequences of perhaps innocuous social blunders, and reinforces negative beliefs about the self. These assumptions, followed by the anxious anticipation of the feared situation, lead individuals to selectively attend to and interpret potentially threatening cues in their social environment, heightening their sensitivity to negative social cues while interpreting ambiguous ones as threatening. Simultaneously, the individual's attention splits to focus on internal cues, imagining that *feeling* anxious is the same as *looking* anxious (Clark & Wells, 1995; Clark, 2001). The mechanism of selective attention to both external and internal stimuli is central to the etiology of social anxiety. Likewise, socially anxious individuals perceive themselves as a social object that is selectively attended to by others, and may engage in safety behaviors, such as covering one's face or avoiding hot liquids to circumvent people noticing a blush, to compensate for these maladaptive cognitive biases. After the event, it is common for a socially anxious individual to engage in post-event processing, where s/he reviews the event in a way that is dominated by the feelings of anxiety and a negative self-image to the point where the actual social interaction is seen as much worse

than it was in reality. This only reinforces prior beliefs about the self and strengthens the pessimistic outlook on the success of the next social interaction (Clark & Wells, 1995; Clark, 2001).

The cognitive-behavioral addition (Heimberg et al., 2010; Rapee & Heimberg, 1997) to Clark and Wells (1995) cognitive model elaborates on the mental representation of the self as seen by the audience and makes additions to the behavioral components of social anxiety such as avoidance and 'safety behaviors'. It also reintroduces fear of negative evaluation as a part of the processing of external cues during the event and stresses the interaction of cognitive, physiological, and behavioral symptoms of social anxiety in generating internal feedback to the anxious individual. This addition serves to add concrete, observable behaviors in the feedback loop that assists in generating and perpetuating the experience of social anxiety (Heimberg et al., 2010).

Comparison Among the Three Models of Social Anxiety. The three models vary not only in their emphasis on specific components of social anxiety, but also in the etiology and maintenance of this process. Both the self-presentation and cognitive models of social anxiety focus on some of the same components such as fear of negative evaluation, perceived audience, and behavioral compensation, and theoretically connect these components in a very similar way via a feedback loop or cognitive cycle. In contrast, the tripartite model focuses much more on the underlying temperamental basis of primarily cognitive and/or behavioral symptoms. A key strength to the tripartite model is its relative success in providing the much-needed discriminant validity among specific subtypes of anxiety disorders as conceptualized by the DSM-IV-TR (American Psychiatric Association, 2000; Brown et al., 1998; Hughes et al., 2006). Likewise, a respective strength of the cognitive/cognitive-behavioral model is its contribution to

understanding how specific symptoms are outlined and carefully broken down and described in a clear path model (see Figure 1). This model would be particularly useful to those looking to administer cognitive therapy or cognitive behavioral therapy as an intervention to ameliorate social anxiety symptoms in a clinical setting. In comparison, the self-presentational model conceptualizes underlying goals in social interaction and emphasizes the experience of non-clinical social anxiety symptoms, contrasting it with successful social interaction. In this way, the self-presentational model may better describe social anxiety symptoms in non-clinical community samples in the context of social motivation.

The key factors in each model also vary in terms of their ability to be changed or modulated by an intervention, which is meaningful in both clinical and research settings. The self-presentation model posits the discrepancy between one's expectations and perceived audience reaction as the main factor leading to social anxiety. Yet, it is difficult to measure a "discrepancy" between these two highly subjective elements reliably, thus limiting this model's clinical utility. The tripartite model focuses on the dispositional or temperamental factors of negative affect and physical hyperarousal as the leading causes of social anxiety. However, because these factors are understood as innate and temperamental in nature, they may not be entirely malleable in clinical settings. The cognitive/cognitive-behavioral model, on the other hand, identifies and underscores the central role of attentional processes as both etiological and maintenance factors leading to social anxiety. Specifically, selective attention toward social threat, a factor that has received much attention in recent literature (e.g., Amir et al., 2008; Heeren et al., 2011), promises to be a malleable variable and is conducive for both research investigation and clinical intervention. The current study was thus guided by the cognitive-behavioral framework that emphasizes the "…preferential allocation of attentional resources

toward external indicators of negative evaluation…" (Rapee & Heimberg, 1997, p. 743). These negative indicators may also vary as a function of social setting or situation, as well as the demand characteristics associated with each.

Subtypes of Social Anxiety

The DSM (American Psychiatric Association, 1987; 2000) has divided social anxiety into two subtypes: "performance only" and "generalized." Although the two subtypes of social anxiety do not seem to differ in causal and maintenance mechanisms in studies of Western populations (Clark & Wells, 1995; Wong & Rapee, 2016) and both depend on the detection of socially threatening stimuli., they vary in the degree to which patterns of apprehension and anxious arousal generalize across socio-evaluative situations. Among individuals with the *performance only* subtype, the social anxiety response is limited to situations where the individual is the center of attention, acting conspicuously, or performing some feat before others (e.g., giving speeches, speaking in meetings, eating or writing in public, or using public restrooms; Turner, Beidel, & Townsley, 1992). Outside of these situations, social anxiety is not experienced. In contrast, individuals experiencing *generalized anxiety* feel anxious in settings that include daily interactions (e.g., social gatherings, initiating or maintaining conversations) with others that are perceived as threatening (e.g., strangers, authority figures, etc.) in addition to performance situations (Turner et al., 1992). In practice, the generalized subtype is considered more severe and receives more clinical attention relative to the performance only subtype (Stein, Torgrud, & Walker, 2000).

There is some evidence that supports the distinction between the two subtypes of social anxiety (Hofmann & Roth, 1996; Holt, Heimberg, Hope, & Liebowitz, 1992; Kessler, Stein, & Berglund, 1998; Turner, Beidel, & Townsley, 1992). For example, by qualitatively contrasting

feared situations, Turner, Beidel, and Townsley (1992) was able to differentiate the generalized subtype from the performance only subtype in 89 outpatient adult patients being treated for anxiety disorders. Holt et al. (1992) proposed that there are four categories of social anxiety based on feared situations: formal speaking/interaction, informal speaking/interaction, observation by others, and assertion; among which social anxiety in response to formal speaking/interaction was most represented in their non-clinical sample of 91 adults. Similarly, Kessler et al. (1998)'s results based on the National Comorbidity Survey, showed that most social anxiety symptoms were related to fear of speaking amongst a non-clinical, community sample of 8,098 adults. Thus, it seems important to differentiate performance only social anxiety, which is mostly related to fear of speaking or performing under public attention, from a more generalized social anxiety that is experienced in daily social interaction.

Biological Underpinnings to the Anxiety Process

Neuroscience research on the biological processes underlying anxiety has largely focused on the amygdala and surrounding structures in the limbic system (e.g., LeDoux, 1995). Other research has focused on the attenuation of the functions of the limbic system by effortful control through suppressor signals from the dorsal medial prefrontal cortex (Compton, 2003). In this section, I gave a brief overview of the general biological model of anxiety by focusing on the fear activation system and the fear inhibition system.

Fear Activation. According to a model by LeDoux (1995) that was developed from research on the neural pathways associated with fear conditioning, anxiety/fear processes are conceptualized to have three stages: (a) a threatening stimuli is sensed, (b) which activates the amygdala through corresponding thalamic pathways, (c) and then influences a range of cognitive processes. In the first stage of this pathway, limited information on basic stimulus features from

one of the sensory organs is rapidly transmitted through the thalamus to the amygdala, where it is initially appraised. Later, more detailed information on stimulus features along with the situational context provided by the hippocampus and cortical pathways are transmitted slowly and are combined for a final appraisal of threat. This system, labeled as the *Valence Evaluation System* by LeDoux (1995), is responsible for assessing the threat value of the stimulus, both an automatic, cursory appraisal as well as a more integrated appraisal as more information is added. This function occurs in the amygdala, which then sends signals through the nucleus basalis and hippocampus to exert influence on other cognitive processes such as perception, selective attention, and explicit memory (LeDoux, 1995). Studies with threat related pictures and words have produced a heightened amygdala response as measured by functional magnetic resonance imaging (fMRI) during the threat appraisal process (Compton, Wilson, & Wolf, 2004; Lane, Chua, & Dolan, 1999; Lang et al., 1998).

Fear Inhibition. The activation of the limbic system can be attenuated by activity in the dorsolateral/ventromedial prefrontal cortex (PFC; see Compton, 2003 for a review). Reciprocal connections between these two regions allow emotionally significant information to be suppressed in accordance to higher-level goals and demands (Barbas, 2000; Groenewegen & Uylings, 2000). According to Frewen, Dozois, Joanisse, and Neufeld (2008), there are two possible pathways by which the PFC can influence amygdala responses. The first is direct attenuation, where activity in the amygdala would be stifled by subsequent activity in the PFC before the signal travels to other brain regions. The second pathway involves the PFC attenuating the representation of emotionally relevant stimuli in the occipital region before the signal is passed to the amygdala (Frewen et al., 2008). This would be analogous to the PFC imposing a competing attentional set, whereby task-related stimuli are preferentially processed (Compton,

2003). In a study that examined PFC activation amongst participants instructed to ignore emotional information on a standard Stroop Task, Compton et al. (2003) found increased PFC activation in the dorsolateral region when viewing threat-related words. Further studies (Rule, Shimamura, & Knight, 2002) have demonstrated that amygdala activity can be modulated by PFC activity. Schaefer et al. (2002) found that instructions on whether to passively view aversive pictures or carry an emotional response impacts subcortical emotional processing. Likewise, Rule et al. (2002) found that patients with damage to the orbitofrontal cortex failed to habituate to repeated exposure to aversive stimuli.

Attention Models

Within the general neurobiological model describing the roles of certain neural structures and pathways in both fear activation and inhibition, it seems that stimuli information sent from sensory organs to be appraised in the amygdala is a crucial first step for social anxiety to occur. For stimuli appraisal to occur, the stimuli must first be noticed. Attentional processes have been thoroughly examined since the inception of psychology as a discipline (James, 1890), but only certain models have stood the test of time. Of particular note is a three-part attention model proposed by Posner and Peterson (1990; Petersen & Posner, 2012), which describes attention as containing alerting networks, orienting networks, and executive networks.

The alerting network's main purpose is to prepare and sustain focus for high-priority signals, activity that has been implicated to occur in the brain stem and other regions in the right hemisphere. The orienting system prioritizes sensory signals by choosing a location or modality. For the processing of visual stimuli, the majority of prior research has examined certain regions in the parietal lobe as well as the dorsal (top-down) and ventral (bottom-up) attention systems (Petersen & Posner, 2012). Finally the executive network, also called 'target detection' (Posner

& Petersen, 1990), is responsible for dealing with issues related to interference and attentional load. The brain structures implicated for this system are the medial prefrontal cortex and the anterior cingulate cortex. These three attentional systems are hypothesized to work in tandem and have overlapping functions and qualities (Petersen & Posner, 2012; Posner & Petersen, 1990). Of particular interest to the current study was the orienting network, where competing stimuli are selected by attentional processes based on the stimuli's novelty, core features, and emotional valence.

The Relation Between Selective Attention Toward Social Threat and Social Anxiety

Selective attention toward social threat, sometimes called social threat bias, refers to an exaggerated tendency to preferentially process threat signals in a given social situation. While normative levels of privileged processing of threat in potentially dangerous situations are considered to be adaptive and contribute to survival (Nesse, 1999), enhanced attention toward threat cues has been found in a variety of cognitive tasks amongst individuals with anxiety disorders (see Bar-Haim, Lamy, Pergamin, Bakermans-Kranenburg, & van Ijzendoorn, 2007 for a review). This is consistent with cognitive models of social anxiety (Clark & Wells, 1995; Rapee & Heimberg, 1997), which posit that the tendency to interpret ambiguous information as threatening that maintains the anxiety process. This is especially salient with social cues, which are often ambiguous and thus, easily distorted (Clark & Wells, 1995).

Selective attention toward social threat has been seen as the cognitive process associated with the hypervigilance that characterizes anxiety disorders (Williams, Mathews, & MacLeod, 1996). Hypervigilance refers to an enhanced state of sensory sensitivity that characterizes anxiety (Clark & Wells, 1995) and has been linked to activity in a limbic system that has been oversensitized to attend to threatening stimuli (Compton, 2003). More specifically, in a study by

Cohen and Shaver (2004), 129 participants were asked to respond to words with positive or negative emotional valence presented in their left or right visual field in a task where their visual fields were divided. Participants more accurately identified negative emotional words as negative when presented in their left visual field, which corresponds to the right brain hemisphere, as oppose to their right visual field. These findings suggest that right hemisphere activity in limbic brain structures such as amygdala plays an important role in processing and interpreting threat (Cohen & Shaver, 2004; Compton, 2003; Mogg & Bradley, 1999). Based on this evidence, selective attention toward social threat could lead to social anxiety through the interpretation of threat among ambiguous social stimuli, pre-cognitive threat orientation, and hypervigilance. As a consequence, I expect selective attention toward social threat to be related to not only subjective reports of social anxiety symptoms, but also behavioral and physiological markers of social anxiety.

Measuring Selective Attention Toward Social Threat. The theoretical construct of selective attention toward social threat is intrinsically bound to the specific measures used to evaluate it. The two most commonly used experimental paradigms used to measure selective attention are the Emotional Stroop Task (modified from the original interference task; Stroop, 1935), where participants are asked to name the color of threatening and non-threatening words printed in unrelated colors, and a modified Dot Probe Task (MacLeod, Mathews, & Tata, 1986). In the Dot-Probe Task, participants focus on a cross hair before two stimuli, one representing social threat and one neutral, appear on opposite sides of the screen for a fixed duration. After this duration, a probe appears where one of the stimuli was previously placed. Participants are asked to indicate which side of the screen they saw this probe previously by pressing one of two keys. In both of these experimental tasks, the relative decrease in reaction time when responding

to threatening stimuli as compared to non-threatening stimuli is operationalized as a measure of selective attention toward social threat (Shechner et al., 2012). While Bar-Haim et al. (2007) found that both the Emotional Stroop and the Dot-Probe Task produced statistically significant and similar effect sizes (Cohen's *d* = .49 and .37, respectively), these two experimental paradigms are thought to access different parts of attentional modulation (Shechner et al., 2012). In a study that used both of these paradigms to examine selective attention in anxious children, Dalgleish et al. (2003) did not find a statistically significant correlation between these two measures, suggesting that they may actually access different parts of the attentional system. The Stroop Task is seen to not only represent attention orienting, but also the suppression of threat relevant information (i.e., attentional control), whereas the Dot-Probe Task does not engage participants in these additional processes—making it a 'pure' measure of selective attention (Shechner et al., 2012).

The type of task and the specific stimuli used in the Dot-Probe paradigm for selective attention vary across studies. The types of stimuli used include emotional and neutral faces (e.g., Amir et al., 2008; Heeren et al., 2011), as well as social threat-related and neutral words (Amir et al., 2009; see Beard, Sawyer, & Hofmann, 2012; Hakamata et al., 2010 for meta-analyses). Bar-Haim et al. (2007) found no differences between face and word stimuli, both producing statistically significant effect sizes (Cohen's *d* = .46 for images and .43 for words). While there were no differences found between these two sets of stimuli, words may be more sensitive to a participant's reading and verbal skills and different words and phrases may have different meanings for individuals of different cultural backgrounds (Shechner et al., 2012).

The Relation between Selective Attention Toward Social Threat and Social Anxiety: Correlational Evidence. In a meta-analysis of 172 studies and 4,031 participants, Bar-Haim et al.

(2007) examined selective attention toward social threat in different types of samples (e.g., clinical samples, anxious and non-anxious non-clinical samples), using various cognitive paradigms (e.g., Dot-Probe Task, Stroop Task) with a variety of stimuli (e.g., fearful faces, fear-related words). They found an overall medium effect (Cohen's d = .45) of selective attention on social anxiety that was robust across various experimental conditions. Furthermore, they found that while the relation between selective attention toward social threat and social anxiety was found for both clinical and non-clinical samples that self-reported high anxiety, it was not present in non-anxious individuals. There were also no differences in selective attention toward social threat between high anxious clinical and high anxious non-clinical groups, suggesting that while the same process of selective attention toward social threat likely triggers milder forms of anxiety in the same way as it does for more severe forms, selective attention toward social threat by itself may not best explain variation in symptom severity.

While Bar-Haim et al.'s (2007) meta-analysis mainly focused on studies with adults, six different studies of children and adolescents with anxiety disorders compared to non-anxious controls have found shorter reaction times when attending to threatening stimuli relative to non-threatening stimuli in the Dot-Probe Task. These studies demonstrate that selective attention toward social threat is related to social anxiety in childhood as well (Dalgleish et al., 2003; Hunt, Keogh, & French, 2007; Roy et al., 2008; Telzer et al., 2008; Waters, Mogg, Bradley, & Pine, 2008; Watts & Weems, 2006). Similarly, there is evidence for the temporal stability of selective attention toward social threat across two weeks among 77 non-clinical, high-anxious college students (Heeren, Philippot, & Koster, 2014). Taken together, it seems that selective attention toward social threat is associated with anxiety in both childhood and adulthood.

Threat specificity is another important factor by which the role of selective attention for specific diagnostic categories could be better understood. Although research supports that selective attention to threatening stimuli in general is related to anxiety (Bar-Haim et al., 2007), depression (Duque & Vázquez, 2015), PTSD (Ashley, Honzel, Larsen, Justus, & Swick, 2013), OCD (Kampman, Keijsers, Verbraak, Näring, & Hoogduin, 2002), panic disorders (De Cort, Hermans, Spruyt, Griez, & Schruers, 2008), eating disorders (Shafran, Lee, Cooper, Palmer, & Fairburn, 2007), etc., it was unclear if general threat sensitivity was related to all of these problem areas or if stimuli specificity would moderate the effect size among groups with these specific disorders—thereby providing evidence for discriminate validity. In a meta-analysis by Pergamin-Hight, Naim, Bakermans-kranenburg, van IJzendoorn, and Bar-Haim (2015), which examined 29 studies ($N = 866$) looking at selective attention among participants who fell into several different diagnostic categories, the authors used a moderator analysis to examine the relative effect of disorder-congruent stimuli as compared to disorder-incongruent stimuli. For example, among those with specific phobias the effect size for trials using the feared stimuli (e.g., a spider) were compared with the effect size associated with trials that used more general stimuli (e.g., neutral or anxiety-related words). Their results indicated that the relative change in effect-size among disorder-congruent stimuli compared to disorder-incongruent stimuli was $d = .28$ ($p < .001$) across samples with social anxiety disorder, panic disorder, and PTSD (but not OCD), providing some evidence for content specificity in the relation of selective attention and social anxiety (Pergamin-Hight et al., 2015).

It should also be noted that anxious/non-anxious group differences in selective attention toward social threat seem to vary depending on the display duration of the threatening stimuli. In their meta-analysis, Bar-Haim et al. (2007) found that display durations of less than 100 msec,

display durations of 500 msec, and display durations of more than 1,000 msec all had a statistically significant effect on selective attention toward social threat (Cohen's d = .65, .31, .29, respectively). They also found that subliminal display durations outperformed supraliminal display durations by producing a larger effect size ($Q_M = 4.12$, $p < .05$), and that while non-anxious control participants did not demonstrate selective attention toward social threat with supraliminal exposure to threatening stimuli, they tended to shift their attention away from threat with subliminal exposures (Bar-Haim et al., 2007). In addition, their meta-analysis failed to find overall differences in selective attention between anxious and non-anxious participants among studies that displayed the threatening stimuli for longer than 1,000 msec.

The changing effect sizes based on display duration likely related to the neurological processes related to detecting and orienting attention. Studies focused on neural network modeling of selective attention toward threatening stimuli in general (Frewen et al., 2008) similarly found that this preferential attention orienting disappears after 1,000 milliseconds. This is attributed to a two-stage processing in anxiety that is characterized by hypervigilance toward and then avoidance of feared stimuli. Perhaps when stimuli are presented at a longer duration, the hypervigilance ends and avoidance begins, causing selective attention toward threatening stimuli to no longer be observed (Frewen et al., 2008; Shechner et al., 2012). In contrast, very short display durations are related to amygdala activity. In an fMRI study with anxious and healthy adolescents, Monk et al. (2008) presented stimuli for 17 msec and saw group differences in amygdala activation, but not decreased reaction times on the Dot-Probe Task (i.e., attention orientation). In a follow-up study, they increased the display duration to 500 msec and subsequently found no group differences in amygdala activation, but differences in attention orienting, which corresponded with activity in the ventral lateral prefrontal cortex (vlPFC).

Taken together, it seems that attention alerting occurs relatively quickly (~17msec), and activates other cognitive processes that translate into attention orienting and hypervigilant behavior (~500 msec). After approximately 1,000 msec higher order cognitive strategies (e.g., avoidance) can be implemented to cope with the feared stimuli.

Another way to understand the presence and absence of different reaction time patterns across varying display lengths is through the inhibition of return (IOR). Classic IOR occurs after visual attention shifts toward a peripheral cue. Despite attentional facilitation to attend to a new stimuli in the same area immediately following the removal of the first cue, if there is a longer latency between the two stimuli, not only does that facilitation vanish, but a subsequent inhibitory effect requires more effort and time to reorient back to that original location (Klein, 2000; Posner & Cohen, 1984). Among emotional stimuli in a dot probe task, there is some evidence that cues presented for 550 msec (Lange, Heuer, Reinecke, Becker, & Rinck, 2008), 800 msec (Theeuwes & Van der Stigchel, 2006), or 960 msec (Fox, Russo, & Dutton, 2002) generate reaction times consistent with the expected IOR effect. However, this effect does not seem consistent across all conditions. For instance, Waters et al. (2008) found that, compared to their pleasant and neutral conditions in a spatial cuing task using scenes as stimuli, their threat condition did not produce reaction times consistent with an IOR effect. Similarly, in an investigation specifically aiming to quantify the IOR effect on emotional dot-probe stimuli, Fox, Russo, and Dutton (2002) did not detect an effect for angry faces, suggesting that some stimuli become so emotionally salient that even after longer display times, returning to that location is not inhibited.

Experimental Evidence. Several researchers (e.g., Amir & Bomyea, 2010; Amir et al., 2008; Heeren, Maurage, & Philippot, 2013; Heeren et al., 2011) have garnered experimental

evidence for the effect of selective attention toward social threat on social anxiety by modifying attention in a laboratory setting using the Dot-Probe Task. The experimental procedure usually begins with a baseline measure of selective attention (a typical Dot-Probe Task as described above), followed by an attention training session and a post-test measure. The training occurs when the investigator sets the ratio of the location of the probe so that the probe appears under the threatening face or the neutral face the majority (typically 80%) of the trials. Over repeated trials, participants begin to learn to preferentially attend to one type of face over another. This methodology began with MacLeod, Rutherford, Campbell, Ebsworthy, and Holker (2002) training two separate samples of 64 non-anxious undergraduate participants to preferentially attend toward and away from threat in order to simulate anxiety in a laboratory setting. Their results indicated that attention could be modified during this paradigm, and that participants randomly assigned to attend toward social threat reported increased anxiety and lower mood after completing an anagram stress task than participants randomly assigned to the attend away from threat condition (MacLeod et al., 2002).

Since this initial study, there have been replications and extensions by other researchers who demonstrated a similar effect of attention training on other self-report measures of anxiety (Amir, Bomyea, & Beard, 2010; Amir et al., 2008; Heeren, Lievens, & Philippot, 2011; Heeren et al., 2013), behavioral tasks such as the cyber rejection task and speech task (Heeren, Peschard, & Philippot, 2012; Heeren, Reese, et al., 2011), and physiological measures such as galvanized skin reaction (GSR; Heeren, Reese, et al., 2011). Heeren, Lievens, et al. (2011) examined the underlying process by which changes in selective attention resulted in changes in social anxiety among 79 individuals with DSM-IV diagnoses of generalized social phobia. Specifically, they investigated whether it was disengagement from threat or re-engagement to non-threat that was

primarily responsible for the decrease in social anxiety by separating their sample into four Dot-Probe conditions that trained participants to (a) re-engage to non-threat cues without disengaging from threat cues, (b) disengage from threat cues without re-engaging non-threat cues, (c) disengage from threat cues as well as reengage to non-threat cues, or (d) a control condition that did not train attention. Their results indicated that the two groups that were trained to disengage from threat reported less social anxiety post-training as well as exhibited fewer socially anxious behaviors on a speech task. The evidence for the effectiveness of disengagement from threat corresponds to models that posit that prefrontal cortex activity, which plays a role in modulating attention through effortful control, suppresses the activity in the limbic system, particularly the right hemispheric amygdala, and over repeated trials these synaptic pathways are strengthened and thus reduce the affective response of anxiety (Compton, 2003).

Attention Bias Modification Training (ABMT). Given the success in experimentally manipulating selective attention toward threat or away from it, other researchers (e.g., Amir et al., 2010) adopted the Dot-Probe Task into a treatment module called 'Attention Bias Modification Training (ABMT)' and used ABMT to train anxious individuals to preferentially attend to non-threatening stimuli as a clinical intervention. ABMT works exactly the same as the previously reviewed experimental paradigms by training selective attention away from threat by placing the probe in the space where the non-threatening face occupied the majority of the time. ABMT has been found to reduce social anxiety in both self-report (Amir, Beard, Taylor, et al., 2009) and behavioral observations of anxious behavior during a speech task (Heeren et al., 2013; Heeren, Reese, et al., 2011) in both clinically-referred anxious samples (diagnoses of social phobia, generalized anxiety disorder, etc.) and non-clinical anxious samples (see Beard et al., 2012; Hakamata et al., 2010; and Hallion & Ruscio, 2011 for three independent meta-analysis).

The effect sizes range from .36 to .61, which are comparable to the effect sizes found in meta-analyses examining the efficacy of CBT for anxiety (Cohen's *d* = .60; Otto, Smits, & Reese, 2004).

In a study examining reductions in social anxiety symptoms amongst social phobia patients randomly assigned to either eight sessions ABMT or a control Dot-Probe Task that does not train attention, Schmidt, Richey, Buckner, & Timpano (2009) found that 72% of participants in the ABMT condition no longer met criteria for social phobia as compared to 11% in the control group. Likewise, Amir et al. (2009) examined changes in social anxiety symptoms amongst 44 patients with social anxiety disorder who were assigned to either an eight session ABMT or control group. While both groups had significant decreases in social anxiety as measured by the Liebowitz Social Anxiety Scale (LSAS) and the Social Phobia and Anxiety Inventory (SPAI), the effect size for the ABMT group was twice as large as the control group (Cohen's *d* = 1.92 and .85, respectively). A mediation analysis indicated that changes in selective attention toward social threat fully mediated the changes in social anxiety. Furthermore, at a 4-month follow-up, the ABMT group's social anxiety scores were not different from their post-treatment scores, and significantly lower than their pretreatment scores (Amir, Beard, Taylor, et al., 2009). Other studies (Amir, Beard, Burns, & Bomyea, 2009; Carlbring et al., 2012; Heeren et al., 2013; Schmidt et al., 2009) have found similar prolonged effects 2-6 months post-treatment, meaning that changes to selective attention lead to long-lasting changes in self-reported social anxiety.

Studies that have found both statistically and clinically significant treatment effects have ranged between 1 and 15 sessions with a total of 112 to 3,360 Dot-Probe Task trials. Meta-regression analysis demonstrated that greater number of trials was related to a larger post-

treatment effect size of the reduction of self-reported social anxiety (Beard et al., 2012). Similarly, there have been other conditions under which ABMT has been shown to be the most efficacious in reducing anxiety symptoms. The top-bottom, vertical placement of stimuli on Dot-Probe Tasks has been shown to significantly moderate the overall effect as compared to left-right, horizontal placement (Beard et al., 2012; Hakamata et al., 2010). Likewise, using words as stimuli has shown to significantly modify the overall effect as compared to pictures. Additionally, there have been some conditions under which ABMT did not significantly change anxiety symptoms (Boettcher, Berger, & Renneberg, 2012; Neubauer et al., 2013). In these studies, different facial stimuli were used and participants used two hands pressing a keyboard as compared to one hand pressing a mouse in other studies (e.g., Amir, Beard, Burns, et al., 2009; Schmidt et al., 2009).

While there is much evidence for the clinical efficacy of ABMT in reducing social anxiety, some studies have found no effect. A study by Carlbring et al. (2012) found no differences amongst social phobia patients randomly assigned to ABMT and control groups in their levels of social anxiety when administering ABMT via the internet, even when all of their procedures matched those of Amir, Beard, Taylor, et al. (2009). This led them to conclude that the active ingredient in ABMT was actually the exposure of going to a lab and participating in a treatment trial. To test this theory, Kuckertz et al. (2014) randomly assigned 79 individuals with social phobia to four online conditions: ABMT with fear activation before treatment, ABMT only, internet-delivered, exposure-based CBT, and a dot-probe control. Their results indicated that consistent with their hypotheses, the only two conditions that significantly lowered self-reported anxiety were the ABMT with fear activation and the CBT condition, indicating that some of the effectiveness of ABMT was due to natural exposure to feared stimuli as a part of

participation in a laboratory as compared to over the Internet. Kuckertz et al. (2014) also conducted a mediation analysis for participants in both the ABMT and ABMT + fear activation conditions and found that despite no significant changes in social anxiety in the ABMT only group, changes in selective attention toward threat fully mediated changes in social anxiety in both groups. This successful mediation further indicated that even in non-laboratory settings, the general selective attention model continued to have good explanatory power.

Upon examining the correlational, experimental, and treatment efficacy evidence, it seems that selective attention toward social threat in ambiguous social situations is a necessary condition for the social anxiety process to occur. Additionally, the evidence for selective attention presented above also speaks to the psychometric properties of the Dot-Probe Task. Test-retest reliability (e.g., Heeren et al., 2014), known-groups validity (e.g., Bar-Haim et al., 2007), and experimental mediation (e.g., Amir, Beard, Taylor, et al., 2009; Heeren, Lievens, et al., 2011) provide strong support for the reliability and validity of the Dot-Probe Task. Given the central role that selective attention toward social threat plays in social anxiety, it is important to understand *when* selective attention toward threatening stimuli occurs in general cognitive processes. While not necessarily mutually exclusive, there is some debate as to whether selective attention toward threatening stimuli occurs *before* or *after* stimuli are processed. In the next two sections, I reviewed two general cognitive models that attempt to explain *when* selective attention occurs: the information-processing theory and the affect-based attentional bias theory.

Information Processing Model. The information processing model posits that selective attention occurs *after* stimuli are processed through the activation of relevant cognitive schemas. The original model, posited by Dodge (1986), included four main stages by which a social situational cue elicits a social behavior. In steps 1 and 2, a social situational cue is encoded via a

sensation/perception mechanism and transformed to a mental representation of that situation. At this point these cues are interpreted and combined with other information (e.g., prior knowledge). In steps 3 and 4, possible responses are accessed from long-term memory and evaluated, before a given response is selected to be behaviorally enacted. The final product of this four-step process is a behavioral response to the situational cue.

Whereas the original model was linear with a rigid, sequential structure, the reformulated model (Crick & Dodge, 1994) takes into account connectionist theory stating that processing can occur in simultaneous, parallel paths by reconstructing the model as cyclical in structure and iterative in nature. The allowance of feedback loops is particularly important in how prior knowledge (represented in social schemas or social knowledge) is incorporated in the interpretation of cues (step 2) and subsequently impacts the encoding of any additional cues (step 1). Furthermore, the reformulated model also includes a more specific role for emotion (i.e., emotional states) in the interpretation of social cues in step 2, where prior-existing negative feelings may lower an individual's accuracy in making social interpretations. This model underscores the importance of social schemas, and how they influence orientation towards specific social cues and motivate encoding of available cues consistent with heuristics based on those schemas (Crick & Dodge, 1994).

Evidence for the Information Processing Model's description of encoding and interpretation can be found in studies on how aggressive children process social situations. Research that was based on the Information Processing Model has shown that aggressive children are less reliant on social cues and more on schemas for interpreting social situations, they show increased attention to aggressive cues, and are more likely to interpret ambiguous social cues as hostile compared to their nonaggressive peers (Burks, Laird, Dodge, Pettit, &

Bates, 1999; Dodge & Newman, 1981; Dodge & Tomlin, 1987; Gouze, 1987). Schemas toward aggression often bias the social cues attended to in the environment (Gouze, 1987), and increase the interpretation of hostile intent in social behavior (Feldman & Dodge, 1987). Conversely, prosocial children tend to judge ambiguous behavior as benign (Erdley & Asher, 1996; Laible, McGinley, Carlo, Augustine, & Murphy, 2014; Nelson & Crick, 1999), relying on environmental cues more than schemas to make interpretations.

In the case of social anxiety, interpretation biases may encode ambiguous social situational cues as threatening, in that a cue such as a neutral facial expression or ambiguous verbal statement would be interpreted as a representation threat. These biased interpretations, in turn, would continue to pile up until the socially anxious individual is inundated with stimuli perceived as hostile. The misinterpretation of social situational stimuli has been found to be characteristic of individuals with social phobia (Amir, Foa, & Coles, 1998). Foa, Franklin, & Kozak (2001) examined social phobia from an information processing perspective, emphasizing the role of negative cognitions on interpretation bias. They proposed that negative cognitions lead to distressing emotions that lower an individual's social performance, resulting in negative feedback from the environment. The negative feedback then leads to both avoidance and negative cognitions and emotions regarding social situations.

Affect-Based Attentional Bias Model. In contrast, the affect-based attention bias model posits that selective attention occurs *before* social stimuli are consciously processed. Attentional biases, similar to selective attention toward social threat, refer to the tendency to have one's attention preferentially drawn to a given category of salient stimuli over another category of less salient stimuli (Todd, Cunningham, Anderson, & Thompson, 2012). In affect-based attention theory, selective attention (see Corbetta & Shulman, 2002) is preferentially directed to categories

of stimuli that are emotionally salient. It has been argued that the selective attentional process is not merely a symptomatic emotional reaction to affectively salient stimuli, but instead takes a proactive role in shaping perception and the emotional experience via bottom-up processing (Todd et al., 2012). Bottom-up processes involve rapid, reflexive attention based on lower level visual features (e.g., shape, motion, etc.). Based on these lower level physical features, a salient stimuli demands attention due to being unexpected or standing out from competing stimuli (Hou & Zhang, 2007; Itti, Niebur, & Koch, 1998).

According to Dennis, Chen, & McCandliss (2007), attention demands work through a three-step attentional process that includes alerting, orienting, and executive processing (Dennis et al., 2008). Alerting refers to entering and maintaining a state of awareness, which includes heightened readiness for perception and reaction. Orienting refers to selecting specific channels of stimuli (e.g., left visual field) and shifting attentional resources towards that channel. Executive processing refers to higher-level control of information flow to resolve conflict among competing stimuli or maintaining focus on goal-related stimuli (Compton, 2003). When emotional state and emotional stimuli are congruent, such as when a highly anxious person views a fear provoking stimuli, enhanced performance in alerting is observed. Likewise, when participants are presented with stimuli that are incongruent with their emotional state (e.g., low anxiety state and fear provoking stimuli), only executive attention was less efficient (i.e., greater conflict interference; Dennis et al., 2007).

The induction of specific mood states influence the degree to which congruent mood-related words are attended. A study by Cavanagh, Shin, & Urry (2011) that looked at 147 undergraduate student's selective attention after inducing mood via watching a fearful, neutral or happy video clip demonstrated that negative mood induction resulted in faster reaction times to

negative emotional words and higher scores on a self-reported anxiety scale. Conversely, positive mood induction was related to shorter reaction times toward positive emotional words and higher scores on a self-report measure of satisfaction with life. This depicts how one's mood influences selective attention to mood-congruent stimuli in the environment (Cavanagh et al., 2011).

Comparisons and Critique of Information-Processing Model and Affect-based Attentional Biases Model. While both the information-processing model and affect-based attentional bias model provide an empirically-supported framework by which to understand how emotionally-relevant information is processed, there are two key differences in how these models are conceptualized. First, in the information-processing model stimuli are encoded first and then subsequently interpreted/appraised, whereas within the affect-based attentional bias model, stimuli are encoded based on rapid, reflexive evaluation of their emotional saliency (i.e., interpreted/appraised and encoded simultaneously). Secondly, while the information-processing model focused more on *how* stimuli are perceived, affect-based attentional biases focus on *what* stimuli are perceived. One way to represent this contrast is that in the information-processing model we try to explain *how* we see our world, while with affect-based attentional biases dictate *what* we see.

One strong critique on the information-processing model is represented by the likely possibility that encoding and interpretation processing actually occurs in simultaneous parallel paths according to neuroscience connectionist theory (Rumelhart, McClelland, & Group, 1986). Despite the revisions made on the Information Processing Model that reduces its adherence to a rigid, sequential structure, the fact that all relevant stimuli need to be processed before accessing the appropriate schema is not conducive to including parallel paths. In contrast, simultaneous

appraisal and encoding is a central tenant for affect-based attentional biases, which formed the basis for testing hypotheses in the current studies.

Summary

In the previous sections, I reviewed four different empirically-supported theoretical models of social anxiety, and introduced the biological underpinnings of the anxiety process before presenting the construct of interest: selective attention to socially threatening stimuli. I then discussed the role of selective attention as it relates to individual variation in social anxiety. It appears that the neurocognitive processes that include amygdala activation, allocation of attentional resources, and the resulting cascading effect to other brain regions relates to the psychological, cognitive, and behavioral symptoms of social anxiety (Heimberg et al., 2010; LeDoux, 1995). Disruptions in any of these particular processes (i.e., amygdala with low sensitivity threshold, maladaptive behavioral or cognitive coping strategies, and particularly selective attention toward social threat) work to aggravate the system and could potentially be responsible for aspects of both the etiology and the maintenance of (sometimes) severe social anxiety.

Cultural Group Differences in Social Anxiety

While the various models and components of social anxiety discussed previously are concerned with individual variation in social anxiety, recent literature also suggests possible cultural group differences. For the last 30 years, studies examining cultural group differences in social anxiety have demonstrated increased self-reported social anxiety amongst Asian Americans and East Asian nationals as compared to European Americans (Abe & Zane, 1990; Hardin & Leong, 2005; Hsu & Alden, 2007; 2008; Hsu, 2004; Hsu et al., 2012; Lau et al., 2009; Lee, Okazaki, & Yoo, 2006; Norasakkunkit & Kalick, 2002, 2009; Okazaki & Kallivayalil, 2002;

Okazaki, Liu, Longworth, & Minn, 2002; Okazaki, 1997; 2000; 2002; Sue, Sue, & Ino, 1983; 1990). While these findings initially appeared to be mixed (e.g., Gordon & Teachman, 2008), a recent meta-analysis of extant findings by Krieg and Xu (2015) demonstrated an overall small-to-moderate effect of cultural group on social anxiety. Specifically, in examining 34 studies with a grand total of 6,552 Asian Americans[1] and 36,428 European Americans, the overall effect was d = .36, 95% CI [0.27; 0.44], indicating significantly higher self-reported social anxiety symptoms amongst Asian Americans as compared to European Americans individuals. Likewise, they found cultural group differences among 11 studies that compared East Asian (Japanese, Chinese, and Korean) nationals to European Americans (d = 0.31; 95% CI [0.16, 0.48]), indicating that East Asian nationals also scored relatively higher on self-report social anxiety scales as compared to European Americans.

Limitations Related to Self-Report. It was important to note that an individual's report of social anxiety or *feeling anxious* is only one indicator that an 'anxiety-like' process is present, albeit a very useful indicator that has shown much clinical utility (e.g., De Los Reyes et al., 2012). Other indicators that may also provide valuable information about this process are whether an individual is *acting anxious* (observed behavior) or is experiencing an expected degree of physiological arousal that would accompany behavioral or cognitive symptoms (physiological measures). Only two studies of cultural group differences in social anxiety have provided information on observational measures in addition to self-report measures. In Sue et al.'s (1983) study with 36 Asian American and 19 European American women, they found no group difference in behavioral ratings on a role playing task that required the participant to be assertive with an experimenter (both ethnically-matched and unmatched), while still finding a significant group difference on a social anxiety questionnaire. Similarly, Okazaki et al. (2002)

asked 40 Asian American and 40 European American undergraduates to participate in a 3-minute performance task, where their microlevel behaviors (e.g. fidgeting, gaze avoidance) were recorded in addition to their emotional state before and immediately after the task. While there were cultural group differences on trait measures of social anxiety (SPAI) as well as emotion ratings before and after the task, there were no group differences on behavioral indicators of social anxiety. The authors concluded that this inconsistency underscores the importance of using multiple modes of assessment.

Explaining the Cultural Group Differences in Social Anxiety Between Individuals of Asian and European Heritages

At least two models have been proposed to explain cultural group differences in social anxiety: the Acculturative-Stress Model and Self-Construal Model, respectively.

The Acculturative Stress Model. Acculturative stress is conceptualized as the experience of distress that immigrant minority groups experience when adjusting to life in a new country, particularly when the new cultural values and goals conflict with their previously socialized cultural standards (Hsu et al., 2012). This conflict is often related to identity confusion, low self-esteem, depression, and anxiety (Berry, Kim, Minde, & Mok, 1987; Zheng & Berry, 1991). When social behaviors in a Western setting create an apparent conflict with Asian values, the resulting acculturative or bicultural stress can generate a reaction that holds similar characteristics to symptoms or experience of social anxiety. Hsu et al. (2012) used the Vancouver Index of Acculturation (VIA; Ryder, Alden, & Paulhus, 2000) to test the acculturative-stress model on 309 East Asian nationals, 280 Asian Americans, and 103 European-American undergraduates. They found that mono-cultural groups (East Asian nationals and EH Americans) displayed lower levels of social anxiety and social comparison as compared to the bicultural

group (Asian Americans). It was conceptualized that the conflict between two value systems accounted for increased wariness and anxiety in social situations. Further research gives support for the notion that difficulties in adjustment to the demands of the new culture may be related to greater acculturative-stress, which then predicts decreased social functioning—possibly related to increased social anxiety (see Aikawa, Fujita, & Tanaka, 2007). Studies of East Asian international students living in North America have found that those who more closely adhered to Western norms experienced better social and psychological adjustment in the new culture (Cross, 1995; Oguri & Gudykunst, 2002). Overall, it appears as if the Acculturative-Stress Model has a strong theoretical rational with empirical evidence to support that this factor could possibly explain some of the differences in increased social anxiety in Asian Americans as due to the unique experience of acculturation—and the associated stress—that European Americans do not share. However, studies that examine this theory did not measure acculturative-stress directly but just measured acculturation as a proxy, creating a significant limitation in examining this model.

The Self-Construal Model. The Self-Construal model, based on the work of Markus and Kitayama (1991), focuses on cultural factors and assumes that there are some fundamental East-West differences in the view of the self in relation to others. In Western societies, ideas such as autonomy, uniqueness, personal rights and achievement are emphasized as cultural values, perhaps contributing to a sense of self that is relatively independent from others (Markus & Kitayama, 1991; Singelis, 1994). In this way, appropriate social behavior in the West includes assertiveness, direct communication, and competitiveness (e.g., Clark, 2001), which underscores one's independence and autonomy of the self. This value system and the corresponding behaviors line up with how (Markus & Kitayama, 1991) define 'independent self-construal'—viewing the self as independent and autonomous from others. In contrast, traditional cultural

values in East Asia focus on creating and maintaining a sense of social harmony, which is accomplished with a sense of heightened sensitivity towards other's feelings, opinions, and negative evaluations during social encounters (Fung, 1999); as well as emotional regulation, specifically suppressing negative emotional responses that may detract from the group's sense of solidarity (Chen & Rubin, 2011). Other behaviors that work to this end are reticence, eye-gaze aversion, non-assertiveness, and more frequent silence (Baker & Edelmann, 2002; Beidel & Turner, 1999)—all of which may mimic symptoms or behavioral indices of social anxiety as defined by Western theorists (Clark & Wells, 1995). These behaviors, socialized from an early age (Fung, 1999), are designed to promote acceptance by others and help foster a sense of what Markus and Kitayama (1991) call 'interdependent self-construal'—viewing the self as connected with members of the immediate group and surrounding environment (Markus & Kitayama, 1991). The relationship between self-construal and social anxiety may be that as an individual sees him/herself as more interdependent and/or less independent, s/he places increased value on the social relationships with other people, and consequently has increased fears about disrupting this relationship or being negatively evaluated by others. Based on this working model, it was conceptualized that it was the extent of interdependence that would predict social anxiety and that independence is just the opposite construct (Okazaki, 1997).

In addition to overarching cultural values and trends, there is also room for within-group (individual) variation in self-construal. When examining differing cultural values and culturally-sanctioned behaviors it is important to acknowledge the wide degree of variance regarding how well collective values/behaviors reflect individual beliefs and actions. These aspects may be intrinsically tied to generational and experiential effects that vary widely from person to person and region to region. Specifically, with Asian American individuals, traditional cultural values

may be the effect of residual socialization from parents and grandparents who hold more strongly to these values than do their offspring. Independent or interdependent self-construal have been found to be contributing factors in explaining Asian American and European American group differences in reported levels of social anxiety (Ho & Lau, 2011; Okazaki, 1997). For instance, Ho and Lau (2011) examined the relation between self-construals and social anxiety symptoms in a sample of 74 European American, 83 U.S.-born Asian American, and 72 foreign-born Asian American undergraduate students. In their analysis, they ran two models with independent and interdependent self-construal entered separately in each model, along with two additional variables (a) contrasting foreign-born Asian Americans and European Americans and (b) contrasting U.S.-born Asian Americans and European Americans entered into each model. They found that interdependent self-construal was positively related to social anxiety whereas independent self-construal was negatively associated with social anxiety, and that the two types of self-construals fully mediated the cultural group differences in social anxiety. Likewise, Hong and Woody (2007) tested a mediation model with 251 Korean Canadians and 254 European Canadians recruited from the community. In these models, the cultural group difference in social anxiety was reported after the variance from independent and interdependent self-construal was partialled out separately. Their results indicated that independent self-construal fully mediated the cultural group difference in social anxiety, whereas interdependent self-construal only partially mediated it.

Comparing the Self-Construal Model and Acculturative-Stress Model. Both models offer a conceptualization of a specific pathway by which an Asian American (or an East Asian national in the case of Self-Construal Model) could develop more social anxiety symptoms than an European American. In the Self-Construal Model, this increased awareness and subsequent

anxiety works through greater value put on social relationships according to how the individual views him/herself in society (i.e. interdependent vs. independent). In the Acculturative-Stress Model, this group difference in increased anxiety is seen as a product of navigating a new social situation and working through values conflict that is unique to Asian American immigrants as compared to European American individuals. While both models have received empirical support, it seems that the acculturative-stress model would better explain individual differences amongst Asian Americans in levels of social anxiety, and that the self-construal model would better explain between-group differences when comparing Asian American and European American individuals on measures of social anxiety.

In a meta-analysis by Krieg and Xu (2015) that tested these explanatory models across previous studies, support was not found for the Acculturative-Stress Model. Specifically, a meta-regression analysis was performed to examine whether levels of acculturation accounted for significant variance in scores of social anxiety amongst Asian Americans. In 4 studies with 411 Asian Americans, acculturation only accounted for 4% of the variance in social anxiety and was not statistically significant ($f^2 = .04$; $p = .85$). While there were considerable limitations, such as not measuring acculturative-stress directly, and overreliance on using a unilinear measure of acculturation as oppose to better-performing bilinear or multidimensional measures (see Yoon et al., 2013 for a review), a follow-up analysis indicated no difference in social anxiety between 1st and 2nd generation Asian Americans ($d = -.21$; 95% CI [-1.96, 1.55]), who were expected to differ in acculturation.

Conversely, in Krieg and Xu's (2015) meta-analytic structural equation modeling (MASEM) analysis that tested 6 different competing mediation and partial mediation models including interdependent self-construal, independent self-construal, or both, self-construal

partially-mediated cultural group differences in social anxiety. Specifically, amongst 7 studies with 2,052 participants, a partial mediation model with independent self-construal only fit the data the best ($\chi^2 = 5.58$, $p = 0.06$; CFI = 0.99; TLI = 0.98; RMSEA = 0.03). This overall finding that highlights a significant partial mediation of independent self-construal and the non-significant role of interdependent self-construal holds implications for the self-construal model. To date, the self-construal model has focused on interdependent self-construal as what increases the value of social relationships and subsequently leads to fear of disrupting that harmony (Okazaki, 1997). Instead, it appears that not viewing oneself as independent and autonomous from others is what may increase this importance of social relationships and lead to greater anxiety in social interactions. Equally important, Krieg and Xu (2015) found that the direct effect between cultural group and social anxiety remained significant, representing unexplained variance in cultural group differences in social anxiety that needs to be further explored.

Other Mediation Models. Given that neither of the proposed models completely explained the cultural group differences in social anxiety, it is important to continue exploring possible working models that could elucidate the specific mechanisms by which these differences occur. To this end, there have been three models proposed to date (Lau et al., 2009; Mak, Law, & Teng, 2011; Park et al., 2011).

Instead of focusing on self-construals or acculturative-stress, Lau et al. (2009) examined the cultural group differences in the attunement to other's emotional states as a mediator for the differences in social anxiety between Asian and European Americans. They hypothesized that given that interpersonal harmony and avoiding loss of face are stressed in Asian American culture more than European American culture (e.g., Matsumoto, 1992), these differences may translate into increased sensitivity to negative emotional states of others (e.g., anger, sadness, and

fear, as compared to happiness and surprise; Beaupré & Hess, 2005; Matsumoto, 1992), and subsequently lead to more social anxiety. However, in the studies that have examined this phenomenon (Beaupré & Hess, 2005; Matsumoto, 1992), the opposite effect, where European Americans outperformed Asian Americans in recognizing negative emotion was found. This surprising difference in lower recognition accuracy was interpreted as being attributable to cultural rules against displaying and acknowledging emotional states that have the possibility of disrupting intra-group harmony (Matsumoto, 1992). In their study with 116 Asian Americans and 148 European Americans, Lau et al. (2009) included the following variables related to attunement to emotional states and relevant to Asian American culture: loss of face, emotional recognition, parent's shaming/love withdrawal, and sensitivity to others. In their mediation analysis, they found that among these four variables, only emotional recognition and loss of face mediated the cultural group differences in social anxiety (see Figure 4).

Other than studies that focused on what mediates the cultural group differences in social anxiety, Mak et al. (2011) and Park et al. (2011) examined individual level mediators in the relation between self-construal and social anxiety. Specifically, Mak et al. (2011) proposed a model where the relation between interdependent and independent self-construal and social anxiety was mediated by sociotropy, a cognitive style in which individuals exaggerate their closeness to others and compulsively try to please them (see Figure 2). People with sociotropic tendencies catastrophize the possibility of losing connection with others and are fearful of being excluded from their group (Blatt & Zuroff, 1992; Robins & Block, 1988). Sociotropy may be similar to interdependent self-construal, in that individuals emphasize group harmony and defining themselves by their relationship with others. Sociotropy is also considered to be a vulnerability to both anxious and depressive types of distress (Bartelstone & Trull, 1995; Beck,

1987; Luthar & Blatt, 1993). In Mak et al.'s (2011) study, which examined sociotropy as a mediator between self-construal and anxiety and depression in a group of 212 Asian American and 202 European American undergraduates, they found that sociotropy completely mediated the relationship between both independent and interdependent self-construal in predicting social anxiety. This model fit both Asian American and European American groups equally well in predicting individual differences in social anxiety.

Similarly, Park et al. (2011) proposed that social anxiety amongst Asian Americans could be predicted from interdependent and independent self-construal by being mediated by emotional suppression, another individual-level mediator related to the inhibition of emotionally expressive behaviors. While emotional suppression does have adaptive outcomes in many situations, it has also been linked to negative impact on psychological adjustment (Campbell-Sills, Barlow, Brown, & Hofmann, 2006; Matsumoto, Yoo, & Nakagawa, 2008). Park et al. (2011) hypothesized that consistent with prior theory (Kitayama & Markus, 1994), cultural values may influence the way in which an individual selects an emotional regulation strategy. Supporting this notion is evidence from both international studies (Matsumoto et al., 2008) and within national studies (Butler et al., 2003) that demonstrated an association between Asian cultural values and emotional suppression as an emotional regulation strategy. In their study of 784 self-identified Asian Americans, they found that emotional suppression completely mediated the relation between both independent and interdependent self-construal, and social anxiety (see Figure 3).

Critique of the Extant Mediation Models. The three mediation models either explored alternative mechanisms in explaining cultural group difference in social anxiety, or investigated additional individual-level factors that may mediate the relation between self-construals and social anxiety among Asian Americans. However, neither model attempted to integrate group-

and individual-level mediators that would shed light on how culture influences the neurocognitive process by which social anxiety emerges.

Identifying the Gap Between Individual Variation Models and Group Differences Models

The previous section identified a group-level difference in social anxiety between individuals of Asian- and European-heritage. I presented two explanatory models in the literature (acculturative-stress and self-construal), and reviewed other models that have attempted to identify either other potential group-level mediators for cultural group differences in social anxiety or individual-level mediators that may explain within-group individual variation in social anxiety. However, there was a gap between the literature that explains individual-level variation and the literature that highlights and explains group-level differences. The former examines social anxiety from a *bottom-up* approach, emphasizing differences in biology and the corresponding cognitive and behavioral correlates. Through these findings amygdala reactivity and attention allocation are highlighted as telltale signs that are able to differentiate between people with low and high social anxiety. The group level explanations, examine social anxiety from a *top-down* approach, emphasizing the contribution of cultural values and how they shape an individual's self-concept, which eventually impacts cognitions and behaviors related to social anxiety. Clearly, there was a need to integrate these two perspectives in order to develop a working model that takes into account the roles of both selective attention toward social threat and independent/interdependent self-construals. In the next section, I discussed cultural group differences in selective attention before presenting an integrated model and hypotheses.

Cultural Differences in Selective Attention

Given the cultural difference in social anxiety and the key role of selective attention toward social threat as a causal mechanism that explains individual differences in social anxiety,

it would be reasonable to expect cultural differences in selective attention toward social threat to be able to explain group differences in social anxiety between individuals of Asian- and European-heritage. Here, I reviewed the relevant literature that describes the source of cultural differences in selective attention, using attention to either the field/context or the focal/detached object as an example. Then, I summarized the literature directly related to cultural differences in the processing of emotionally salient social stimuli.

From Social Organization to Selective Attention. In a seminal review by Nisbett et al. (2001), differences in cognition between East Asians and European Americans were reviewed in the context of the social, political, and economic history of ancient China and ancient Greece. The resulting model proposed that differences in cognitive processes are influenced by differences in social organization, i.e., the way how social relationships and society are organized, both directly as well as mediated by meta-physical and epistemological beliefs on how the world works and from where to obtain knowledge (see Figure 5). As an example, Nisbett asserted that cognitive differences between Easterners and Westerners can be loosely categorized as stemming from either holistic thought that selectively attends to the context/field, or analytic thought that centers around the focal/detached object (Nisbett, 1998; Peng & Nisbett, 1999). They theorized that this difference was influenced by how the respective societies have been traditionally organized. In ancient China as an agricultural society, survival was dependent on social groups (i.e., villages) cooperating to grow sufficient amounts of food; this in turn, led to a more complex social world with many roles and obligations and placed greater emphasis on group harmony. In contrast, ancient Greece was comprised of mountainous landmasses separated by the sea, providing a geographic sense of disconnection. This resulted in a social world with

fewer and less significant social relationships, and placed greater emphasis on individual agency and focusing on the object of one's goals (Nisbett et al., 2001).

Social organizational systems are hypothesized to result in differences in selective attention via the development of cognitive tools that aid solving specific social dilemmas faced within a context of a unique social system. For instance, within a social system that stressed interdependence and harmony, the tool of *dialectics*, philosophically reconciling two opposite ideas, could have helped develop selective attention towards holistic scenes through rationalizing the need to look beyond the object in order to define it. Conversely, in a society that stressed independent assertions and individual prowess, the tool of debate may have helped direct attention to carefully defining objects through an analysis of its parts and description (Nisbett et al., 2001). Likewise, it is also hypothesized that the influence of social organization on differences in selective attention would be carried on through meta-physical or epistemological beliefs. Nisbett et al. (2001) proposed that Chinese social organization influenced the idea of interconnectedness or covariation among a given set of objects and events, which needs to be understood by its context. In contrast, Greek social organization is thought to promote the idea that everything has a category or rule that governs its existence. These differences in meta-physical beliefs also correspond to selective attention towards either the context/field or the focal/detached object (Nisbett et al., 2001).

While much of Nisbett et al. (2001) theory is related to events and people thousands of years ago, the resulting differences in selective attention are visible today (e.g., Hedden et al., 2000; Ji, Peng, & Nisbett, 2000; Masuda & Nisbett, 2001; Park, Nisbett, & Hedden, 1999). For example, Masuda and Nisbett (2001) presented Japanese and European American participants with an animated scene of fish and other underwater objects and asked them to report what was

seen. In the majority of cases, the first response from the European American participants included a statement about the fish (e.g., “a trout swimming”), whereas the first response from the Japanese participants often referred to the background objects or the general context (e.g., “there is a lake”). Further questioning revealed that while both Japanese and American participants stated details about the fish, Japanese participants made 70% more comments about background or contextual details (Masuda & Nisbett, 2001). In a follow-up task, Japanese but not European American participants performed more poorly when the background of the fish was switched with a mismatching background (Masuda & Nisbett, 2001). Based on these studies, Ji (2001) hypothesized that European Americans would perform better when separating an object embedded in its field as compared to their East Asian counterparts. Their participants performed the rod and frame test, where they were asked to report when a line (the rod), presented at a random angle inside a rectangular frame presented at a random angle, appears to be vertical. In this experimental paradigm, field dependence is defined as the influence of the angle of the frame on the perception of the angle of the line. East Asian participants made more errors on this trial than did European American participants, demonstrating a reduction in de-contextualization of an object from its field that supports more holistic than analytic thoughts (Ji, Nisbett, & Zhang, 2001).

More recent studies have replicated these results using eye-tracking methodology. A study by Chua, Boland, and Nisbett (2005) examined 25 European American and 27 Chinese International students’ eye fixations on either the object or the background of 36 pictures of scenes with a distinct object in the foreground (e.g., a tiger standing by a stream). The latency until first fixating on the object as well as the amount of time the participants’ eyes were fixated on the object and the background were recorded as dependent variables. Their results indicated

that Chinese participants spent more time examining the background than did European Americans (Cohen's d = .37). Likewise, European Americans looked at the foreground object 118 msec faster on average than did Chinese participants. The difference in amount of time fixated on the background as well as the latency until first fixated on foreground image provided further evidence for culture group differences in holistic and analytic thought (Chua et al., 2005). Other replication/extension studies (e.g., Hedden, Ketay, Aron, Markus, & Gabrieli, 2008; Kitayama, Duffy, Kawamura, & Larsen, 2003), and studies that examine neurological difference in brain functioning (e.g., Han & Northoff, 2008) also demonstrate cultural group differences in selective attention toward the field/context or focal/detached object that characterize holistic and analytic thoughts proposed in Nisbett et al.'s (2001) model.

Despite this progress, much was still unknown on how culture influences specific cognitive processes relative to social anxiety. In their 2008 review, Han and Northoff posited two possible relations between culture and cognitive processes: *modulatory* or *constitutional*. If the relation between culture and cognition is modulatory, then the same cognitive process (and its neurological correlates) would perform differently based on group differences in shared rules for social behavior and social ideas. If the relation is constitutional, cultural differences in the meaning or perception of a cognitive task may determine whether a particular brain region (and corresponding cognition) is used at all (Han & Northoff, 2008).

Cultural Differences in Attention to Emotional Faces. In addition to cultural differences in holistic and analytic thoughts, East Asians/Asian Americans and European Americans also seem to differ in their ability to interpret and attend to specific facial expressions of emotion. One of the most salient stimuli that all human beings selectively attend to is eye gaze, the direction targeted by a pair of eyes (Friesen & Kingstone, 1998). Selective attention toward eye

gaze has been observed to emerge in infants as early as 2-3 months old (Maurer, 1985), and by the time children are 12 months old, they are able to consistently look where others are looking (Corkum & Moore, 1995). In adults, reflexive orientation in response to gaze direction has been explored extensively via a *modified Posner paradigm* (see Kingstone, Smilek, Ristic, Friesen, & Eastwood, 2003). In the Posner task, participants focus on a blank face positioned between two boxes, before the eyes on the face appear looking either to one box or the other. Then, a symbol appears in one of the boxes and the participants are asked press a key indicating which box they saw it in as fast as they can. Enhanced or faster reaction time is observed when the eye gaze predicts which box the symbol appears in, and increased reaction time is observed when the eye gaze does not predict the position of the symbol (Friesen & Kingstone, 1998). In studies that incorporate eye-tracking devices, results show that when viewing an on-screen photograph of a face both socially anxious (Manera, Samson, Pehrs, Lee, & Gross, 2014) and non-anxious (Holas, Krejtz, Cypryanska, & Nezlek, 2014) participants spend relatively greater amounts of time focused on the eyes and other indicators of emotional expression. The significant amount of attention paid to human faces indicates that there might be something special about the human face and eyes that can be used to infer emotional state.

Emotional Recognition in Facial Expression. Classical studies (e.g., Ekman, 1994; Ekman et al., 1987; Ekman, Friesen, & Ellsworth, 1972; Izard, 1971) have demonstrated that expressions of basic emotions such as happiness, anger, sadness, etc., have been traditionally thought of to be universal and similarly recognized across many different cultures (e.g., Chevalier-Skolnikoff, 1973; Darwin, 1872). Recently, however, this assumption of universality has been challenged by modern cognitive experimental paradigms and neuroimaging evidence (e.g., Derntl et al., 2012; Elfenbein, 2007; Huang, Tang, Daiga, Shioiri, & Someya, 2001). The

discovery of cultural differences at the neurological level has led to the advent of the field of cultural neuroscience (see Chiao & Ambady, 2007; Chiao, Cheon, Pornpattananangkul, Mrazek, & Blizinsky, 2014) and proposition of a new idea of 'culturally-tuned' neurological processes, that culture influences not just affect, behavior, and cognition, but also the use and activity of neurons in task-specific brain regions (Chiao et al., 2008; Han & Northoff, 2008).

Differences between East Asian nationals and European Americans in emotion recognition in standard sets of faces have demonstrated that some facial expressions are more universal than others. In a study examining 237 Chinese Nationals, 123 Japanese Nationals (reanalyzed from Shioiri, Someya, Helmeste, & Tang, 1999), and 271 European Americans (reanalyzed from Matsumoto & Ekman, 1989), Huang et al. (2001) presented standardized photographs of European American (50%) and Japanese (50%) faces expressing specific emotions to participants who were asked to rate the photograph on nine emotions (e.g., happy, neutral, angry, fear, sadness, surprise, etc.) Their results indicated participants from each group correctly identified each emotion most of the time (group means: 49.7 – 92.0%), but with some group-level differences showing that Japanese and Chinese Nationals correctly identified negative emotions (i.e., anger, disgust, fear, sadness, and surprise) less often than European Americans. In addition to group differences, relatively larger standard deviations (*SD*: 10.8 – 19.9%) for group means on these five emotional expressions demonstrate greater within-group variability than emotional expressions that were did not demonstrate a group difference (e.g., happiness; *SD*: 2.7 – 2.9%). Huang et al. (2001) suggested that differences in emotion recognition may be due to East Asian participants using different facial cues than European Americans when they decipher emotional expressions. This hypothesis, however, has not yet been empirically tested.

At the same time, there is preliminary evidence to suggest that the way by which Asian Americans and European Americans perceive emotional faces involves both a different modulated cognitive processes (e.g, Chiao et al., 2008) and different constitution in terms of active regions in the brain (e.g., Moriguchi et al., 2005). Specifically, A study by Derntl et al. (2012) used a similar facial recognition task with 24 Asian exchange students (17 Chinese, 7 Japanese) and 24 Austrian students, and applied functional magnetic resonance imaging (fMRI) to identify which regions in the brain were correlated for ascertaining the emotional expressions in photographs in each group. Like Huang et al. (2001), they found that Australians correctly identified the emotional expression more often than East Asian participants (90.8% and 77.4%, respectively). Among the specific expressions, the highest accuracy in both groups was for identifying fearful expressions and the lowest was for identifying expressions of disgust. The fMRI data indicated an interaction effect with type of emotion and participant ethnicity, specifically the longest bilateral amygdala activation was observed amongst East Asian participants viewing emotional (as compared to neutral) faces. This extended activation period indicates greater sensitivity and autonomic arousal at the neurological level amongst East Asian participants as compared to European participants. To examine the moderating effects of Western socialization on the interaction between cultural group and amygdala activation, the duration of stay in Austria was analyzed as a covariate, which subsequently attenuated the interaction effect. These attenuated results indicate (a) support for Han and Northoff (2008) description of *modulatory* influence of culture on a neurological system and (b) that the modulatory influence of culture can be modified by relatively recent changes in social environmental influences.

Social environmental influences are thought to work by facilitating the meaning of facial expressions as well as determining the appropriateness of certain expressions in certain settings

(Tsai, 2007). For example, in a Japanese social context, displays of negative emotions tend to be viewed as having the potential to disrupt the sense of social harmony. Smiling behavior is sometimes considered an attempt to mask other types of negative emotion. Conversely, in the U.S., overt displays of many types of emotions, regardless of negative or positive emotions, are often considered appropriately 'speaking one's mind' (Matsumoto, 1990). Culturally disparate normative expressions of emotion would work to influence the inferences that people make when deciphering the emotional expressions of others. In social contexts such as the U.S. where emotion is more overtly expressed, less intensity is put into interpreting emotional expression, whereas in places such as Japan where overt emotional expression is less prominent, increased sensitivity is needed to read the nuances of these displays (Matsumoto, Kasri, & Kooken, 1999). Perhaps because of these cultural norms in deciphering emotional expression, other studies (Derntl et al., 2012; Moriguchi et al., 2005; Russell, Suzuki, & Ishida, 1993) found that compared to the relative ease in assigning a specific label to a given emotional expression observed in European Americans, Asian participants often described the expression rather vaguely. This vagueness included describing faces with fearful expressions as 'surprised', 'shocked', or 'confused' (Moriguchi et al., 2005), applying internal cognitive states (i.e., 'thinking', 'perplexed', 'frustrated') to describe an angry expression (Damjanovic, Roberson, Athanasopoulos, Kasai, & Dyson, 2010), and preferring to pick more neutral categories when describing negative emotional expressions via closed-ended questions (Derntl et al., 2012). This may represent what Han and Northoff (2008) described as the *constitutional* influence of culture on a neurological system, where the same stimuli are neurologically processed differently due to culturally determined pre-set differences in the meaning of those stimuli.

Differences in Selective Attention Toward Facial Signals of Threat. Group differences in labeling emotional expressions may be related to differences in the neurological processing of and attending to emotional expressions of threat by the amygdala and other parts of the limbic system. In this section, I reviewed the literature related to East Asian/Asian American and European American differences in how facial threat signals are selectively attended. There are two types of threat signals that can be represented through facial expressions: the representation of *indirect threat* that is often shown in a fearful expression, and a representation of *direct threat* that is often manifested in an angry expression.

There are some observed cultural differences in the processing of facial fear expressions both at the behavioral and neurological level. In a study examining behavioral and fMRI responses to a categorization task of 80 images of fearful, happy, neutral, angry Japanese (50%) and European (50%) faces among 10 Japanese nationals and 10 European Americans, Chiao et al. (2008) found that while both groups of participants had high performance in emotion recognition accuracy, Japanese participants had significantly faster reaction time when responding to fear expressions as compared to European Americans. Similarly, when examining the change in blood flow (hemodynamic response) that represents relatively greater activity in the brain, the percent change in amygdala was largest when viewing a fearful face as compared to any other emotional expression for Japanese participants relative to European American participants (Chiao et al., 2008).

However, this difference in neurological processing is only observed when participants interpret the fearful facial expression as actually fearful. In a similar study by Moriguchi (2005) that incorporated a different set of standardized emotional face stimuli that had been randomly morphed to varying degrees of intensity, Japanese participants did not see the fearful expression

as actually fearful, whereas the majority of Caucasian participants did. Their results showed the opposite effect in that Caucasian participants had a greater tendency for amygdala activation in response to these faces (Moriguchi et al., 2005). The moderation of emotion interpretation on Japanese/Caucasian differences in amygdala activation further demonstrates the constitutional effect of these biological processes as well as the need to choose standardized stimuli that are interpreted similarly by both groups.

There also seems to be an interaction between eye-gaze and the neurological processing of fearful faces. In a study examining fMRI responses to images of fearful Japanese (50%) and European American (50%) faces with either direct (50%) or averted (50%) eye-gaze among 14 Japanese nationals and 18 European Americans, Adams Jr et al. (2010) found increased amygdala activation in direct-gaze as compared to averted-gaze fear expressions in both Japanese and European Americans. Direct eye-gaze combined with a fearful expression is supposed to represent a direct threat, while averted eye-gaze combined with a fearful expression is supposed to represent an indirect threat (e.g., fear-inducing stimuli outside of the dyad). The significant main effect of direct as compared to averted eye-gaze in amygdala activation may be because direct eye-gaze is construed as a more salient social threatening cue, especially in the context of a fear expression (Adams Jr et al., 2009). It is surprising, however, that there was no interaction effect of group (Japanese vs. European American) and eye-gaze (direct vs. averted) given the differences in cultural meaning associated with direct eye gaze in Japan as compared to the U.S. (Baker & Edelmann, 2002; Beidel & Turner, 1999).

Attending to the expression of anger has been demonstrated to be different between Asian nationals and European Americans. For instance, in Chiao et al. (2008) study, there was an observed difference in reaction time between Japanese and European American participants

when recognizing the emotional expression of anger (Japanese: *M*[*SD*] = 1063.0[156.5]; European American: *M*[*SD*] = 1367.5[167.7]). However, amygdala activation under the 'anger' condition was not explored. In another study, Damjanovic et al. (2010) compared the responses of 18 European and 18 Japanese participants in a visual search experiment. Specifically, four faces (either one happy face and three neutral faces; or one angry face and three neutral faces) were randomly arranged on the screen and participants were asked to find the face that was different from the others. They found that European participants were faster to detect happy faces than the Japanese group, but that there was no difference in reaction time to detecting angry faces. Within the Japanese group, there was no significant difference between types of emotion (happy or angry) that was detected (Damjanovic et al., 2010).

The respective tasks in the Chiao et al. (2008) and Damjanovic et al. (2010) studies seemed to target different aspects of selective attention. Damjanovic et al.'s (2010) task used a *visual search paradigm*, where participants sorted through a series of faces and identified one that was different. This task targeted the *detection* process of selective attention. In contrast, Chiao et al.'s (2008) task examined relative reaction times to certain stimuli, measuring the attention *orientation* to these faces. Taken together, it seems that orienting to a single stimulus in a task works better to elicit differences in selective attention than a visual search paradigm with multiple faces.

The 'Alien Effect'. It should be noted that there has been a consistent observed interaction effect of the ethnicity of the stimuli and the ethnicity of the participant (e.g., Derntl et al., 2012). This effect, known as *the alien effect*, shows differences in responses in emotion identification (Derntl et al., 2012; Huang et al., 2001) and emotion detection (Chiao et al., 2008; Damjanovic et al., 2010) tasks that involve one's in-group as compared to one's out-group. Studies on emotional

identification found higher accuracy when identifying emotional expressions in one's in-group compared to one's out-group for European American but not Japanese national participants, and that this is attenuated by the frequency exposure to out-group members reported by participants (Huang et al., 2001). Specifically, in Huang et al.'s (2001) study, Japanese national participants more accurately identified emotional expressions in pictures of Japanese nationals than European Americans, and vice versa for the European American group. A third group of Chinese undergraduate students, who had frequent contact with European/European American students on campus, demonstrated increased accuracy in identifying European American emotional expression.

Similarly, there appears to be a greater amygdala response when viewing a face from one's in-group than when viewing a face from one's out-group (Chiao et al., 2008). Specifically, when examining changes in amygdala activation via fMRI (hemodynamic response) amongst 10 European Americans and 12 Japanese nationals they found a large effect size (Cohen's $d = 2.17$) demonstrating greater activation when viewing any emotion on an in-group face compared to any emotion on an out-group face. Adams et al.'s (2010) study on direct vs. averted eye gaze in expressions of fear among 16 Japanese nationals and 18 European Americans replicated and extended these results by finding that direct gaze (indicating direct threat) created greater percent change in amygdala response when viewing out-group faces and averted gaze (indicating indirect threat) elicited a stronger amygdala response for in-group faces. This unique pattern of fear activation complicates the picture by demonstrating the moderating impact of in-group/out-group biases on amygdala activation when viewing direct or averted fearful facial expressions.

Selective Attention as a Mediator between Self-Construal and Social Anxiety

To summarize, it seems that there are consistent cultural difference in social anxiety between Asian Americans and European Americans, and between East Asian nationals and European Americans. The cultural differences in social anxiety have been partially explained by group-level differences in self-construals, particularly lower independent self-construal among Asian Americans and East Asian nationals. However, the results of partial mediation of self-construals found in a meta-analysis (Krieg & Xu, 2015) indicated that additional mediators may further explain cultural differences in social anxiety; one of them may be selective attention toward social threat. As reviewed above, selective attention toward social threat has been found to be related to variations in social anxiety at only the individual level. However, other cross-cultural studies, which demonstrate cultural group differences in holistic and analytic thought as well as the processing of emotional faces, suggest plausible cultural group differences in selective attention toward social threat.

If selective attention toward social threat is a key etiological factor that distinguishes between groups of individuals with low and high social anxiety *and* Asian Americans/East Asian nationals represent a group with higher social anxiety relative to European Americans, it seemed reasonable to hypothesize selective attention toward social threat as another mediator that could help explain group-level differences in social anxiety. However, the mediation effect of selective attention toward social threat may not be independent of cultural group differences in self-construal. The differences between independent and interdependent self-construal seem to correspond well to the differences between analytic and holistic thought and may impact the way how members of different cultural groups attend to emotional faces. Assuming there is a broad *macro*-level cultural difference in holistic and analytic thought as well as independent and interdependent self-construal, these differences in the way how people think and the way how

people view themselves in relation to others, are likely to be manifested in micro-level cultural differences in specific social cognitive processes that are salient in daily social interactions, such as selective attention toward social threat. Therefore, to fully understand why cultural groups differ in social anxiety, it is important to develop a model that takes into account both macro- and micro-level explanatory factors that may mediate these cultural differences.

Culturally-Tuned Cognition Model for East-West Differences in Social Anxiety

As shown in Figure 6, I proposed a working model for cultural group differences in social anxiety that integrates both macro- and micro-level mediators. Specifically, I argued that for Asian-heritage individuals, lower independent self-construal or the lack of viewing oneself as unique and separate from one's social context, may increase their sensitivity to cues that could potentially represent a threat to social harmony or interpersonal relationships and thus lead to selective attention toward threatening social stimuli such as negative emotional faces than non-threatening stimuli such as neural faces. The heightened attention toward social threat would in turn form the basis for elevated symptoms of social anxiety among individuals of Asian-heritage. In contrast, European Americans on average may exhibit higher independent self-construal that may be manifested in lowered sensitivity and selective attention toward social threat. As a consequence, European Americans tend to report less symptoms of social anxiety in comparison to their Asian counterparts.

This model hinges upon identifying group-level differences in selective attention toward social threat, independent and interdependent self-construal, and social anxiety. If differences were found among these variables, the model would then predict that (a) the relation between cultural group contrast and selective attention toward social threat, would be explained by cultural group differences in self-construals; and (b) the relation between cultural group contrast

and social anxiety would be explained by cultural group differences in both self-construals and selective attention toward social threat.

Two studies were conducted to test this model. Both studies included two steps. First, I compared Asian Americans/Japanese nationals to European Americans in self-construals, selective attention toward social threat, and social anxiety. Then I examined how cultural differences in self-construals and selective attention toward social threat may explain cultural differences in social anxiety. Study 1 used a correlational design and analyzed covariance patterns among variables in the model. Study 2 used a quasi-experimental design and manipulated selective attention to and away from threat in a laboratory. Collectively, the results of these two studies represented an initial attempt to integrate macro- and micro-level mediators in relation to cultural group differences in social anxiety.

STUDY 1

The aims of Study 1 were to (a) compare cultural group differences in self-reported selective attention toward social threat, self-construals, and social anxiety as well as (b) demonstrate the mediation of self-construals and selective attention toward social threat, in order to explain cultural group differences in self-reported social anxiety symptoms. Specifically, selective attention toward social threat was operationalized as self-reported threat appraisals in anxiety provoking situations that were nominated by Asian Americans, Japanese nationals, and European Americans (see details below), whereas self-construals and social anxiety were assessed using self-report questionnaires. I focused on both Asian American / European American and Japanese national / European American comparisons, and hypothesized that (a) Asian Americans and Japanese nationals would show greater appraisal of threat, higher interdependent self-construal, lower independent self-construal, and higher social anxiety

symptoms as compared to European Americans; (b) cultural group differences in threat appraisals would be at least partially mediated by the differences in self-construals between individuals of Asian- and European-heritage; and (c) cultural group differences in self-reported social anxiety symptoms would be at least partially mediated by cultural group differences in self-construals and threat appraisal in social situations.

Study 1 Methods

Study 1 Procedure

Study 1 was conducted in both the U.S. and Japan and used slightly different data collection procedures due to the practical constraints in both research sites. Data collection included the collection of self-report data pertaining to demographics (including ethnicity), self-construals, threat appraisal in social situations, and social anxiety. Due to the use of a psychology subject pool that included students of various ethnic backgrounds, I recruited as many participants as possible in the American site to ensure that a sufficient number of Asian and European American participants can be recruited for the study. In contrast, I recruited Japanese nationals directly from three Japanese universities via announcements in both introductory and seminar classes. Participants completed either online (Asian and European Americans) or paper-pencil (Japanese) versions of the same questionnaires (presented in a randomized order) on social anxiety, self-construals, and appraisal of threat in social situations. American and Japanese participants also completed a demographic questionnaire including two questions on ethnicity used to derive cultural group membership. Please see below for information on how ethnicity questions were defined and how cultural groups were categorized. The questionnaire in its entirety can be found in Appendix A.

Study 1 Participants

In total, 310 Asian American (208 females; *M* age = 20.08; *SD* = 3.10) and 249 European American (180 females; *M* age = 21.14; *SD* = 5.01) undergraduate students were recruited from University of Hawaii and 212 Japanese students (116 females; *M* age = 20.88; *SD* = 2.23) were recruited from the University of Tokyo, Meiji Gakuin University, and Yokohama National University in Japan. For the Asian American sample, 88.75% had lived in Hawaii for four years or more, while only 16.78% of the European American sample had lived in Hawaii for four years or more. Among the Asian American sample, 12.50% indicated that both they and their parents were born outside the U.S. (1st generation), 30.63% indicated that they were born within the U.S. while their parents were born outside (2nd generation), 56.88% indicated that both they and their parents were born in the U.S. (3rd generation or above). 26.25% claimed Japanese ancestry, 16.25% Chinese ancestry, 15.63% Korean ancestry, and 41.86% claimed more than one of the above categories. All European American participants were born within the U.S. and indicated their ethnicity as "White", "Caucasian", "European American", or a specific European heritage (e.g., "German"). Other demographic information, including parent education, can be found in Table 1.

Study 1 Measures

Ethnicity. I used two questions to assess a participant's ethnicity. In the first question, I asked each participant to complete an extensive checklist endorsing his or her own ethnicity (see Appendix A). Afterwards, I asked them to write their ethnic identity in an open-ended question format. American participants who endorsed one or more east Asian backgrounds (China, Japan, Korea, Taiwan) with no other ethnic group background and indicated their ethnic identity as "Asian American", "Asian", or a specific East Asian cultural group, such as "Japanese" or "Korean", were included in the Asian American cultural group. Another question on the online

assessment battery asked if the participant was an international student (living in the United States just for the duration of their college education). Given that the target cultural group was Asian Americans, international students were excluded from the sample.

I followed the same procedures for the European American group with the inclusion groups being "White/Caucasian", "Portuguese", and "Jewish", and the appropriate ethnic identity as "White", "Caucasian", "European American", or a specific European heritage (e.g., "German", "Irish"). Any case with a mismatch between endorsed ethnicity and ethnic identity was excluded. All American participants were asked questions about their birthplace and their parent's birthplace in order to assess generational status. Similarly, Japanese undergraduates who endorsed Japanese ethnicity only, and wrote "Japanese" in response to the ethnic identity question were included in the Japanese culture group.

Social Anxiety. To assess social anxiety, we included two measures: the Social Phobia Scale– 6-item Version (SPS-6; Peters et al., 2011) and the Social interaction Anxiety Scale– 6-item Version (SIAS-6; Peters et al., 2011) that seem to tap different subtype of social anxiety. The SPS-6 mainly focuses on *social performance anxiety*, emphasizing public attention and public presentation. In contrast, the SIAS-6 focuses on *social interaction anxiety* that represents a more generalized form of social anxiety present in daily interactions (Mattick & Clarke, 1998).

The original SPS is a 20-item questionnaire, scored on a five-point Likert scale from 0 (not true of me at all) to 4 (extremely true of me). It examines situations that involve being observed by others in the middle of normative activities such as eating or writing. Items of the SPS-6 were generated by taking a set of items from the Fear of Negative Evaluation Scale and Social Avoidance and Distress Scale (Watson & Friend, 1969) and re-construing them to better fit the DSM-based discrimination of performance-based social anxiety (Carter & Wu, 2010).

Four to 12-week test-retest reliability estimates ranged from .66 to .93, and its internal consistency, measured using Cronbach's*α*ranged from .87 to.94. Factor analysis confirmed a one-factor structure for the SPS, and the criterion validity was estimated via its correlations with other social anxiety measures, and ranged from .41 to .86.

The original SIAS is a 20-item questionnaire, scored on a five-point Likert scale from 0 (not true of me at all) to 4 (extremely true of me). It examines cognitive, affective, and behavioral reactions towards situations that require interactions with people. Four to 12-week test-retest reliability estimates ranged from .86 to .92, and its internal consistency estimated by Cronbach's α ranged from .86 to .94. Factor analysis confirmed a one-factor structure for the SIAS, and its concurrent validity was estimated via its correlations with previously established measures of social anxiety, which ranged from .36 to .59.

The brief forms of the SPS and SIAS, the SPS-6 and SIAS-6 (Peters, Sunderland, Andrews, Rapee, & Mattick, 2011), were constructed to utilize the most psychometrically sound items identified using IRT analyses, while discarding the rest in order to shorten administration time. The resulting SPS-6 consists of mostly items related to *social performance anxiety*. Example items include "I can suddenly become aware of my own voice and others listening to me" and "I would get tense if I had to carry a tray across a crowded cafeteria". In contrast, the short form of SIAS-6 includes items that tap a generalized form of *social interaction anxiety*. Example items include "I find myself worrying that I won't know what to say in social situations" and "I get nervous if I have to speak with someone in authority (teacher, boss, etc.)".

The SPS-6 and SIAS-6 were strongly correlated with the original scale (*rs* = .92 and .88), and the correlations with other measures of anxiety ranged from .32 to .50. The SPS-6 and SIAS-6 also demonstrated diagnostic sensitivity, differentiating between individuals with and without a

diagnosis of social phobia, as well as sensitivity to changes in social anxiety during the course of psychotherapeutic treatment (Peters et al., 2011). The SPS-6 and SIAS-6 have demonstrated good psychometric properties amongst samples of Asian Americans (Krieg, Xu, & Cicero, in press) and Japanese nationals (Krieg, Xu, & Cicero, in preparation). Specifically, Krieg et al. (in press; in preparation) examined responses to the SPS-6 and SIAS-6, as well as other measures of social anxiety amongst 198 European Americans, 232 Asian American, and 167 Japanese nationals (who filled out translated versions of the scales; Kanai et al., 2004). Confirmatory factor analyses revealed that the SPS-6 and SIAS-6 were unidimensional for all cultural groups, and had good internal consistency, estimated by Cronbach's α of .72 to.83 for all cultural groups. High correlations with other social anxiety measures, which ranged from .38 to .80, demonstrated good concurrent validity. Furthermore, the results of these two studies revealed that the SPS-6 and SIAS-6 were scalar invariant between Asian Americans and European Americans (Krieg et al., in press), and partial scalar invariant between Japanese nationals and European Americans (Krieg et al., in preparation), providing support for examining mean differences in the SPS-6 and SIAS-6 among the three groups (Little, 1997). Table 4 reported Cronbach's αs of the SPS-6 and SIAS-6 for the three cultural groups in Study 1.

Given that no studies have directly examined discriminant validity of social performance and social interaction anxiety among individuals of Asian and European heritage, a two-factor multi-group confirmatory factor analyses were conducted to examine whether SPS-6 and SIAS-6 tapped distinct subtypes of social anxiety or one single construct of undifferentiated social anxiety, The two-factor model fit the data satisfactorily: CFI = .989, TLI = .986, RMSEA = .036, SRMR = .043 and better than the one factor model, CFI = .906, TLI = .885, RMSEA = .086, SRMR = .052. Therefore, the current studies treated social performance anxiety, measured by

SPS-6, and social interaction anxiety, measured by SIAS-6, as two distinct subtypes of social anxiety in the analyses.

Self-Construals. The Singelis Self-Construal Scale (Singelis, 1994) was used to examine independent and interdependent self-construals among individuals of Asian and European American heritage. The 30-item measure contains two 15-item subscales corresponding to the two types of self-construal. Each item is rated on a 7-point Likert scale. Confirmatory factor analyses demonstrated that a two-factor structure provided better model fit compared to a one-factor model (Singelis, 1994). Original internal consistency estimates for the interdependent (αs ranged from .73 to .74) and independent (αs ranged from .69 to .70) subscales were satisfactory (Singelis, 1994). Evidence for construct validity included higher levels of interdependent self-construal and lower levels of independent self-construal reported by Asian Americans in comparison to European Americans (Singelis, 1994). The measure has been widely used among samples of both Asian Americans (e.g., Hsu & Alden, 2008; Okazaki, 2000; Park et al., 2011) and Japanese nationals (Kleinknecht, Dinnel, Kleinknecht, Hiruma, & Harada, 1997; Norasakkunkit & Uchida, 2011). Table 4 summarized Cronbach's αs of independent and interdependent self-construal subscales for all three cultural groups.

Threat Appraisal in Social Situations. Study 1 defined selective attention toward social threat as threat appraisal in social situations. As the theory of affect-based cognition posits, emotional cues in the environment are preferentially processed due to increased saliency (Todd et al., 2012), making these cues most relevant in how the scene or situation is appraised. Threat appraisals represent markers of selective attention toward social threat (e.g., Amir, Prouvost, & Kuckertz, 2012), where anxious anticipation or arousal occurs after preferred sets of anxiety-provoking aspects of the situation are encoded.

To measure appraisals of threat, a pilot study was first conducted to identify social situations that were perceived by individuals of Asian and European heritage as anxiety provoking. This situation sampling approach (Kitayama, Markus, Matsumoto, & Norasakkunkit, 1997; Morling, Kitayama, & Miyamoto, 2002) offers many methodological advantages, including the face validity of items generated by and used with individuals of the same ethnic or cultural backgrounds, as well as having the spread of items randomly balanced across participants. Some investigators have specifically called for increased incorporation of situation sampling methodology in cultural psychology (Chiao et al., 2014).

The pilot study recruited 30 Asian Americans, 30 European Americans, and 30 Japanese nationals, from introductory psychology classes either at University of Hawaii at Manoa or Meiji Gakuin University in Tokyo, Japan. To generate a pool of situations that are relatively salient to members of the three cultural groups in provoking their social anxiety, participants responded to an open-ended question online, "For the following categories, please create brief, specific situations where someone would feel socially anxious," and generated a total of 993 unique social situations; 313 by Japanese nationals, 383 by Asian Americans, and 297 by European Americans. Examples of the situations generated by Japanese nationals included "asserting my opinion" and "not being recognized as a member of a group". Examples of the situations generated by Asian American respondents included, "answering a teacher's question" and "creating a group for a class project in a class where you do not know anyone". Examples of the situations generated by European American respondents included, "accidentally taking someone else's coffee" and "being told that what you are doing is wrong". All of these situations were translated by a team of two bilingual translators either to or from Japanese in order to have linguistically equivalent translations of every situation. A bilingual Japanese language instructor

with over twenty years of translation experience confirmed linguistic equivalence between the English and Japanese translations. Table 3 lists all 993 situations based on which cultural group generated them and the frequency by which they were sampled and administered to participants.

In accordance with the situation sampling method, each participant in Study 1 answered a unique set of randomly selected situations. I randomly selected 45 situations, 15 each from the pool of the situation generated by each cultural group, and asked Study 1 participants to rate two aspects of these situations on a five-point scale: anticipated consequence ("How bad would the consequences be?"; 1 = not bad, 5 = very bad) and likelihood of occurrence ("How likely is this situation going to occur?"; 1 = not likely, 5 = very likely). These two questions were derived based on Magnúsdóttir and Smári (1999)'s conceptualization of "threat appraisal" of situations as the function of both *anticipated consequence* and *likelihood of occurrence*, i.e., those situations that meet both conditions of severe consequence and high likelihood would be perceived as a threat that likely leads to experience of social anxiety. Prior studies have demonstrated both theoretical soundness and research utility of using consequence ^{X} likelihood to operationalize appraisal of threat (Imada & Ellsworth, 2011; Magnúsdóttir & Smári, 1999; Smári, Pétursdóttir, & Porsteinsdóttir, 2001).

Consistent with this conceptualization, Study 1 operationalized threat appraisal as the product of both anticipated direness of the potential consequence of a particular anxiety-provoking situation and the perceived likelihood that individuals would experience this situation in the near future. By using this operationalization, scores from 'consequence' and 'likelihood' questions were multiplied to emphasize elevated threat in situations that are expected to lead to both severe consequences and to have a high likelihood of occurrence.

Given the use of 15 randomly selected situations generated by each of the three cultural groups, I derived three mean scores of threat appraisal, calculated as consequence ^{X} likelihood, that corresponded to the three groups of situations. Due to the large range of scores generated by the multiplication, these variables were transformed to a z-distribution using Equation 1 below. Table 4 reports Cronbach's *αs* for each group of threat appraisal scores from situations generated by each group.

Equation 1. Calculation of Standardized Score for Threat Appraisal in Social Situations

$$for\ each\ score\ i\ in\ group\ j\text{:}$$

$$Threat_{ij} = \frac{(Consequence_{ij} * Likelihood_{ij}) - (Consequence_{j} * Likelihood_{j})_{\overline{X}}}{(Consequence_{j} * Likelihood_{j})_{var(X)^2}}$$

I conducted exploratory factor analyses (EFA) to examine whether threat appraisal scores, generated by each cultural group, should be treated as three separate or one single variable(s). EFA rather than CFA (confirmatory factor analysis) was chosen because a single factor model with only three indicators was "just-identified" and cannot be analyzed using CFA. The results of EFA using quartamin rotation showed that the three threat appraisal scores generated by individual cultural group, loaded on one primary factor, which explained 94% of the variance. To further explore whether a single factor solution best fit the data, I used the Hull Method (Lorenzo-Seva, Timmerman, & Kiers, 2011), which quantitatively compared the changes in the CFI, TLI, and RMSEA as well as the degrees of freedom for one-, two-, and three-factor models. The results showed that a one-factor solution provided the best (largest) "return on investment" value for each of the three model fit indicators. In addition, I also conducted a parallel analysis (Horn, 1965), in which empirically derived eigenvalues are compared to a simulated set of eigenvalues. The results of this analysis also suggested a one-factor model. Given that both the results of the Hull Method and parallel analysis supported a

one-factor solution, I calculated the average threat appraisal scores across the three threat appraisal scores generated by different cultural groups, and calculated mean group differences based on this aggregated threat appraisal variable.

Study 1 Results

Preliminary Analysis

Missing data. Following the recommendation by Enders and Bandalos (2001), missing data were imputed, using the R module 'mice' (van Buuren & Groothuis-Oudshoom, 2011). The "mice" module applies an algorithm that generates five plausible datasets with both the known, non-missing scores as well as missing scores selected from a distribution that most likely represents that particular missing score, given the set of scores from all other items and all other participants through Monte Carlo resampling. The generated datasets were then analyzed and pooled via a predictive mean matching algorithm that minimized the standard error. The entire process was repeated five times, and returned a dataset that contained both the original, non-missing items as well as the pooled missing values (van Buuren, Brand, Groothuis-Oudshoorn, & Rubin, 2006; van Buuren & Groothuis-Oudshoom, 2011). After I confirmed that no values were missing in the dataset, the imputed dataset was subject to further analysis.

Examining Model Violations and Outliers. I examined distribution, skewness, and kurtosis for each variable. In cases there was a skewness or a kurtosis value greater than and absolute value of 2 (Gravetter & Wallnau, 2016), I ran Grubbs' outlier tests (Grubbs, 1950) in order to identify problematic scores, but found no variables with problematic skewness or kurtosis.

Cultural Group Differences in Social Performance Anxiety, Social Interaction Anxiety, Self-Construals, and Threat Appraisal in Social Situations

To address Hypothesis 1 regarding cultural group mean differences, General Linear Modeling (GLM) analyses were used to examine how the scores of the mediator (i.e., threat appraisal and self-construals) and the outcome (i.e., social performance anxiety and social interaction anxiety) variables varied across groups. Specifically, two GLM analyses were conducted: one included the dummy coded group contrast between Asian Americans and European Americans; the other included the dummy coded group contrast between Japanese nationals and European Americans. Threat appraisal, independent and interdependent self-construals, social performance anxiety, and social interaction anxiety were treated as the dependent variables in both GLMs.

Social performance and social interaction anxiety. Consistent with Hypothesis 1, compared to European Americans, Asian Americans reported higher social performance anxiety ($B = 2.07$; t [768] = 5.04; $p < .001$) and social interaction anxiety ($B = 2.05$; t [768] = 5.36; $p < .001$). Inconsistent with Hypothesis 1, compared to European Americans, Japanese nationals only reported higher social interaction anxiety as measured by the SIAS-6 ($B = 3.40$; t [768] = 8.07; $p < .001$), but unexpectedly reported lower social performance anxiety ($B = -2.07$; t [768] = -4.99; $p < .001$).

Self-construals. Consistent with Hypothesis 1, Asian Americans reported lower independent ($B = -2.39$; t [768] = -2.73; $p = .006$) and higher interdependent ($B = 3.12$; t [768] = 3.72; $p < .001$) self-construals than European Americans. Inconsistent with Hypothesis 1, although there was a significant difference in independent self-construal in the expected direction between Japanese nationals and European Americans ($B = -2.13$; t [768] = -2.22; $p = .027$), the difference in interdependent self-construals between these two groups was not statistically significant ($B = -.46$; t [768] = -2.73; $p = .615$).

Threat appraisal. Consistent with the Hypothesis 1, compared to European Americans, both Japanese nationals and Asian Americans reported perceiving more threat in social situations ($B = 1.27$; t [1,768] = 18.32; $p < .001$; ($B = .12$; t [1,768] = 1.99; $p = .047$).

Testing the Mediating Effects of Self-Construals in Explaining Cultural Group Differences in Threat Appraisals

Mediation analyses using structural equation modeling were used to address Hypothesis 2 concerning how cultural group differences in self-construals may explain cultural group differences in threat appraisals. A series of competing models were compared via the following goodness of fit indices in order to select the most parsimonious model that best fit the data: Comparative Fit Index (CFI), Tucker-Lewis fit index (TLI), Root Mean Square Error of Approximation (RMSEA), Square Root Mean Residuals (SRMR), Aikake Information Criterion (AIC), and Bayesian Information Criterion (BIC). For the CFI and TLI, Hu and Bentler (1998) recommend a cutoff of .95. For the RMSEA and SRMR, they recommend a cutoff of .06 and .08, respectively. For the AIC and BIC, it is recommended to select the model that provides the *most* information given the degrees of freedom (e.g., Kline, 2011).

The mediation models included either Asian American/European American contrast, or Japanese national/European American contrast as the predictor, independent and/or interdependent self-construals as the mediators, and threat appraisal as the outcome. I tested and compared a series of competing models with various specification of full and partial mediation of two types of self-construals (see Table 6 for a summary of model comparisons). Threat appraisal was treated as a latent variable with two indicators; appraisal of threat in social situations generated by Asian Americans and by European Americans for the Asian American/European

American comparisons, or appraisal of threat in social situations generated by Japanese nationals and by European Americans for the Japanese national/European American comparisons.

As shown in Table 6, Model AAS1A-AAS1F compared Asian Americans and European Americans, and represented a series of competing mediation models with or without mediating effects of independent and/or interdependent self-construals, and with or without direct effect of cultural group contrast on threat appraisal. All but one model, Model AAS1D, converged within 10,000 iterations. All models were non-nested, and therefore were compared via model fit indices rather than a χ^2 difference test. A final model was selected based on (1.) having no non-significant paths, (2.) superior model fit indices, and (3.) more degrees of freedom (i.e., more parsimonious). The rationale for examining non-significant paths is that since each of these models are a series of all possible permutations of each other, ad hoc model modification is not meaningful, given that removing a non-significant path from one model makes it identical to another. Based on these three criteria, Model AAS1B, which represented a full mediation of both independent and interdependent self-construals seemed to fit the data best. This model had no non-significant paths and was the only one that met Hu and Bentler's (1998) criteria for satisfactory model fit.

Similarly, Models JNS1A-JNS1F in Table 6 compared Japanese nationals and European Americans, and represented two competing mediation models with mediating effect of independent but with or without direct effect of cultural group contrast on threat appraisal. It should be noted that interdependent self-construal was not included as a mediator because Japanese nationals and European Americans did not differ in this type of self-construal. Although both models did not contain any non-significant paths, the partial mediation (Model JNS1A) fit the data better than the full mediation (Model JNS1B).

Testing the Mediating Effects of Self-Construals and Threat Appraisal in Explaining Cultural Group Differences in Social Anxiety

A series of multi-mediation models that included both self-construals and threat appraisals as mediators, were conducted to address Hypothesis 3 that cultural group differences in self-construals and threat appraisal at least partly explained cultural group differences in social performance and social interaction anxiety (see Figures 8 and 9).

Based on the results related to Hypothesis 2, the multi-mediation analyses retained best-fitting Model AAS1B for the Asian American/European American comparison, and Model JNS1A for the Japanese national/ European American comparison, while adding two variables of social performance anxiety (with six indicators represented by items on the SPS-6) and social interaction anxiety (with six indicators represent by items on the SIAS-6; see Figures 8 and 9) as the outcomes. I chose to examine *social interaction anxiety* and *social performance anxiety* as two separate latent variables for two reasons. First, as discussed in the Introduction and Methods, these two measures were designed to access different aspects of social anxiety: performance and generalized and can be empirically differentiated using factor analyses. Second, I found that group differences in social anxiety were moderated by specific subtype. For the Japanese national/European American difference in social anxiety, the SPS-6 and SIAS-6 showed opposite patterns, with Japanese nationals scoring higher on the SIAS-6 and lower on SPS-6 relative to European Americans.

As shown in Table 6, Model AAS2A-AAS2H compared Asian Americans and European Americans, and represented a series of competing mediation models with or without mediating effect of self-construals and/or threat appraisal, and with or without direct effect of cultural group on the two social anxiety latent variables. As shown in Table 6, only Model AAS2D seemed to

meet the same model selection criteria as in Step 1. Model AAS2D included partial mediation of threat appraisal and independent self-construal, but did not include mediating effect of interdependent self-construal (see Figure 8).

Similarly, Models JNS2A-JNS2H in Table 6 compared Japanese nationals and European Americans, and represented four competing mediation models with or without mediating effect of independent self-construal and/or threat appraisal, and with or without direct effect of cultural group on the two latent social anxiety variables. All of these models contained at least one path that was non-significant. Upon further investigation of Model JNS2A with partial mediation of both threat appraisal and independent self-construal, which fit the model the best, the non-significant path was the direct path from cultural group contrast to social interaction anxiety, despite the path to social performance being statistically significant. When this path was removed in a subsequent modified model (Model JNS2Am), model fit indices improved slightly, and this model met the selection criteria mentioned above (see Figure 9).

Study 1 Discussion

Study 1 examined mean differences in social anxiety, self-construals, and threat appraisal, as well as compared mediation models for each group. For an overview of the results and their respective hypotheses, see Table 7. Consistent with Hypothesis 1, the results of Study 1 mostly replicated previous findings regarding cultural group differences in social anxiety (Hsu et al., 2012; Krieg & Xu, 2015; Krieg et al., in press; Lau, Fung, Wang, & Kang, 2009; Norasakkunkit & Kalick, 2009; Okazaki, 1997; Woody, Miao, & Kellman-McFarlane, 2015) and self-construals (Krieg & Xu, 2015; Norasakkunkit & Kalick, 2002; Okazaki, 2000; Singelis, 1994) between Asian Americans and European Americans. In general, Asian Americans reported higher social performance and social interaction anxiety symptoms than European Americans, suggesting that

Asian Americans are more likely to experience social anxiety not only in social performance situations but also during more general social interaction.

Also in line with Hypothesis 1, Asian Americans reported higher interdependent self-construal, and lower independent self-construal as compared to European Americans. This is consistent with Markus and Kitayama's (1991) original conceptualization of cultural differences in how people of East Asian heritage and people of European heritage view themselves as either innately connected or autonomous but interacting with social others. The results of the current study indicate that as compared to our European American sample, Asian American participants tended to endorse feeling that their identities are intertwined with those around them, and that their social relationships play an important role in defining who they are as a person.

Furthermore, consistent with Hypothesis 1, Asian Americans reported stronger threat appraisal in social situations than did European Americans. According to our operationalization of threat appraisal, this group mean difference indicates that, on average, Asian American participants found a given social situation as more likely to occur and as having worse consequences than European American participants. In terms of selective attention toward socially threatening stimuli, a possible interpretation of this result is that relative to European Americans, Asian Americans detect more emotionally salient cues that could represent social threat in a given social situation, focus on those cues, and develop an image of that situation that represents the threatening cues perceived.

The comparisons between Japanese nationals and European Americans yielded mixed results. Although Japanese nationals, as expected, reported greater social interaction anxiety than European Americans, they also reported less social performance anxiety symptoms as compared to European Americans—a finding that contradicted Hypothesis 1. The cultural group

differences in social interaction anxiety demonstrates that in general, Japanese nationals report being less comfortable with meeting others and holding conversations as compared to European Americans. In contrast to Hypothesis 1, the Japanese participants reported *less* social performance anxiety as compared to European Americans, indicating that they were more comfortable in attracting unwanted attention in public spaces. However, interpretation of these unexpected findings requires some caution. To my knowledge, no prior studies have differentiated social performance and social interaction anxiety when comparing social anxiety among different cultural groups. In situations where performance was perceived being evaluated by others, experience of social anxiety may depend on the target audience, situational characteristics, or reference group (Bolino, Kacmar, Turnley, & Gilstrap, 2008; Heine, Lehman, Peng, & Greenholtz, 2002; Lissek, Pine, & Grillon, 2006; Turner, Beidel, & Larkin, 1986), in a different way than it would in a more general social interactions. Clearly there is a need to replicate these findings and to further explore what factors that may explain lower social performance anxiety among Japanese nationals as compared to European Americans.

Inconsistent with Hypothesis 1, despite reporting lower independent self-construal, Japanese nationals did not differ from European American in their scores on interdependent self-construal. Relatively lower interdependent self-construal found among Japanese nationals was also found recently in Norasakkunkit, Kitayama, and Uchida (2012), where despite the lack of group differences, interdependent self-construal was still able to explain a statistically significant degree of individual variability of social anxiety in each group. Duffy (2004) suggested that the unexpected lack of differences in interdependent self-construal between Japanese nationals and European Americans could be explained via response style characteristics (e.g., Heine, Lehman, Peng, & Greenholtz, 2002). Prior studies have show that people from East Asia tend to select

middle items on standardized Likert scales, while people from the U.S. tend to use the full range of items or even prefer the extreme points (Chen, Lee, & Stevenson, 1995; Heine et al., 2002). Similarly, in Duffy's (2004) study, he found that European American participants outscored Japanese participants on nearly every scale, irrespective of what it measured, also indicating a response style difference. Alternatively, there is evidence that the entire world (e.g., Greenfield, 2013; Hamamura, 2012; Oyserman, Coon, & Kemmelmeier, 2002), Japan included (Hamamura, 2012; Shimizu, Park, & Greenfield, 2014), is becoming more culturally independent. Given that this is one of the most recent samples taken in a non-Western metropolitan area, the lack of group mean differences could instead be pointing toward this new global trend.

Consistent with Hypothesis 1, Japanese nationals reported stronger threat appraisal in social situations than did European Americans. These results suggest that like Asian Americans, Japanese nationals may also perceive similar social situations as having the potential to result in a more negative consequence as well as be more likely to occur than European American participants perceive them to be. In terms of selective attention toward social threat, higher reports of threat appraisal may be related to increased sensitivity to emotionally salient, potentially threatening social cues embedded in the situation. Using this interpretation, it seems that the Japanese participants had increased focus on these cues relative to others as compared to European Americans.

Consistent with Hypothesis 2, when examining the Asian American / European American differences in self-construals in relation to their differences in threat appraisal, both independent and interdependent self-construal mediated cultural group differences in threat appraisal. It seems that for Asian Americans viewing oneself as more innately connected with social others increases the degree to which social situations have "high stakes" (Buttermore, 2009) and are

perceived to have more likely, negative consequences. At the same time, viewing oneself as less autonomous and separated from social others also works to reduce the degree to which the social consequences of situations are perceived as personally threatening. A specific combination of these two ways of being (Kitayama, Duffy, & Uchida, 2007) mediated group differences in threat appraisal.

Inconsistent with Hypothesis 2, when examining the Japanese National / European American differences in self-construals in relation to their differences in threat appraisal, only independent but not interdependent self-construal significantly mediated the relation between the cultural group contrast and cultural differences in threat appraisal. This finding is line with the results of mean group comparisons, which only found significant group differences in independent but not interdependent self-construals between Japanese nationals and European Americans. It seems that similar to Asian Americans, endorsing relatively less independent self-construal also works to increase the degree social situations are perceived as threatening by decreasing one's sense of autonomy and separateness among Japanese nationals.

Consistent with Hypothesis 3, the results provided preliminary support for the mediating roles of threat appraisal and independent self-construal in explaining the cultural group differences in social interaction anxiety and social performance anxiety between Asian Americans and European Americans. The mediation of threat appraisal demonstrated that group differences in the tendency to view social situations as threatening contribute to the group differences in social anxiety. This is consistent with the cognitive behavioral model of social anxiety (Heimberg, Brozovich, & Rapee, 2010; Rapee & Heimberg, 1997) that emphasizes the detection of social threat and hypervigilence to anxiety-provoking social cues as the primary causal and maintenance mechanism. Groups of individuals with the greater tendency to detect

social threat should also have a greater tendency to experience social anxiety, according to this model.

Also consistent with Hypothesis 3, the contribution of independent and interdependent self-construal to group differences in social anxiety was mediated by cultural differences in threat appraisal. How members of different cultural groups tend to views themselves amongst social others influences both the degree to which situations are perceived as threatening as well as the degree to which social anxiety is experienced. These findings suggest that the cultural value of independence (or reduction thereof) has the opportunity to intervene at multiple points in the anxiety process. In contrast to independent self-construal, interdependent self-construal seemed to contribute to the degree to which people interpreted social situations as potentially threatening, rather than to the experience of social anxiety itself. Perhaps it is the pattern of interdependence contributing to the detection of social threat but not the phenomenological experience of social anxiety that better explains the reduced magnitude of the relation to social anxiety relative to independence as found in prior studies (Okazaki, 1997; 2000).

The results concerning the Japanese National / European American cultural group differences in social performance and social interaction anxiety were mixed (Figure 9). Consistent with Hypothesis 3, and similar to the Asian American / European American comparisons, I found evidence for the mediating roles of threat appraisal and independent self-construal in explaining the cultural group differences in social interaction anxiety and social performance anxiety. For both subtypes of social anxiety, it seems that cultural group differences viewing oneself as less autonomous and separate from others leads to group differences in how situations are viewed as more socially threatening. At the same time, viewing oneself as less independent from others also directly impacts the phenomenological experience of both forms of

social anxiety. Differentiating the lower Japanese cultural group score on social performance anxiety from the higher cultural group score on social interaction anxiety is a direct (negative) path from cultural group to social performance anxiety. This path may represent that some outside factor associated with being Japanese is responsible for the reduced rate in social performance anxiety.

Inconsistent with Hypothesis 3, interdependent self-construal did not seem to explain Japanese National / European American group differences in either subtype of social anxiety. Although interdependent self-construal was initially posited as a key cultural factor that drove group differences in social anxiety (Okazaki, 1997), other studies have repeatedly noted its relatively smaller role as compared to independent self-construal (e.g., Norasakkunkit & Kalick, 2009; Okazaki, 2000). Independent self-construal and interdependent self-construal were initially conceptualized to be orthogonal scales (Singelis, 1994). However, most studies that use them in practice find that there is usually a moderate correlation between the two (Krieg & Xu, 2015). Perhaps, this shared variance reduces the explanatory power of both predictors in the amount of variance they explain in self-report measures of social anxiety.

The results of Study 1 provided correlational evidence for the mediation of independent self-construal and threat appraisal in explaining the cultural group differences in social anxiety. The mediation model for the Asian American / European American comparison and the mediation model for the Japanese national / European American comparison had a high degree of similarity. Although Japanese culture and Asian American culture vary on a number of dimensions including language, behavioral scripts, immigration history, in-group/out-group experiences, and specific cultural practices, there are a few pan-Asian cultural elements that show a degree of similarity (Chin & Kameoka, 2006; Hofstede, 2001; Markus & Kitayama,

1991; Triandis & Gelfand, 2012). One of these cultural elements include how one views oneself in society, with both groups tending to stress an interdependent orientation that includes (to a varying degree) aspects of hierarchical orientation, group decision making, situational adaptivity, self-sacrifice, and deference to others (Markus & Kitayama, 1991; Oyserman et al., 2002; Triandis, 1995). It is possible that it is these cultural similarities that shape selective attentional processes and result in similar models of culture and attention as well provide a similar impact on social anxiety when compared with European Americans who, on average, do not ascribe as strongly to these values.

In contrast, independent self-construal may work to create a sort of barrier between one's sense of self and the potentially anxiety-inducing situation as well as work to effectively distance oneself psychologically from the scrutiny of others within a threatening social situation. Reducing the degree to which one views one's own identity as tied to the immediate others, lowers the degree to which a given social situation is perceived as personally threatening (Buttermore, 2009; Okazaki, 1997). Even if a given social situation is likely to turn for the worse and one's relationship with those involved is disrupted, the degree of harm to one's ego integrity is buffered by the psychological distance placed between the self (as autonomous) and other people (as related but separate). This explanation corresponds to research on the effects of psychological distancing in social anxiety (via mindfulness or acceptance techniques; Herbert & Cardaciotto, 2005). These studies show that the more that one becomes an independent and autonomous observer (e.g., less emotionally invested in the situation), the less of psychological distress is reported (Kocovski, Fleming, & Rector, 2009; Koszycki, Benger, Shlik, & Bradwejn, 2007). That said, viewing oneself as embedded in a social collective and receiving support from that group have also been shown to alleviate symptoms of social anxiety (La Greca & Harrison,

2005; La Greca & Lopez, 1998), and may be especially valued in East Asian contexts (e.g., Markus & Kitayama, 1991). Perhaps the role of social support works as a conflicting mechanism that reduces the degree of influence of interdependent self-construal on social anxiety despite contributing to threat appraisal. Although my results cannot speak directly to this explanation, future research that examines the differences in mechanisms among independent / interdependent self-construal and social anxiety on the individual variation level may want to directly examine this process model.

In summary, Study 1 clarified cultural group mean differences in the relevant factors of self-construal, threat appraisal, and social anxiety. Additionally, it provided evidence that demonstrates the benefits of examining specific subtypes of social anxiety when studying these specific groups. Study 1 also elucidated a possible mediation model that focuses on the role of independent self-construal on reducing cultural group differences in threat appraisal and the phenomenological experience of social anxiety within two independent comparisons of Asian Americans and European Americans as well as Japanese nationals and European Americans.

A key limitation of Study 1 is its use of self-report measures. The results of the study examined differences in self-reported social anxiety—tapping into questions related to the phenomenological experience of feeling anxious, but did not investigate behavioral and physiological markers of social anxiety. Although Asian Americans and Japanese national typically self-reported higher social anxiety symptoms (Krieg & Xu, 2015; Krieg et al., in press; Woody et al., 2015), they did not seem to exhibit more frequent anxious behavior as observed by experimenters (Okazaki et al., 2002; Sue et al., 1990), raising the question on whether the cultural group difference in social anxiety were limited only to self-reported subjective experiences.

Likewise, although the situation sampling method (Kitayama et al., 1997) has provided a number of different insights in cultural group differences among psychologically relevant variables (e.g., Morling, Kitayama, & Miyamoto, 2002), there were some limitations in how the current study implemented it to measure threat appraisal. Viewing threat appraisal from the affect-based attentional bias theory, this process should happen with minimal cognition and be a nearly effortless orientation to emotionally salient stimuli within a social anxiety-provoking situation. The brief situational descriptions used in Study 1 can only be processed linguistically by nature, thereby accessing less of a reflexive response to perceived threat and a more thoughtful appraisal of different features of that situation—as the participant ideographically imagined it to be from the text. Examining both the automatic and cognitive appraisals of potentially threatening stimuli seem necessary to better understand the mediating mechanism of threat appraisal.

In summary, despite the contributions, Study 1 has two important limitations including (a) a correlational design that relied on statistical mediation analyses rather than experimental manipulation of mediators; and (b) shared method variance due to the use of all self-reports that may have overestimated inter-relations among variables. To address these limitations, Study 2 was conducted to garner additional empirical support for the proposed mediation model. Specifically, Study 2 used a quasi-experimental design that manipulated selective attention toward or away from socially threatening stimuli, and included not only self-reports, but also behavioral and physiological measures of social anxiety.

STUDY 2

The aims of Study 2 were to replicate and extend the findings of Study 1 with a particular focus on the potential causal role selective attention toward social threat may play in explaining

cultural group differences in social anxiety. Specifically, Study 2 first examined group differences in social anxiety and selective attention toward social threat, and then investigated how manipulating attention toward and away from socially threatening stimuli using an experimental task impacted cultural group differences in not only self-reported social anxiety symptoms, but also behavioral and physiological markers of social anxiety. Rather than relying on self-reports of threat appraisal, Study 2 operationalized selective attention toward social threat as reaction time differences in response to threatening or unthreatening stimuli, i.e., angry or neutral faces, using a standardized dot-probe task in a laboratory setting. By using a quasi-experimental design, the causal roles of selective attention can be inferred if manipulating attention away from threatening stimuli would result in diminished group differences whereas manipulating attention toward social threat would result in increased group differences among various markers of social anxiety.

Similar to Study 1, I first hypothesized that Asian Americans and Japanese nationals would report greater social anxiety and selective attention toward social threat before the attention training (Hypothesis 1). Second, I expected cultural group differences in self-report, behavioral, and physiological measures of social anxiety to be stronger when attention was manipulated toward threat, than when attention was manipulated away from threat (Hypothesis 2). Put in another way, I expected to find significant interactions between cultural group contrasts and conditions of attention training.

Study 2 Method

Overview of General Procedure

Different recruitment procedures were used for American and Japanese participants. At the American site, a group of Asian and European American participants were randomly selected

from those who participate in Study 1, whereas in the Japanese site, new participants were recruited from psychology seminar classes at University of Tokyo and Yokohama National University. It should be noted that due to the practical constraint, Japanese participants in Study 2 were not selected from those who participate in Study 1. Rather, a new group of Japanese participants first completed all of Study 1 measures before participating in the laboratory tasks. Both American and Japanese participants completed the same tasks in a university laboratory.

The laboratory tasks included (a) tasks administered before the Attention Bias Modification Training (ABMT; Hereen et al., 2011; see details below), which included self-report measures of social performance and social interaction anxiety (SPS-6 and SIAS-6) and a dot-probe discrimination task that assessed baseline selective attention toward social threat (MacLeod et al., 1986); (b) the ABMT that used the dot-probe task again that acted to manipulate attention toward or away from angry faces (i.e., social threat); and (c) tasks administered after the ABMT which comprised of a self-presentational speech task (Heeren, Reese, et al., 2011; Mulac & Sherman, 1974), during which skin conductance and nonverbal behavior were assessed, and the same SPS-6 and SIAS-6. Figure 7 illustrates the procedure of Study 2 for all three cultural groups.

I obtained written informed consent from all participants, who were debriefed following the guidelines of American Psychological Association and the University of Hawaii at Manoa's IRB protocol after the completion of the laboratory tasks. This project received final approval from University of Hawaii at Manoa's IRB on 10/22/2014 (CHS# 22377).

Participants

Study 2's sample included 152 participants (62 Asian American, 47 European American, 43 Japanese nationals). 19 participants were not included in the analyses below due to technical

difficulties such as computer freezing and GSR data collection failure; four participants quit the experiment midway, and two participants had invalid data due to significant extraneous distraction while measuring the baseline selective attention. The remaining 127 participants included 42 Asian Americans (27 females), 44 European Americans (37 females), and 41 Japanese nationals (19 females). Within each cultural group, participants were assigned via block randomization to one of the two ABMT attention training groups that trained participants to shift attention either toward or away from angry faces. Unfortunately, this left the sample with a substantial gender imbalance containing 64%, 84%, and 46% female for each cultural group, respectively. Given the significant gender differences on performance in reaction time tasks (Kujawa, Torpey, Kim, & Hajcak, 2011) and emotional processing tasks (Campanella et al., 2004; Schirmer, Zysset, Kotz, & Yves von Cramon, 2004), and on self-reported social anxiety symptoms (Xu et al., 2012), I used a participant matching algorithm (*optmatch*; Hansen & Klopfer, 2006) to create groups that were matched by their gender ratio. Due to the smallest number of European American males (n = 10), the resulting matching groups tended to have more female than male participants.

The final matched sample included 104 participants that contained 42 Asian Americans (27 females), 28 European Americans (18 females), and 34 Japanese nationals (25 females). This resulted in gender ratios of 64%, 65%, and 73% female for each cultural group respectively that did not significantly differ from each other. The mean age for these participants was 22.95 (SD = 6.10), 20.89 (SD = 2.76), and 21.82 (SD = 1.73) for each cultural group. For more information about this final matched sample's demographic information, please see Table 2.

Study 2 Measures

Social Performance and Social Interaction Anxiety Before and After the ABMT. The same self-report measures of SPS-6 and SIAS-6 were used to assess social performance and social interaction anxiety before (pretest) and after (posttest) the ABMT. To explore change in social performance and social interaction anxiety due to ABMT, I regressed the post-test SPS-6 and SIAS scores on the pre-test SPS-6 and SIAS-6 scores respectively. This approach resulted in standardized residual scores for both types of social anxiety, which were used in the analyses to demonstrate whether or not manipulated attention toward or away from angry faces in the ABMT would lead to change in self-reported social anxiety symptoms. The Equation 2 and 3 below illustrated how the standardized residual scores were calculated:

Equation 2. Standardized residual scores of social performance anxiety calculated based on pretest and posttest SPS-6 scores.

$$for\ each\ score\ i\ in:$$

$$postSPS_i = \alpha_0 + \beta_1 * preSPS_i + \varepsilon_i$$

$$\varepsilon_i = y_i - \widehat{y_i}$$

Equation 3. Standardized residual scores of social interaction anxiety calculated based on pretest and posttest SIAS-6 scores.

$$for\ each\ score\ i\ in:$$

$$postSIAS_i = \alpha_0 + \beta_1 * preSIAS_i + \varepsilon_i$$

$$\varepsilon_i = y_i - \widehat{y_i}$$

As in Study 1, both pretest and post-test measures of social anxiety had good internal consistencies across cultural groups. Alpha coefficients ranged from .83 to .91 for Asian

Americans, .75 to .91 for European Americans, and .80 to .93 for Japanese nationals. For a list of all alpha values and their corresponding measures, please see Table 4.

Selective Attention to Threat. To assess selective to threat before the ABMT, participants completed a dot-probe discrimination task modeled after the original dot-probe detection task by MacLeod et al. (1986) and modified from the similar task used in Heeren, Reese, et al. (2011) and Amir, Taylor, and Donohue (2011). The dot-probe task is used to assess preferential allocation of attention between two sets of stimuli displayed simultaneously on a screen. Faster reaction time to stimuli belonging to one set as compared to the other demonstrates selective attention toward some defining feature of the stimuli set. In Study 2, the dot-probe task was used to provide reaction time measure for selective attention to threat. I examined whether there were differences in reaction times to stimuli that represented social threat, i.e., angry faces, as compared to those that did not, i.e., neutral faces, among the three cultural groups.

The dot-probe discrimination task included 96 trials. Each trial began with a black fixation cross, 'plus sign' (+), in the center of a grey background on a 92.71 x 55.25 cm display television monitor in order to center participants' gaze. After 500 msec, the fixation cross disappeared and was replaced by two 11.5 by 8 cm digital photographs of two faces. Faces were placed above and below center screen so that they appeared to be on top of each other with a four cm gap between the two. Eight faces were selected from a standardized set of European American and Japanese nationals faces (four each) with both angry and neutral facial expressions (Matsumoto & Ekman, 1989), resulting in a total of 16 face stimuli (8 angry faces and 8 neutral faces). The use of angry faces in contrast to neutral faces is consistent with Adams Jr et al.'s, (2012) conceptualization of anger as representing a direct social threat. The standardized images had demonstrated strong reliability and validity in studies of Japanese nationals, Asian

Americans, and European Americans (Matsumoto & Ekman, 1988; 1989). For instance, according to a study by Matsumoto and Ekman (1989), amongst a sample of 124 European American and 110 Japanese undergraduate students, the majority of participants were able to correctly identify the target emotion of the on-screen photograph (range: 68 – 98%). Similarly, when rating the intensity of the emotional expression of each face, participants were fairly consistent in their ratings with European Americans rating expressions as slightly more intense on average than Japanese participants (Cohen's d = .18). These results indicated good agreement in emotional expression recognition and consistency in emotional valence among the samples (Matsumoto & Ekman, 1989).

Participants were instructed that: "First, a + will appear. When you see this symbol, please look at it. Then, two faces will appear at the top and bottom of the screen. After the faces disappear, the letter "e" or "f" will appear. Please press the "e" key if you see the letter "e" and press the "f" key if you see the letter "f". Please answer with the "e" or "f" key as accurately and as quickly as possible." Each pair faces remained on the screen for 500 msec before being replaced with either the lowercase letter 'e' appearing in the top quadrant (where the upper picture was) or a lowercase letter 'f' appearing in the bottom quadrant (where the lower picture was). Once the reaction time measured between letter stimulus onset and key press was recorded, that trial was saved and the next trial began. There was an inter-trial interval of 1500 msec. All experimental protocols and procedures were written in the Python language (v. 2.7.8; Python Software Foundation, 2013) using the 'PsychoPy' module (v. 1.79.01; Peirce, 2007). This experiment-specific application was performed on a Macbook Pro (8,1) computer with OSX 10.7.5 'Lion'.

Selective attention toward social threat is conceptualized as the reaction time differences in conditions when the probe is placed in a location previously occupied by a threatening stimuli as compared to conditions where the probe follows a non-threatening condition. To develop an individual-level estimate of selective attention, I divided the average reaction time across non-threatening trials by the average reaction time across threatening trials. The degree to which selective attention toward threating stimuli is thus defined a ratio, with 1.00 indicating no attentional bias, less than 1.00 indicating attentional bias for non-threatening stimuli (neutral face), and greater than 1.00 indicating attentional bias for threatening stimuli.

To address the issue of construct validity between my self-report and experimental variables for selective attention, a correlation analysis was conducted with selective attention (dot-probe) and threat appraisal in social situations (situation sampling) variables in order to provide construct validity for the self-report variable. When I correlated the dot-probe pretest estimate of selective attention the threat appraisal estimate, the correlation was not statistically significant ($r = .05$, $p = .62$).

Attention Bias Modification Training Task (ABMT; Amir et al., 2009; Amir & Conley, 2014). The ABMT was based on the dot-probe discrimination task mentioned above. However, the dot-probe discrimination task was modified to direct attention either toward the angry face (toward threat) or toward the neutral face (away from threat). In the 'attend toward social threat' condition, the letter stimuli (either 'e' or 'f') appeared in the place previously occupied by an angry face 80% of the time. This condition trained participants to implicitly expect the letter to appear where the angry face had previously been, and thus increased attention towards the angry face. Likewise, in the 'attend away from threat' condition, the letter stimuli appeared under the neutral face 80% of the time, training participants to look away from the angry face and toward

the neutral face. Participants in each training condition completed 560 trials delivered consecutively with short breaks every 80 trials. According to a meta-analysis by Beard et al. (2012), 500 trials is sufficient to create a moderate temporary effect of ABMT in a single session. This was also the number of trials used by Heeren, Reese, et al. (2011). On average, the training required approximately 25 minutes.

I ran an experimental manipulation check in order to test whether the ABMT actually changed the reaction times associated with the angry (threatening) and neutral (non-threatening) stimuli between the pretest and posttest measures. I used a linear mixed-effects model with random intercepts associated with participant and trial ID as well as a key preference covariate (see Equation 4). In this model, I specifically tested a face type ^{x} training ^{x} pretest/posttest three-way interaction effect in order to establish the effectiveness of the training. This interaction effect was statistically significant ($B = 11.72$; t [1,18849] = 2.26; $p = .023$), indicating that the training was effective in shifting participant's attention to the targeted stimuli, regardless of cultural group. Selective attention toward social threat after the ABMT was again defined as the ratio of the average reaction time across non-threatening trials to the average reaction time across threatening trials, with 1.00 indicating no attentional bias, less than 1.00 indicating attentional bias for non-threatening stimuli (neutral face), and greater than 1.00 indicating attentional bias for threatening stimuli.

Equation 4. Linear Mixed Effects Model to Test the Effectiveness of Experimental Manipulation of ABMT

$$y_{ij} = \beta_0 + \beta_1 face\ type_{ij} + \beta_2 training_{ij} + \beta_3 pretest/postest_{ij} + \beta_5 face\ type * training_{ij} + \beta_6 training * pretest/postest_{ij} + \beta_7 face\ type * pretest/postest_{ij} + \beta_8 face\ type * training * pretest/postest_{ij} + \mu_1 Participant_j + \mu_2 trial_i + e_{ij}$$

Speech Task. Following Heeren, Reese, et al. (2011), a speech task was administered after the ABMT to provide additional behavioral and physiological markers of social anxiety. Specifically, participants began the task seated 60 cm away from the computer screen, while receiving on-screen instructions to rest quietly for one minute. A countdown timer then appeared on the screen to alert participants how much time remained. After the one-minute timer expired, the next set of instructions appeared, informing participants that they had been "selected for a speech task". Participants were instructed to use the next two minutes to prepare a speech about a negative emotional event that they had experienced in the past year. After 30 seconds, the instructions were replaced by a two-minute countdown timer that appeared on the screen. Participants' skin conductance was also recorded during this time (see below). The final instructions appeared after this two-minute timer expired, requesting participant to wait for the experimenter. The experimenter then entered the room, asking participant to stand in a designated area in front of a video camera. The experimenter then left the room while participants' speeches were recorded. The experimenter returned after participants signaled that they were done with their speeches.

Behavioral Assessment During the Speech Task. Five bilingual research assistants, (two Japanese nationals, two Asian Americans, and one European American) who were blind to experimental conditions assigned to participants, rated each participant's recorded speech. Specifically, the research assistants used the Behavioral Assessment of Speech Anxiety (BASA;

Mulac & Sherman, 1974), a standardized behavioral assessment scale, to rate specific behaviors associated with social anxiety. The BASA examined 18 specific behaviors, e.g., fidgeting, swallowing, breathing heavy, and each were coded using a 7-point likert scale (1 = not at all, 7 = strong). Each rater coded all of the videos and inter-rater reliability was calculated as an intra-class correlation of .91 (CI: .88 – .94). Final scores consisted of the rounded average. All 18 ratings were summed together to generate a final behavioral score (alpha = .83). The BASA has demonstrated evidence of internal consistency, inter-rater reliability, and concurrent validity with expert ratings of speech performance in prior Western studies (Heeren, Reese, et al., 2011; Mulac & Sherman, 1974). To date, there has not been any evidence for cross-cultural validity garnered for this coding system. To remove the variance associated with the particular topic discussed in the speech as well as any skill or prior experience the participant might have in giving speeches (Mulac & Sherman, 1974), I regressed BASA rating on an average subjective rating of the speech's quality and the emotional intensity of the topic itself, as rated by the three coders (please see Equation 5). .

Equation 5. BASA Residuals Calculated From Speech Quality and Emotional Valence

$$for\ each\ score\ i\ in:$$

$$BASA_i = \alpha_0 + \beta_1 * SpeechQuality_i + \beta_2 * EmotionalValence_i + \varepsilon_i$$

$$\varepsilon_i = y_i - \widehat{y_i}$$

Skin Conductance Response During the Preparation for the Speech Task. Skin conductance reactivity (SCR), also known as galvanized skin reactivity (GSR), measures the ease of passage of electricity from one point to another across the surface of the epidermis. The conduction of electricity across this surface is facilitated by perspiration produced by eccrine

sweat glands. When these glands are concentrated in a specific area on the epidermis (such as the medial phalanges), the generation of perspiration is especially sensitive to activity in the sympathetic nervous system via the electrodermal system (Edelberg, 1972a; Hassett, 1978). This occurs via synaptic activity across three distinct but related pathways. The first is centered in the premotor cortex and descends through the pyramidal tract. The second involves activation of the hypothalamus and limbic system. The third path spans the reticular formation (Dawson, Schell, & Filion, 1990; Edelberg, 1972a). Skin conductance elicited in response to emotional or threatening stimuli are conceptualized to be thermoregulatory responses that prepare extremities for movement necessary for the fight or flight response, and thus are controlled by activation of the hypothalamic/limbic system (Edelberg, 1972b, 1973). To date, skin conductance is considered to be one of the more "pure" measures of physiological reactivity via the sympathetic nervous system, especially towards emotionally salient stimuli (Stern, Ray, & Quigley, 2001).

In this study, skin conductance was measured using snap-connect Ag/AgCl electrodes placed on the volar surfaces of the medial phalanges of the right index and middle finger of each participant. The signal transmission between the electrode and the epidermis was facilitated via BIOPAC's GEL101 isotonic skin conductance gel, described as having a 0.5% saline solution within a neutral base. A Shimmer 3 GSR unit (Shimmer Sensing, 2013; 2014a) was used along with software that I wrote in Python. Recordings were set to 100 HZ, and measurement range set to 56 kOhms – 220 kOhms. The raw ADM output was calibrated via a linear equation using parameters specific to this measurement range, and returned as skin resistance measured in kOhms, which was then converted to skin conductance (measured in μSiemens) by multiplying each value by .001. Published research guidelines outlined in Dawson et al. (1990) was used to inform the parameters and conversions associated with the skin conductance measurement in this

study. Skin conductance values were averaged for the 2-minute time period while participants are preparing for their speech, and were divided by the average skin conductance value collected during the 1-minute rest period in order to take into account individual differences in baseline skin conductance (see Equation 6).

Equation 6. Calculation of Change in GSR

$$\Delta GSR = \frac{GSR_{(\mu \mid stress)}}{GSR_{(\mu \mid rest)}}$$

Study 2 Results

Data Cleaning

In the same manner as described in Study 1, I imputed missing values using multiple imputation, checked for outliers and calculated reliability and validity estimates for each variable. Although there were no missing variables, one variable appeared problematic: the change in GSR measured after the ABMT and before the speech task. One participant's GSR score increased by 800% after the introduction of the speech task. This single score was over 8.5 standard deviations above the mean, and subsequently skewed the distribution to the right. In order to maintain a normal distribution, this one score was replaced with the second highest score (214% increase), and the distribution was checked again for non-normality. Given the modest sample sizes, I adopted a *p* value of .10 as the alpha level, rather than incorporating the commonly used alpha level of .05 as the arbitrary cut-off.

Cultural Group Differences in Social Performance Anxiety, Social Interaction Anxiety, and Selective Attention Toward Social Threat in the Dot-Probe Task Before the ABMT

Social Performance and Social Interaction Anxiety. To address Hypothesis 1, I used generalized linear modeling analyses and compared cultural group means for the measures of

social performance and social interaction anxiety (SPS-6 and SIAS-6) administered before the ABMT. Specifically, two generalized linear models were analyzed with either an Asian American / European American group contrast or a Japanese national / European American group contrast as the predictor, and social performance anxiety and social interaction anxiety as the outcomes. Compared to European Americans, Asian Americans reported higher social performance anxiety as measured by the SPS-6 (B = 2.30; t [101] = 1.71; p = .091), as well as higher social interaction anxiety as measured by the SIAS-6 (B = 3.42; t [101] = 3.05; p < .001).

When comparing Japanese nationals to European Americans, however, a different pattern emerged. Inconsistent with Hypothesis 1, although Japanese nationals reported higher social interaction anxiety (B = 3.29; t [101] = 2.80; p = .008), they reported lower social performance anxiety (B = -2.42; t [101] = -1.72; p = .09) than European Americans. For information about cultural group mean differences[4] for each variable, please see Table 2.

Baseline Selective Attention Toward Social Threat in the Dot-Probe Discrimination Task. To examine whether the three cultural groups differed in selective attention to angry vs. neutral faces before the ABMT, I examined differences in reaction time in the dot-probe task. I conducted two generalized linear modeling analyses where the ratios of the average reaction time across neutral face trials to the average reaction time across angry face trials were treated as the outcomes, whereas cultural group contrasts were treated as the predictors. The results showed that both Asian Americans (B = .02; t [1,101] = 2.07; p = .041) and Japanese nationals (B = .02; t [1,101] = 2.80; p = .006) demonstrated higher reaction time ratios, i.e., faster reaction or increased attention to angry faces than to neural faces, as compared to European Americans.

However, using a generalized linear modeling approach with participants as the unit of analysis ignored the variance associated with the unique features of the trials (such as the

ethnicity of the face, presentation, key preference, etc.) In order to provide a more robust estimate of this very important variable, I used a linear mixed-effects model to account for random variance attributed to (a) individual differences in reaction time within each of the three cultural groups and (b) stimuli differences in strength of emotional expression, presentation order, and ethnicity, and estimated the effect of cultural group and emotional valence over and above that. In this way, my random intercept model (Equation 7) contained two random effects variables: participant ID and trial ID, three fixed effects: Asian American / European American contrast (Asian American; level 2), Japanese national / European American contrast (Japanese national; level 2) and emotional valence of the targeted stimuli (angry vs. neutral; level 1), as well as a single covariate: key preference (domain; level 1). Key preference is a common covariate in cognitive psychology experiments and is used to partial out differences in finger strength and dexterity as well as any ideographic key patterns displayed by participants. I used the package *nlme* (Pinheiro, Bates, DebRoy, Sarkar, & R Core Team, 2015) in the statistical programming language R (R Core Team, 2014) to conduct these analyses. P-values were automatically generated by comparing the model including the effect in question with a null model using likelihood ratio tests.

Equation 7. Random Intercept Mixed-Effects Model for Examining Cultural Group Differences in Selective Attention

$$y_{ij} = \beta_0 + \beta_1 Asian\ American_j + \beta_2 Japanese\ National_j + \beta_3 face\ type_{ij} + \beta_4 key\ preference_{ij} + \beta_5 Asian\ American * face\ type_{ij} + \beta_6 Japanese\ National * face\ type_{ij} + \mu_1 Participant_j + \mu_2 trial_i + e_{ij}$$

Two significant group ^{x} face type interaction effects confirmed the previous generalized linear model by demonstrating decreased reaction time raw scores, or increased selective

attention to angry than to neutral faces, among Asian American (B = -7.93; t [1,9470] = -2.17; p = .030) and Japanese participants (B = -10.47; t [1,9470] = -2.73; p = .006) for the threat condition even when the random variance associated with participant, trial, and key preference was partialled out (see Table 8 for reaction time means and Table 9 for full model results).

Manipulation of Attention Toward or Away From Social Threat In Relation to Cultural Group Differences in Self-Report, Behavioral, and Physiological Measures of Social Anxiety

To examine Hypothesis 2 that manipulated selective attention away from threat would reduce, whereas manipulated selective attention to threat would increase cultural group differences in self-reports, behavioral, and physiological measures of social anxiety, I conducted another general linear modeling analysis. The four outcome variables included residualized social performance anxiety, residualized social interaction anxiety, changes in GSR, and anxious behavior in the speech task and each was regressed on the two cultural group contrasts, ABMT training condition, and the associated group ^{x} training interactions (see Equation 8). The interactions between the ABMT training condition the cultural group contrasts were of primary interest in examining potential causal role of selective attention to threat played in explaining cultural group differences in various measures of social anxiety.

Equation 8. Examining the variance in outcome measures accounted for by cultural group and manipulated selective attention toward social threat.

for residualized SPS-6, residualized SIAS-6, ΔGSR, and BASA:

$$y_{ij} = \beta_0 + \beta_1 Asian\ American + \beta_2 Japanese\ National + \beta_3 ABMT\ Attention\ Training + \beta_4 Asian\ American * ABMT\ Attention\ Training + \beta_5 Japanese\ National * ABMT\ Attention\ Training + e$$

As can be seen in Table 10, Hypothesis 2 was only partially supported. Among all the group contrast by ABMT interactions, only two were statistically significant: the interaction between Japanese National contrast and ABMT for the residualized social performance anxiety ($B = 2.75$, $p = .079$), and the interaction between Asian American contrast and ABMT for the anxious behavior during the speech task after the ABMT ($B = 3.63$, $p = .041$). Thus, the group differences in social performance anxiety between Japanese nationals and European Americans increased when participants were trained to attend toward angry faces (and decreased when they were not). Likewise, the group differences between Asian American and European American participants in behavioral ratings of anxiety during a speech task increased when trained to attend toward threat (and decreased when trained to attend away from it). I also observed statistically significant main effects of cultural group and ABMT attention training across some of the social anxiety outcome variables (see Table 10). However, given that these main effects were contaminated both by the experimental manipulation and cultural group differences, I will not attempt to report or provide an interpretation.

Study 2 Discussion

Study 2 extended the findings of Study 1 by further exploring the potential causal role selective attention toward social threat may play in explaining cultural group differences in social anxiety using a quasi-experimental design. Consistent with Hypothesis 1, prior literature, and the results of Study 1, Study 2's results also indicated that Asian Americans endorsed more social performance and social interaction anxiety than European Americans, as well as demonstrated more selective attention toward social threat through faster reaction times to socially threatening images or angry faces relative to non-threatening neutral faces as compared to European Americans. Similar to Study 1 but inconsistent with Hypothesis 1, Japanese nationals showed

more social interaction anxiety, but less social performance anxiety as compared to European Americans. Like Asian Americans, Japanese nationals also scored higher than European Americans on selective attention toward social threat as measured by reaction time differences in the dot-probe task. These findings were in line with Chiao et al.'s (2008) results who showed that Japanese nationals had faster reaction times for angry faces compared to neutral faces when contrasted with European Americans. However, the inconsistent results that involved social performance and social interaction anxiety further demonstrated the importance of understanding subtypes of social anxiety among different cultural groups.

The results pertaining to Hypothesis 2 were mixed. Among all the eight cultural group contrast by ABMT interactions, only two were significant, raising the caution of type I errors. Among the two outcome variables related to residualized social anxiety scores, only social performance anxiety had a significant cultural group ^{x} ABMT attention training interaction effect, and only for the Japanese cultural group. This result suggests, that the ABMT attention training manipulation worked together with culture group to explain the differences in social performance anxiety. Given that cultural group differences in indicators social anxiety remained influential when the ABMT training condition were entered into the model. According to MacKinnon (2008; MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002) this pattern of significant results corresponds to a partial statistical mediation and is therefore similar to the mediation model uncovered in Study 1. Furthermore, the specific interaction effect between Japanese cultural group and ABMT attention training condition may also indicated that the training impacted Japanese nationals differently than Asian Americans and European Americans. It seems that this group is more sensitized to being trained to attend toward faces that represent social threat. One possible explanation is that direct displays of negative emotions such as anger

are less common in East Asian societies as compared to Western societies (Matsumoto et al., 1999). The novelty of the stimuli may have played a part in this significant interaction effect.

Inconsistent with Hypothesis 2, none of the interactions were significant for changes in GSR prior to the speech task. Instead, I found that the main effect for ABMT attention training alone accounted for the variance in this social anxiety indicator. This is also consistent with previous findings that support ABMT's efficacy (Amir, Beard, Taylor, et al., 2009; Hakamata et al., 2010; Heeren et al., 2013, 2012; Linetzky, Pergamin-Hight, Pine, & Bar-Haim, 2015) in reducing anxious arousal preceding a speech task. Given that no interaction effects were statistically significant, it seems that the ABMT attention training had a more uniform effect on physiological social anxiety across cultural groups. It is possible that some of the physiological building blocks of the anxiety process are less affected by cultural group membership or the values associated with these groups. This conclusion contradicts the cultural neuroscience perspective that posits that the influence of culture, genetics, and neurobiological processes are all mutual (e.g., Chiao et al., 2014; Kitayama & Park, 2014; Murata, Moser, & Kitayama, 2013). In contrast, this perspective would posit that it is likely that the measures and the sample size were insufficient to detect the distal influence of culture on GSR response.

In support of Hypothesis 2, the behavioral measure of anxious behavior in the speech task contained a significant interaction effect of Asian American cultural group membership and ABMT attention training. This indicates that among Asian Americans, those who had their attention trained toward threatening stimuli were most likely to display anxious behavior. This provides some evidence for the partial mediation of selective attention toward social threat. However, one potential issue that confounds this problem is that unlike the self-report and physiological measures of social anxiety, there are no studies that provide psychometric evidence

for using the BASA among groups of Asian Americans or Japanese nationals. Without measurement equivalence, I cannot be sure that the difference found between these two group reflect true mean differences rather than measurement artifacts (Little, 1997; Vandenberg & Lance, 2000). For instance, some behavior, such as eye-gaze aversion, nonassertiveness, and more frequent silence (Baker & Edelmann, 2002; Beidel & Turner, 1999), seem to mimic symptoms or behavioral indices of social anxiety as defined by Western theorists (Clark & Wells, 1995), despite having very different meanings among people of East Asian heritage, and thus may be misinterpreted as social anxiety. Future studies that identify an accurate way to compare behavioral ratings of anxiety among these three groups are needed before any further conclusions can be drawn.

Study 2 contained other limitations related to measurement and design. First, the differences in measurement of selective attention toward social threat may reflect differences in the actual kind of selective attention being assessed between Study 1 and Study 2. When attempting to provide evidence that both threat appraisal in Study 1 and the dot-probe reaction time task in Study 2 both represented selective attention toward social threat, I found that there was a small, non-significant correlation between the two measures. This could indicate that these two measures represent two separate and unique constructs rather than a unified understanding of selective attention toward social threat. In contrast to that conclusion, evidence from differences in implicit and explicit measurement methods often indicates that the relation between these types of methodology are often small or nonexistent (Hofmann, Gawronski, Gschwendner, Le, & Schmitt, 2005; Kitayama, Park, Sevincer, Karasawa, & Uskul, 2009), despite representing the same idea. Even if a small but significant correlation between the two measurement methods does exist, it is likely that Study 2's small sample size of 104 participants was unable to detect it.

Future studies may want to perform a careful psychometric analysis of the construct of selective attention toward social threat in order to establishing a working nomological network.

Second, it is important to note that the outcome measures were administered at different times in the same order among all participants. All participants completed the two self-report measures immediately following the ABMT training session, and then had their GSR response measured as they prepared for the speech, which they completed last, just prior to debriefing. According to Podsakoff, MacKenzie, Lee, and Podsakoff's (2003) important critique of experimental methodology and the biases involved, by fixing the order in which outcome measures were administered, I inadvertently created a confounding variable that would systematically impact the strength of the manipulated effect on each of the outcome variables as well as potentially reduce the intercorrelations among variables. This was likely exacerbated by small sample sizes and imbalanced gender distributions.

Third, I did not manipulate self-construal. Given how self-construal functioned in tandem with selective attention toward social threat, it is important to see how the two mediators work together to explain cultural group differences in social anxiety. According to the mediation model in Study 1, self-construal influences social performance anxiety by both influencing selective attention as well as social performance anxiety directly. Future investigations may also want to manipulate independent and interdependent self-construal alongside ABMT attention training in order to better account for the culture ^{x} attention interaction model that my study proposed.

In summary, Study 2 provided initial evidence suggesting potential causal role of selective attention, but should be interpreted with caution due to most interaction effects not being statistically significant. Unlike Study 1, that relied solely on self-report measures and statistical mediation, Study 2 used physiological and behavioral indicators of social anxiety in

addition to self-report within a quasi-experimental design. Similar to Study 1, the evidence in Study 2 was mixed, especially with self-report measures. This may indicated that my mediation better describes the physical and behavioral experience of social anxiety and needs to be adjusted to take into account the various aspects of the phenomenological experience of social anxiety, where the findings were more mixed.

General Discussion

The current investigation began by reviewing four main veins of research: (a) the influence of selective attention toward social threat on social anxiety, (b) cultural group differences in social anxiety, (c) the mediation of these cultural group differences in social anxiety by self-construal, and (d) the preliminary evidence for cultural group differences in selective attention. It is from these four branches of research that I posited that self-construal and selective attention could interact to mediate cultural group differences in social anxiety. I developed a working model based on the idea of culturally-tuned cognition (e.g., Han & Northoff, 2008), where cultural values, behavioral scripts, and beliefs influence neurobiological activity that subsequently accounts for differences in observable behavior. I hypothesized that the way that cultural group differences in how members view themselves in relation to others influences the degree to which potentially threatening social cues are understood and processed among individuals in each cultural group. Members of different cultural groups often attend to socially threatening cues in different ways, which in turn, leads to cultural group differences in social anxiety.

Consistent with this working model, Study 1 and Study 2 consistently found that Asian Americans reported higher social anxiety, more interdependent self-construal, less independent

self-construal, higher threat appraisals, and higher selective attention to threat in the dot-probe task, than European Americans, and these group differences were in the same direction. These findings laid the foundation for examining mediating role of self-construals (Study 1), and mediating (Study 1) or causal (Study 2) role of selective attention to threat in explaining cultural group differences in social anxiety.

Differentiation of Subtypes of Social Anxiety

The results that involved comparisons of Japanese nationals and European Americans were mixed. One of the most noteworthy findings was the reverse relationship between Japanese National and European American cultural group membership and scores on in social performance anxiety. Although nearly all prior studies examining differences in social anxiety between these two groups have indicated that Japanese participants score higher in social anxiety than European Americans (Krieg & Xu, 2015; Woody et al., 2015), our findings showed not only the opposite effect, but also had a strong effect size (d = -.47). In contrast to social interaction anxiety, measured by the SIAS-6, which has items oriented to assess for the phenomenological experience of social anxiety within social interactions, the SPS-6 focuses more on public performance situations or conspicuousness in front of an audience (Mattick & Clarke, 1998; Peters et al., 2011). The differences between these two subtypes of social anxiety are well documented in the social anxiety literature (Hofmann & Roth, 1996; Holt, Heimberg, Hope, & Liebowitz, 1992; Kessler, Stein, & Berglund, 1998; Turner, Beidel, & Townsley, 1992) to the degree that 'performance-only' social anxiety disorder is its own subtype in both DSM-IV and the new DSM-5 classification system (American Psychiatric Association, 2000; 2013).

Because prior estimates of group differences in social anxiety did not take these subtypes into account, it is possible that the influence of Japanese cultural group only apply to social

anxiety associated with interpersonal interactions as compared to public performance and conspicuousness in front of others. Furthermore, the reverse relationship on this social performance anxiety variable may not represent culture at all, but rather reflect the social situations in which culture group members commonly find themselves exposed. For instance, item 6 on the SPS-6 reads, "I can feel conspicuous standing in a line." Although this item does seem to indicate a degree of social awkwardness that many Americans would find to be social anxiety-provoking, in Japan, this is experienced by most people throughout day on very crowded trains, lines into restaurants and offices, and waiting to get on an elevator. In this way, the social structure of mass public transportation usage as well as the ecological factor of high population density may mitigate the degree to which social performance anxiety is experienced among this population due to repeated exposure and subsequent desensitization.

In another manuscript currently in preparation, Krieg, Xu, and Cicero explore the measurement invariance properties of the SPS-6 among a separate sample with groups of European American and Japanese participants. Although the measure achieved scalar invariance and the latent mean difference did indicate that a greater expression of self-reported social performance anxiety among Japanese participants, item 6, discussed in the prior paragraph did have a higher item intercept for European Americans (1.181) as compared to Japanese participants (.881). This may indicate that European Americans rather than Japanese nationals more readily endorsed some items on the scale.

Assessing the Role of Self-Construal and Selective Attention Toward Social Threat

Results of Study 1 found support for the mediating role of self-construals, particularly independent self-construal. According to my structural equation model, independent self-construal influences both the cultural group differences in how threatening a social situation is as

well as the phenomenological experience of social anxiety. The role of interdependent self-construal was unable to be examined in the Japanese National group due to the lack of cultural group differences with European Americans. Recent studies in global cultural trends have all noted global shifts from interdependence to independence in non-Western countries (e.g., Greenfield, 2013; Hamamura, 2012; Oyserman et al., 2002; Shimizu et al., 2014) likely associated with globalization. It is possible that the lack of statistically significant differences comes from this global pattern. At the same time, I do not believe that it is prudent to dismiss interdependent self-construal entirely, given that prior studies examining individual variation in social anxiety consistently find it to be a meaningful individual-level predictor (e.g., Mak et al., 2011; Park et al., 2011). Perhaps future studies can work to combine individual and cultural group-level predictors to produce a more complete model of social anxiety that highlights individual by culture interaction.

The results that involved the role of selective attention to threat were mixed, partly due to the different way in which this construct was operationalized in the two studies. In Study 1, I operationalized selective attention toward social threat as threat appraisal, where participants appraised and reported the likelihood of occurrence and degree of negative consequences in randomly selected situations. With this operationalization, partial statistical mediation of cultural group differences in social anxiety through selective attention toward social threat was identified in both cultural group comparisons. In contrast, when operationalizing selective attention toward social threat in a dot-probe task paradigm only two of the eight expected interaction effects were statistically significant, one for each cultural group comparison. Although evidence for experimental mediation is stronger than evidence for statistical mediation, the results of Study 2 were not as strong as the results for Study 1. Likewise, Study 2's operationalization only

included one emotional expression (anger), making it unclear if the group difference only exists toward angry faces, all emotional expressions (including happiness or sadness), or all threatening stimuli—social and nonsocial alike. Further complicating issues of operationalization, self-reports of threat appraisal and reaction time ratios did not have a statistically significant correlation, possibly indicating that they do not measure a shared construct. Future studies should examine the underlying nomological network of selective attention toward social threat and investigate which measures are most appropriate for assessing this construct among groups of diverse individuals.

Culture and Social Anxiety as a Self-Report Phenomenon

My effort to include various measures of social anxiety was not very successful. On the one hand, we found support for the mediation of Asian American / European American cultural group differences in behavioral ratings of social anxiety through selective attention toward social threat. On the other hand, this pattern was not replicated for the Japanese national / European American cultural group difference for the same behavioral outcome variable or any of the cultural group differences in physiological arousal prior to the speech. Though exceptions were present, in general, the results of analyses using both self-report measures and non-self-report indicators provided evidence for the proposed theoretical model. However, it is important to note that while ABMT attention training accounted for group differences in post-experimental measures of social performance anxiety and behavior ratings during a speech task, the latter two measures of social anxiety did not demonstrate a clear picture of group level differences.

This pattern of results leads to the question of whether or not the relation between culture and social anxiety is a self-report phenomenon only or if it is actually related on the construct level but not accessed in its entirety through physiological, behavioral, and task performance

measures. A potential issue is that to my knowledge there has been no psychometric investigation that examined the appropriateness of using this other forms of measurement among different ethnic and cultural groups. One possibility is that these tasks are not viewed equally amongst these groups and elicit a different set of behaviors or neurobiological processes that are either not comparable or related to other psychological processes. To this point, a recent investigation by Murata, Moser, and Kitayama (2013) examined emotional suppression among 17 European Americans and 17 international students from East Asia and found that the same behavioral instructions to suppress a stimuli elicited different neurobiological patterns of prefrontal cortex activity between the two groups (as measured by parietal late positive potential of the event-related potential). The same task elicited different processes. Similarly, as reviewed earlier, prior literature has not found behavioral differences in social anxiety presentation among Asian Americans and European Americans (Okazaki et al., 2002; Sue et al., 1990).

Limitations Related to Sample Characteristics

On top of limitations related to measurement and measurement properties, there were some potential limitations related to the sample. My sample of Japanese nationals had more hypothesis-inconsistent findings than my sample of Asian Americans, despite that hypotheses for both groups were supported by a large collection of prior studies. Among the Japanese national / European American comparison, I failed to find differences in interdependent self-construal and the cultural group mean difference was opposite the predicted direction for social performance anxiety.

These surprising findings may be due to unique characteristics associated with the Japanese sample, such as higher academic achievement and social status of University of Tokyo students. Alternatively, given the ecological differences in Tokyo as compared to Hawaii (e.g.,

higher population density, limited personal space), Japanese respondents may have received more exposure to obtaining unwanted attention or having the sense of performing before others on a daily basis. Likewise, unlike many other social ecologies found in Japan, students at the University of Tokyo have generally spent years focusing on their own academic achievements and learning in a solitary setting, potentially limiting the social ecological value of interdependent self-construal. Furthermore, at the University of Tokyo itself, there is an emphasis on individual work as compared to the group projects in both undergraduate and graduate level courses in education and psychology that is typically associated with Japanese education. Perhaps it is repeated exposure to the demand characteristics of a more independent environment that reduces the emphasis of interdependent self-construal (e.g., Markus & Conner, 2013), thereby obscuring the expected group mean differences.

In the same vein, there was an important confounding variable that may have affected performance on the dot-probe task and ABMT among the Japanese sample. Although Asian Americans and European Americans all completed Study 2 procedures in the same laboratory location, the Japanese undergraduate students completed Study 2 procedures in three separate locations across two campuses. The environmental difference in which the experiment took place could have primed differing set of demand characteristics, and subsequently alter the behavioral performance on these tasks among groups. However, given that the Asian American and Japanese National cultural groups performed similarly, relative to European Americans, there is also some evidence to suggest that the results were related more to culture than physical location.

Finally, the sample size in Study 2 was rather low due to the matched samples procedure in order to balance the gender ratio across group. Lower sample size indicates lower statistical power and the reduced ability to detect statistically significant effects even when a true effect is

present. This is especially the case when the effect size is small. Future studies may want to replicate the current procedures with larger samples of Asian Americans, European Americans, and Japanese nationals in order to see if (a.) the observed effects hold, and (b.) some of the smaller effects that trended towards statistical significance become statistically significant when power is increased.

Future Directions

In addition to addressing the aforementioned limitations, futures studies may benefit by including additional variables that vary by culture group and impact selective attention toward social threat. Despite the information provided by the current set of studies, it is also important to note that this model is still incomplete. Both studies and both comparisons between Asian Americans / European Americans as well as Japanese nationals / European Americans indicated that a partial mediation model fit better than a full mediation model. There was variance left over from the social anxiety variables that is better explained by cultural group membership than any of the mediators in my model. Recent advances in cultural theory and neuroscience methodology have led to the advent of the new academic branch of cultural neuroscience (Chiao et al., 2014; Chiao & Ambady, 2007; Han & Northoff, 2008; Kitayama, King, Hsu, Liberzon, & Yoon, 2016; Kitayama & Tompson, 2010; Kitayama & Uskul, 2011). According to the position held by investigators in this field, rather than explaining a certain phenomenon through pan-cultural values alone, it is better to look at how these values inspire patterns of socially-scripted behaviors and practices that interact with culture members' genotypes to shape the way that neurobiological processes interact with one another. In this way, it is not culture or genes that explain behavior, but rather the interaction of culture, genes, and their associated neurobiological

processes that provide the best explanation (e.g., Chiao & Ambady, 2007; Kitayama, Duffy, & Uchida, 2007).

Specifically, there are known differences in the genotype prevalence of the serotonin transporter gene (5-HTTLPR) between individuals of European ancestry and individuals of East Asian ancestry (e.g., Chiao & Blizinsky, 2010; Way & Lieberman, 2010). Furthermore, the more prevalent 5-HTTLPR genotype found in East Asian populations (SS allele) has been associated with increased inter-synaptic serotonin levels (Fukudo et al., 2009; Kobiella et al., 2011), stronger and longer amygdala responses to emotional stimuli (Fox, Ridgewell, & Ashwin, 2009; Munafò, Brown, & Hariri, 2008; Pérez-edgar et al., 2011), and levels of trait anxiety (Lesch et al., 1996). On top of that, a recent study by Kitayama et al. (2014) demonstrated that the overall level and impact of self-construal varied by dopamine genotype in populations of European and Asian Americans. Given all of this emerging evidence of the influence of gene ^{x} culture interactions, it is possible that the remaining variance between cultural group membership and social anxiety could be accounted for by genotype or the interaction between genotype and cultural orientation.

Conclusions

Despite these limitations, the current set of studies was the first to examine a model that connects cultural values and neurobiological processes to explain cultural group differences in social anxiety. I found that selective attention toward social threat is influenced by the cultural values associated with how one views oneself among social others and that this in turn impacts the expression of social anxiety. An important implication of this work is realizing that higher interdependent self-construal, lower independent self-construal, and stronger selective attention toward social threat are all characteristics that may be more adaptive in Asian American and

Japanese culture as compared to European American contexts. Selective attention, in and of itself, does not represent psychopathology, but rather it is simply attending to one stimulus over another. Furthermore, given that the samples examined in the current study are not from clinical settings, our model does not indicate that the increased endorsement of social anxiety is actually maladaptive. The current findings may help raise cultural awareness among psychopathology researchers and mental health professionals who may otherwise misinterpret or even accidently pathologize experiences that may be a rather normative expression of cultural values. It is my hope that the development of future models of psychopathology includes intentional efforts to include elements associated with culture alongside neurobiological mechanisms.

Footnotes

1. Krieg & Xu's (2015) sample of Asian Americans also included East Asian individuals residing in Canada and Australia.
2. In Study 1, I shortened the phrase 'selective attention toward social threat' to 'threat appraisal' in order to be more brief and concise.
3. Participants in Study 2 also completed the Symbolic Self-inflation Task (Duffy, Uchida, & Kitayama, 2008). Participants were instructed to draw a network of their social relationships with circles representing themselves and their friends, and lines representing the connections and relationships between the circles (Duffy et al., 2008). I measured the circles at their largest diameter points. The average diameter size of the "self" circle was compared to the diameter of the "friends" circle (Grossmann & Varnum, 2011), resulting in a ratio of self-inflation over others. The symbolic self-inflation measurement is considered an implicit indicator of independent and/or interdependent self-construal. In a study conducted by Kitayama, Park, Sevincer, Karasawa, and Uskul (2009), American, British, and German participants drew the circle representing themselves larger than the circle representing others, resulting in a larger self-inflation ratio as compared Japanese participants. In my study, I also found significant group differences in circle size (B = -0.34; $p < .05$), with European Americans self-circles larger than other-circles as compared with the other two groups. However, the scores for this measure were not correlated with any other measure, defeating the purpose of using them in any of the analyses reported. A follow-up study is being planned to assess the utility of using this type of implicit task-based measure.

4. I also matched both the European American and Asian American group to the Japanese nationals by using all demographic variables. The resulting 626 observations generated the same mean differences as with the full sample. For that reason, I retained the full sample.

References

Abe, J. S., & Zane, N. W. (1990). Psychological maladjustment among Asian and White American college students: Controlling for confounds. *Journal of Counseling Psychology*, *37*, 437–444. http://doi.org/10.1037//0022-0167.37.4.437

Adams Jr, R. B., Franklin, R. G., Rule, N. O., Freeman, J. B., Kveraga, K., Hadjikhani, N., … Ambady, N. (2009). Culture, gaze and the neural processing of fear expressions. *Social Cognitive and Affective Neuroscience*, *5*, 340–348. Journal Article. http://doi.org/10.1093/scan/nsp047

Adams Jr, R. B., Franklin Jr, R. G., Kveraga, K., Ambady, N., Kleck, R. E., Whalen, P. J., … Nelson, A. J. (2012). Amygdala responses to averted vs direct gaze fear vary as a function of presentation speed. *Social Cognitive and Affective Neuroscience*, *7*, 568–577. Journal Article. http://doi.org/10.1093/scan/nsr038

Aderka, I. M., Nickerson, A., Bøe, H. J., & Hofmann, S. G. (2012). Sudden gains during psychological treatments of anxiety and depression: A meta-analysis. *Journal of Consulting and Clinical Psychology*, *80*, 93–101. http://doi.org/10.1037/a0026455

Aikawa, A., Fujita, M., & Tanaka, K. (2007). The relationship between social skills deficits and depression, loneliness, and social anxiety: Rethinking a vulnerability model of social skills deficits. [The relationship between social skills deficits and depression, loneliness, and social anxiety: Re. *The Japanese Journal of Social Psychology*, *23*, 95–103. Journal Article.

American Psychiatric Association. (1987). *Diagnostic and Statistical Manual of Mental Disorders, 3rd Edition*. Arlington, VA: American Psychiatric Publishing, Inc.

American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders*

(4th ed., text rev.). Washington, DC.

American Psychiatric Association. (2013). *Diagnostic and Statistical Manual of Mental Disorders, 5th Edition: DSM-5* (Fifth). Arlington, VA: American Psychiatric Publishing, Inc.

Amir, N., Beard, C., Burns, M., & Bomyea, J. (2009). Attention modification program in individuals with generalized anxiety disorder. *Journal of Abnormal Psychology*, *118*, 28–33. Journal Article. http://doi.org/10.1037/a0012589

Amir, N., Beard, C., Taylor, C. T., Klumpp, H., Elias, J., Burns, M., & Chen, X. (2009). Attention training in individuals with generalized social phobia: A randomized controlled trial. *Journal of Consulting and Clinical Psychology*, *77*, 961–973. Journal Article. http://doi.org/10.1037/a0016685

Amir, N., & Bomyea, J. (2010). Cognitive biases in social anxiety disorder. In S. G. H. P. M. DiBartolo (Ed.), *Social anxiety: Clinical, developmental, and social perspectives (2nd ed.)* (pp. 373–393). Book Section, San Diego, CA, US: Elsevier Academic Press. http://doi.org/10.1016/b978-0-12-375096-9.00014-6

Amir, N., Bomyea, J., & Beard, C. (2010). The effect of single-session interpretation modification on attention bias in socially anxious individuals. *Journal of Anxiety Disorders*, *24*, 178–182. Journal Article. http://doi.org/10.1016/j.janxdis.2009.10.005

Amir, N., & Conley, S. (2014). Attentional bias modification. In S. G. Hofmann, D. J. A. Dozois, W. Rief, & J. A. J. Smits (Eds.), *The Wiley handbook of cognitive behavioral therapy (Vols. 1-3)* (pp. 181–202). Book Section, Wiley-Blackwell: Wiley-Blackwell.

Amir, N., Foa, E. B., & Coles, M. E. (1998). Negative interpretation bias in social phobia.

Behaviour Research and Therapy, *36*, 945–957. Journal Article. http://doi.org/10.1016/s0005-7967(98)00060-6

Amir, N., Prouvost, C., & Kuckertz, J. M. (2012). Lack of a benign interpretation bias in social anxiety disorder. *Cognitive Behaviour Therapy*, *41*, 119–129. JOUR. http://doi.org/10.1080/16506073.2012.662655

Amir, N., Taylor, C. T., & Donohue, M. C. (2011). Predictors of response to an attention modification program in generalized social phobia. *Journal of Consulting and Clinical Psychology*, *79*, 533–541. Journal Article. http://doi.org/10.1037/a0023808

Amir, N., Weber, G., Beard, C., Bomyea, J., & Taylor, C. T. (2008). The effect of a single-session attention modification program on response to a public-speaking challenge in socially anxious individuals. *Journal of Abnormal Psychology*, *117*, 860–868. Journal Article. http://doi.org/10.1037/a0013445

Anderson, E. R., & Hope, D. A. (2008). A review of the tripartite model for understanding the link between anxiety and depression in youth. *Clinical Psychology Review*, *28*, 275–287. Journal Article. http://doi.org/10.1016/j.cpr.2007.05.004

Ashley, V., Honzel, N., Larsen, J., Justus, T., & Swick, D. (2013). Attentional bias for trauma-related words: exaggerated emotional Stroop effect in Afghanistan and Iraq war veterans with PTSD. *BMC Psychiatry*, *13*, 86. JOUR. http://doi.org/10.1186/1471-244X-13-86

Baker, S. R., & Edelmann, R. J. (2002). Is social phobia related to lack of social skills? Duration of skill-related behaviours and ratings of behavioural adequacy. *British Journal of Clinical Psychology*, *41*, 243–257. Journal Article. http://doi.org/10.1348/014466502760379118

Bar-Haim, Y., Holoshitz, Y., Eldar, S., Frenkel, T. I., Muller, D., Charney, D. S., … Wald, I.

(2010). Life-threatening danger and suppression of attention bias to threat. *The American Journal of Psychiatry*, *167*, 694–698. Journal Article. http://doi.org/10.1176/appi.ajp.2009.09070956

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. Web Page. http://doi.org/10.1037/0033-2909.133.1.1

Barbas, H. (2000). Connections underlying the synthesis of cognition, memory and emotion in primate prefrontal cortices. *Brain Research Bulletin*, *52*, 319–330. Journal Article. http://doi.org/10.1016/s0361-9230(99)00245-2

Bartelstone, J. H., & Trull, T. J. (1995). Personality, life events, and depression. *Journal of Personality Assessment*, *64*, 279–294. Journal Article. http://doi.org/10.1207/s15327752jpa6402_8

Beard, C., Sawyer, A. T., & Hofmann, S. G. (2012). Efficacy of attention bias modification using threat and appetitive stimuli: A meta-analytic review. *Behavior Therapy*, *43*, 724–740. Journal Article. http://doi.org/10.1016/j.beth.2012.01.002

Beaupré, M. G., & Hess, U. (2005). Cross-Cultural Emotion Recognition among Canadian Ethnic Groups. *Journal of Cross-Cultural Psychology*, *36*, 355–370. Journal Article. http://doi.org/10.1177/0022022104273656

Beck, A. (1987). Cognitive models of depression. *Journal of Cognitive Psychotherapy*, *1*, 5–37. Journal Article.

Beidel, D. C., & Turner, S. M. (1999). The natural course of shyness and related syndromes. In

L. A. S. J. Schulkin (Ed.), *Extreme fear, shyness, and social phobia: Origins, biological mechanisms, and clinical outcomes* (pp. 203–223). Book Section, New York, NY, US: Oxford University Press.

Berry, J. W., Kim, U., Minde, T., & Mok, D. (1987). Comparative Studies of Acculturative Stress. *International Migration Review*, *21*, 491–511. Journal Article. http://doi.org/10.2307/2546607

Blatt, S. J., & Zuroff, D. C. (1992). Interpersonal relatedness and self-definition: Two prototypes for depression. *Clinical Psychology Review*, *12*, 527–562. Journal Article. http://doi.org/10.1016/0272-7358(92)90070-o

Boettcher, J., Berger, T., & Renneberg, B. (2012). Internet-based attention training for social anxiety: A randomized controlled trial. *Cognitive Therapy and Research*, *36*, 522–536. Journal Article. http://doi.org/10.1007/s10608-011-9374-y

Bolino, M. C., Kacmar, K. M., Turnley, W. H., & Gilstrap, J. B. (2008). A Multi-Level Review of Impression Management Motives and Behaviors. *Journal of Management*, *34*, 1080–1109. JOUR. http://doi.org/10.1177/0149206308324325

Brown, T. A., Chorpita, B. F., & Barlow, D. H. (1998). Structural relationships among dimensions of the DSM-IV anxiety and mood disorders and dimensions of negative affect, positive affect, and autonomic arousal. *Journal of Abnormal Psychology*, *107*, 179–192. Journal Article. http://doi.org/10.1037/0021-843x.107.2.179

Burks, V. S., Laird, R. D., Dodge, K. A., Pettit, G. S., & Bates, J. E. (1999). Knowledge structures, social information processing, and children's aggressive behavior. *Social Development*, *8*, 220–236. Journal Article. http://doi.org/10.1111/1467-9507.00092

Butler, E. A., Egloff, B., Wlhelm, F. H., Smith, N. C., Erickson, E. A., & Gross, J. J. (2003). The social consequences of expressive suppression. *Emotion*, *3*, 48–67. Journal Article. http://doi.org/10.1037/1528-3542.3.1.48

Buttermore, N. R. (2009). *The evolved function of social anxiety: Detecting high stakes social interactions* (DISS). *ProQuest Dissertations and Theses*. The University of Michigan.

Campanella, S., Rossignol, M., Mejias, S., Joassin, F., Maurage, P., Debatisse, D., … Guérit, J. . (2004). Human gender differences in an emotional visual oddball task: an event-related potentials study. *Neuroscience Letters*, *367*, 14–18. JOUR. http://doi.org/10.1016/j.neulet.2004.05.097

Campbell-Sills, L., Barlow, D. H., Brown, T. A., & Hofmann, S. G. (2006). Acceptability and suppression of negative emotion in anxiety and mood disorders. *Emotion*, *6*, 587–595. Journal Article. http://doi.org/10.1037/1528-3542.6.4.587

Carlbring, P., Apelstrand, M., Sehlin, H., Amir, N., Rousseau, A., Hofmann, S. G., & Andersson, G. (2012). Internet-delivered attention bias modification training in individuals with social anxiety disorder—A double blind randomized controlled trial. *BMC Psychiatry*, *12*, 66. Journal Article. http://doi.org/10.1186/1471-244x-12-66

Carter, S. A., & Wu, K. D. (2010). Symptoms of specific and generalized social phobia: An examination of discriminant validity and structural relations with mood and anxiety symptoms. *Behavior Therapy*, *41*, 254–265. Journal Article. http://doi.org/10.1016/j.beth.2009.04.002

Cavanagh, H. L., Shin, S. R., & Urry, L. M. (2011). Mood-induced shifts in attentional bias to emotional information predict ill- and well-being. *Emotion*, *11*, 241–248. JOUR.

http://doi.org/10.1037/a0022572

Chen, C., Lee, S., & Stevenson, H. W. (1995). Response style and cross-cultural comparisons of rating scales among East Asian and North American students. *Psychological Science*, *6*, 170–175. JOUR DESCRIPTORS - *Cross Cultural Differences; *Rating Scales; Test Taking. http://doi.org/10.1111/j.1467-9280.1995.tb00327.x

Chen, X., & Rubin, K. H. (2011). *Socioemotional Development in Cultural Context*. (X. Chen & K. H. Rubin, Eds.), *Guilford Publications*. Book, New York, NY: Guilford Press.

Chevalier-Skolnikoff, S. (1973). Facial Expression of Emotion in Nonhuman Primates. In P. Ekman (Ed.), *Darwin and Facial Expression: A Century of Research in Review* (pp. 11–83). Electronic Book Section, ISHK.

Chiao, J. Y., & Ambady, N. (2007). Cultural neuroscience: Parsing universality and diversity across levels of analysis. In S. Kitayama & D. Cohen (Eds.), *Handbook of cultural psychology* (pp. 237–254). Electronic Book, New York: Guilford Press.

Chiao, J. Y., & Blizinsky, K. D. (2010). Culture-gene coevolution of individualism-collectivism and the serotonin transporter gene. *Proceedings. Biological Sciences / The Royal Society*, *277*, 529–537. JOUR. http://doi.org/10.1098/rspb.2009.1650

Chiao, J. Y., Cheon, B. K., Pornpattananangkul, N., Mrazek, A. J., Blizinsky, K. D., & D. (2014). Cultural neuroscience: Understanding human diversity. In M. J. Gelfand, C. Y. Chiu, & Y. Y. Hong (Eds.), *Advances in culture and psychology (Vol 4)* (pp. 1–77). Book Section, New York, NY, US: Oxford University Press.

Chiao, J. Y., Iidaka, T., Gordon, H. L., Nogawa, J., Bar, M., Aminoff, E., … Ambady, N. (2008). Cultural specificity in amygdala response to fear faces. *Journal of Cognitive Neuroscience*,

20, 2167–2174. Journal Article. http://doi.org/10.1162/jocn.2008.20151

Chin, D., & Kameoka, V. A. (2006). Sociocultural influences. In *Comprehensive handbook of personality and psychopathology: Vol. 2: Adult Psychopathology* (pp. 67–84). CHAP DESCRIPTORS - *Epistemology; *Methodology; *Psychological Theories; *Psychopathology; Sociocultural Factors, Hoboken, NJ: John Wiley & Sons Inc.

Chua, H. F., Boland, J. E., & Nisbett, R. E. (2005). Cultural variation in eye movements during scene perception. *Proceedings of the National Academy of Sciences of the United States of America*, *102*, 12629–12633. JOUR.

Clark, D. M. (2001). A cognitive perspective on social phobia. In W. R. C. L. E. Alden (Ed.), *International handbook of social anxiety: Concepts, research and interventions relating to the self and shyness* (pp. 405–430). Book Section, New York, NY, US: John Wiley & Sons Ltd.

Clark, D. M., & Wells, A. (1995). A cognitive model of social phobia. In R. G. Heimberg, M. R. Liebowitz, D. A. Hope, & F. R. Schneier (Eds.), *Social phobia: Diagnosis, assessment, and treatment* (pp. 69–93). Book Section, New York, NY: Guilford Press.

Clark, L. A., & Watson, D. (1991). Tripartite model of anxiety and depression: Psychometric evidence and taxonomic implications. *Journal of Abnormal Psychology*, *100*, 316–336. Journal Article. http://doi.org/10.1037/0021-843x.100.3.316

Cohen, M. X., & Shaver, P. R. (2004). Avoidant attachment and hemispheric lateralisation of the processing of attachment- and emotion-related words. *Cognition and Emotion*, *18*, 799–813. Journal Article. http://doi.org/10.1080/02699930341000266

Compton, R. J. (2003). The Interface Between Emotion and Attention: A Review of Evidence

From Psychology and Neuroscience. *Behavioral and Cognitive Neuroscience Reviews*, *2*, 115–129. Journal Article. http://doi.org/10.1177/1534582303002002003

Compton, R. J., Banich, M. T., Mohanty, A., Milham, M. P., Herrington, J., Miller, G. A., … Heller, W. (2003). Paying attention to emotion: An fMRI investigation of cognitive and emotional Stroop tasks. *Cognitive, Affective & Behavioral Neuroscience*, *3*, 81–96. Journal Article. http://doi.org/10.3758/cabn.3.2.81

Compton, R. J., Wilson, K., & Wolf, K. (2004). Mind the Gap: Interhemispheric Communication About Emotional Faces. *Emotion*, *4*, 219–232. Journal Article. http://doi.org/10.1037/1528-3542.4.3.219

Corbetta, M., & Shulman, G. L. (2002). Control of goal-directed and stimulus-driven attention in the brain. *Nat Rev Neurosci*, *3*, 201–215. Journal Article. http://doi.org/10.1038/nrn755

Corkum, V., & Moore, C. (1995). Development of joint visual attention in infants. In C. M. P. J. Dunham (Ed.), *Joint attention: Its origins and role in development* (pp. 61–83). Book Section, Hillsdale, NJ, England: Lawrence Erlbaum Associates, Inc.

Crick, N. R., & Dodge, K. A. (1994). A review and reformulation of social information-processing mechanisms in children's social adjustment. *Psychological Bulletin*, *115*, 74–101. Journal Article. http://doi.org/10.1037/0033-2909.115.1.74

Cross, S. E. (1995). Self-construals, coping, and stress in cross-cultural adaptation. *Journal of Cross-Cultural Psychology*, *26*, 673–697. Journal Article. http://doi.org/10.1177/002202219502600610

Dalgleish, T., Taghavi, R., Neshat-Doost, H., Moradi, A., Canterbury, R., & Yule, W. (2003). Patterns of Processing Bias for Emotional Information Across Clinical Disorders: A

Comparison of Attention, Memory, and Prospective Cognition in Children and Adolescents With Depression, Generalized Anxiety, and Posttraumatic Stress Disorder. *Journal of Clinical Child & Adolescent Psychology*, *32*, 10–21. Journal Article. http://doi.org/10.1207/s15374424jccp3201_02

Damjanovic, L., Roberson, D., Athanasopoulos, P., Kasai, C., & Dyson, M. (2010). Searching for happiness across cultures. *Journal of Cognition and Culture*, *10*, 85–107. Journal Article. http://doi.org/10.1163/156853710x497185

Darwin, C. (1872). *The expression of the emotions in man and animals*. *London, UK: John Marry*. Journal Article.

Dawson, M. E., Schell, A. M., & Filion, D. L. (1990). The electrodermal system. In J. T. C. L. G. Tassinary (Ed.), *Principles of psychophysiology: Physical, social, and inferential elements* (pp. 295–324). Book Section, New York, NY, US: Cambridge University Press.

De Cort, K., Hermans, D., Spruyt, A., Griez, E., & Schruers, K. (2008). A specific attentional bias in panic disorder? *Depression and Anxiety*, *25*, 951–955. JOUR. http://doi.org/10.1002/da.20376

De Los Reyes, A., Aldao, A., Thomas, S. A., Daruwala, S., Swan, A. J., Van Wie, M., … Lechner, W. V. (2012). Adolescent self-reports of social anxiety: Can they disagree with objective psychophysiological measures and still be valid? *Journal of Psychopathology and Behavioral Assessment*, *34*, 308–322. Journal Article. http://doi.org/10.1007/s10862-012-9289-2

Dennis, T. a., Chen, C. C., & McCandliss, B. D. (2008). Threat-related attentional biases: an analysis of three attention systems. *Depression and Anxiety*, *25*, E1–E10. Journal Article.

http://doi.org/10.1002/da.20308

Derntl, B., Habel, U., Robinson, S., Windischberger, C., Kryspin-Exner, I., Gur, R. C., & Moser, E. (2012). Culture but not gender modulates amygdala activation during explicit emotion recognition. *BMC Neuroscience*, *13*, 54. Journal Article. http://doi.org/10.1186/1471-2202-13-54

Dodge, K. A. (1986). A social information processing model of social competence in children. In M. Perlmutter (Ed.), *The Minnesota Symposium on Child Psychology* (Vol. 18, pp. 77–125). Book Section, Hillsdale, NJ: Earlbaum.

Dodge, K. A., & Newman, J. P. (1981). Biased decision-making processes in aggressive boys. *Journal of Abnormal Psychology*, *90*, 375–379. Journal Article. http://doi.org/10.1037/0021-843x.90.4.375

Dodge, K. A., & Tomlin, A. M. (1987). Utilization of self-schemas as a mechanism of interpetational bias in aggressive children. *Social Cognition*, *5*, 280–300. Journal Article.

Duffy, S. (2004). *Seeing through cultures: Perceiving and estimating object extent in North America and Japan.* (THES DESCRIPTORS - *Cross Cultural Differences; *Culture (Anthropological); Literature). ProQuest Information & Learning, US.

Duffy, S., Uchida, Y., & Kitayama, S. (2008). *Symbolic self-inflation: a cross-cultural comparison* (Unpublished Work). Rutgers, The State University of New Jersey, University College--Camden.

Duque, A., & Vázquez, C. (2015). Double attention bias for positive and negative emotional faces in clinical depression: Evidence from an eye-tracking study. *Journal of Behavior Therapy and Experimental Psychiatry*, *46*, 107–114. JOUR.

http://doi.org/10.1016/j.jbtep.2014.09.005

Edelberg, R. (1972a). Electrical activity of the skin: Its measurement and uses in psychophysiology. In N. S. Greenfield & R. A. Sternbach (Eds.), *Handbook of Psychophysiology* (pp. 367–418). Electronic Book Section, New York: Holt.

Edelberg, R. (1972b). Electrodermal recovery rate, goal-orientation, and aversion. *Psychophysiology*, *9*, 512–520. Journal Article. http://doi.org/10.1111/j.1469-8986.1972.tb01805.x

Edelberg, R. (1973). Mechanisms of electrodermal adaptions for locomotion, manipulation, or defense. *Progress in Physiological Psychology*, *5*, 155–209. Journal Article.

Ekman, P. (1994). Strong evidence for universals in facial expressions: A reply to Russell's mistaken critique. *Psychological Bulletin*, *115*, 268–287. Journal Article. http://doi.org/10.1037/0033-2909.115.2.268

Ekman, P., Friesen, W. V, & Ellsworth, P. (1972). *Emotion in the human face: Guidelines for research and an integration of findings*. Book, Oxford, England: Pergamon Press.

Ekman, P., Friesen, W. V, O'Sullivan, M., Chan, A., Diacoyanni-Tarlatzis, I., Heider, K., … Tzavaras, A. (1987). Universals and cultural differences in the judgments of facial expressions of emotion. *Journal of Personality and Social Psychology*, *53*, 712–717. Pamphlet. http://doi.org/10.1037/0022-3514.53.4.712

Elfenbein, H. A. (2007). It Takes One to Know One Better: Controversy about the Cultural Ingroup Advantage in Communicating Emotion as a Theoretical Rather Than Methodological Issue. In U. H. P. Philippot (Ed.), *Group dynamics and emotional expression* (pp. 51–68). Book Section, New York, NY, US: Cambridge University Press.

http://doi.org/10.1017/cbo9780511499838.004

Enders, C. K., & Bandalos, D. L. (2001). The relative performance of full information maximum likelihood estimation for missing data in structural equation models. *Structural Equation Modeling*, *8*, 430–457. JOUR. http://doi.org/10.1207/S15328007SEM0803_5

Erdley, C. A., & Asher, S. R. (1996). Children's social goals and self-efficacy perceptions as influences on their responses to ambiguous provocation. *Child Development*, *67*, 1329–1344. Journal Article. http://doi.org/10.2307/1131703

Feldman, & Dodge, K. A. (1987). Social information processing and sociometric status: Sex, age, and situational effects. *Journal of Abnormal Child Psychology*, *15*, 211–227. Journal Article. http://doi.org/10.1007/bf00916350

Foa, E. B., Franklin, M. E., & Kozak, M. J. (2001). Social phobia: An information-processing perspective. In S. G. H. P. M. DiBartolo (Ed.), *From social anxiety to social phobia: multiple perspectives* (pp. 268–280). Journal Article, Needham Heights, MA, US: Allyn & Bacon.

Fox, E., Ridgewell, A., & Ashwin, C. (2009). Looking on the bright side: biased attention and the human serotonin transporter gene. *Proceedings of the Royal Society B: Biological Sciences*, *276*, 1747–1751. JOUR. http://doi.org/10.1098/rspb.2008.1788

Fox, E., Russo, R., & Dutton, K. (2002). Attentional bias for threat: Evidence for delayed disengagement from emotional faces. *Cognition & Emotion*, *16*, 355–379. JOUR. http://doi.org/10.1080/02699930143000527

Frewen, P. a, Dozois, D. J. a, Joanisse, M. F., & Neufeld, R. W. J. (2008). Selective attention to threat versus reward: meta-analysis and neural-network modeling of the dot-probe task.

Clinical Psychology Review, *28*, 307–37. http://doi.org/10.1016/j.cpr.2007.05.006

Friesen, C. K., & Kingstone, A. (1998). The eyes have it! Reflexive orienting is triggered by nonpredictive gaze. *Psychonomic Bulletin & Review*, *5*, 490–495. Journal Article.

Fukudo, S., Kanazawa, M., Mizuno, T., Hamaguchi, T., Kano, M., Watanabe, S., … Aoki, M. (2009). Impact of serotonin transporter gene polymorphism on brain activation by colorectal distention. *NeuroImage*, *47*, 946–951. http://doi.org/10.1016/j.neuroimage.2009.04.083

Fung, H. (1999). Becoming a moral child: The socialization of shame among young Chinese children. *Ethos*, *27*, 180–209. Journal Article. http://doi.org/10.1525/eth.1999.27.2.180

Goffman, E. (1959). *The presentation of self in everyday life*. Book, Oxford, England: Doubleday.

Good, B. J., & Kleinman, A. M. (1985). Culture and anxiety: Cross-cultural evidence for the patterning of anxiety disorders. In A. H. T. J. D. Maser (Ed.), *Anxiety and the anxiety disorders* (pp. 297–323). Book Section, Hillsdale, NJ, England: Lawrence Erlbaum Associates, Inc.

Gordon, T. L., & Teachman, B. A. (2008). Ethnic group differences in affective, behavioral, and cognitive markers of anxiety. *Journal of Cross-Cultural Psychology*, *39*, 424–446. Journal Article. http://doi.org/10.1177/0022022108318224

Gouze, K. R. (1987). Attention and social problem solving as correlates of aggression in preschool males. *Journal of Abnormal Child Psychology*, *15*, 181–197. Journal Article. http://doi.org/10.1007/bf00916348

Gravetter, F. J., & Wallnau, L. B. (2016). *Statistics for the behavioral sciences*. BOOK, Boston, MA: Cengage Learning.

Greenfield, P. M. (2013). The Changing Psychology of Culture From 1800 Through 2000. *Psychological Science*, *24*, 1722–1731. JOUR. http://doi.org/10.1177/0956797613479387

Groenewegen, H. J., & Uylings, H. B. M. (2000). The prefrontal cortex and the integration of sensory, limbic and autonomic information. In G. G. van E. J. P. C. de B. M. G. P. F. C. M. A. P. H.B.M. Uylings (Ed.), *Progress in Brain Research* (Vol. Volume 126, pp. 3–28). Book Section, Elsevier. http://doi.org/http://dx.doi.org/10.1016/S0079-6123(00)26003-2

Grossmann, I., & Varnum, M. E. W. (2011). Social class, culture, and cognition. *Social Psychological and Personality Science*, *2*, 81–89. Journal Article. http://doi.org/10.1177/1948550610377119

Grubbs, F. E. (1950). Sample Criteria for Testing Outlying Observations. *The Annals of Mathematical Statistics*, *21*, 27–58. JOUR. http://doi.org/10.1214/aoms/1177729885

Hakamata, Y., Lissek, S., Bar-Haim, Y., Britton, J. C., Fox, N. A., Leibenluft, E., … Pine, D. S. (2010). Attention Bias Modification Treatment: A meta-analysis toward the establishment of novel treatment for anxiety. *Biological Psychiatry*, *68*, 982–990. Journal Article. http://doi.org/10.1016/j.biopsych.2010.07.021

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. Journal Article. http://doi.org/10.1037/a0024355

Hamamura, T. (2012). Are Cultures Becoming Individualistic? A Cross-Temporal Comparison of Individualism-Collectivism in the United States and Japan. *Personality and Social Psychology Review*, *16*, 3–24. JOUR. http://doi.org/10.1177/1088868311411587

Han, S., & Northoff, G. (2008). Culture-sensitive neural substrates of human cognition: A

transcultural neuroimaging approach. *Nature Reviews Neuroscience*, *9*, 646–654. Journal Article. http://doi.org/10.1038/nrn2456

Hansen, B. B., & Klopfer, S. O. (2006). Optimal full matching and related designs via network flows. *Journal of Computational and Graphical Statistics*, *15*, 609–627. JOUR. http://doi.org/10.1198/106186006X137047

Hardin, E. E., & Leong, F. T. (2005). Optimism and Pessimism as Mediators of the Relations Between Self-Discrepancies and Distress Among Asian and European Americans. *Journal of Counseling Psychology*, *52*, 25–35. Journal Article. http://doi.org/10.1037/0022-0167.52.1.25

Hassett, J. (1978). *A primer in psychophysiology*. Book, San Francisco: Freeman.

Hedden, T., Ji, L.-J., Jing, W., Jiao, S., Yao, C., Nisbett, R. E., & Park, D. C. (2000). *Culture and age differences in recognition memory for social dimensions* (Report).

Hedden, T., Ketay, S., Aron, A., Markus, H. R., & Gabrieli, J. D. E. (2008). Cultural influences on neural substrates of attentional control. *Psychological Science*, *19*, 12–17. Journal Article. http://doi.org/10.1111/j.1467-9280.2008.02038.x

Heeren, A., Lievens, L., & Philippot, P. (2011). How does attention training work in social phobia: Disengagement from threat or re-engagement to non-threat? *Journal of Anxiety Disorders*, *25*, 1108–1115. Journal Article. http://doi.org/10.1016/j.janxdis.2011.08.001

Heeren, A., Maurage, P., & Philippot, P. (2013). A Bayesian case-controls exploration of the malleability of attentional bias for threat in social phobia. *International Journal of Cognitive Therapy*, *6*, 24–39. Journal Article. http://doi.org/10.1521/ijct.2013.6.1.24

Heeren, A., Peschard, V., & Philippot, P. (2012). The causal role of attentional bias for threat

cues in social anxiety: A test on a cyber-ostracism task. *Cognitive Therapy and Research*, *36*, 512–521. Journal Article. http://doi.org/10.1007/s10608-011-9394-7

Heeren, A., Philippot, P., & Koster, E. H. W. (2014). Impact of the temporal stability of preexistent attentional bias for threat on its alteration through attention bias modification. *Journal of Behavior Therapy and Experimental Psychiatry*, 1–7. JOUR. http://doi.org/10.1016/j.jbtep.2014.10.012

Heeren, A., Reese, H. E., McNally, R. J., & Philippot, P. (2011). Attention training toward and away from threat in social phobia: Effects on subjective, behavioral, and physiological measures of anxiety. *Behaviour Research and Therapy*, *50*, 30–39. Journal Article. http://doi.org/10.1016/j.brat.2011.10.005

Heimberg, R. G., Brozovich, F. A., & Rapee, R. M. (2010). A cognitive behavioral model of social anxiety disorder: Update and extension. In S. G. DiBartolo & P. M. Hofmann (Eds.), *Social anxiety: Clinical, developmental, and social perspectives (2nd ed.)* (pp. 395–422). Book Section, San Diego, CA: Elsevier Academic Press. http://doi.org/10.1016/b978-0-12-375096-9.00015-8

Heine, S. J., Lehman, D. R., Peng, K., & Greenholtz, J. (2002). What's wrong with cross-cultural comparisons of subjective Likert scales?: The reference-group effect. *Journal of Personality and Social Psychology*, *82*, 903–918. JOUR DESCRIPTORS - *Cross Cultural Differences; *Likert Scales; *Reference Groups; *Social Comparison; *Statistical Validity; Subjectivity PMID - 12051579. http://doi.org/10.1037/0022-3514.82.6.903

Herbert, J. D., & Cardaciotto, L. A. (2005). An acceptance and mindfulness-based perspective on social anxiety disorder. In *Acceptance and mindfulness-based approaches to anxiety* (pp. 189–212). CHAP, Springer.

Ho, L. L. Y., & Lau, A. S. A. (2011). Do self-report measures of social anxiety reflect cultural bias or real difficulties for Asian American college students? *Cultural Diversity and Ethnic Minority Psychology*, *17*, 52–58. Journal Article. http://doi.org/10.1037/a0022533

Hofmann, S. G., & Roth, W. T. (1996). Issues related to social anxiety among controls in social phobia research. *Behavior Therapy*, *27*, 79–91. http://doi.org/10.1016/S0005-7894(96)80037-2

Hofmann, W., Gawronski, B., Gschwendner, T., Le, H., & Schmitt, M. (2005). A Meta-Analysis on the Correlation Between the Implicit Association Test and Explicit Self-Report Measures. *Personality and Social Psychology Bulletin*, *31*, 1369–1385. JOUR. http://doi.org/10.1177/0146167205275613

Hofstede, G. (2001). *Culture's consequences: comparing values, behaviors, institutions, and organizations across nations*. JOUR, Thousand Oaks, CA: Sage Publications.

Holas, P., Krejtz, I., Cypryanska, M., & Nezlek, J. B. (2014). Orienting and maintenance of attention to threatening facial expressions in anxiety – an eye movement study. *Psychiatry Research*, No Pagination Specified. JOUR. http://doi.org/10.1016/j.psychres.2014.06.005

Holt, C. S., Heimberg, R. G., Hope, D. A., & Liebowitz, M. R. (1992). Situational domains of social phobia. *Journal of Anxiety Disorders*, *6*, 63–77. http://doi.org/10.1016/0887-6185(92)90027-5

Hong, J. J., & Woody, S. R. (2007). Cultural mediators of self-reported social anxiety. *Behaviour Research and Therapy*, *45*, 1779–1789. Journal Article. http://doi.org/10.1016/j.brat.2007.01.011

Hou, X., & Zhang, L. (2007). Saliency Detection: A Spectral Residual Approach. In *Computer*

Vision and Pattern Recognition, 2007. CVPR '07. IEEE Conference on (pp. 1–8). Conference Proceedings. http://doi.org/10.1109/cvpr.2007.383267

Hsu, L. (2004). *Patterns of social anxiety in Chinese and European Canadian students* (Journal Article).

Hsu, L., & Alden, L. E. (2007). Social Anxiety in Chinese- and European-Heritage Students: The Effect of Assessment Format and Judgments of Impairment. *Behavior Therapy*, *38*, 120–131. Journal Article. http://doi.org/10.1016/j.beth.2006.06.006

Hsu, L., & Alden, L. E. (2008). Cultural influences on willingness to seek treatment for social anxiety in Chinese- and European-heritage students. *Cultural Diversity and Ethnic Minority Psychology*, *14*, 215–223. Journal Article. http://doi.org/10.1037/1099-9809.14.3.215

Hsu, L., Woody, S. R., Lee, H.-J., Peng, Y., Zhou, X., & Ryder, A. G. (2012). Social anxiety among East Asians in North America: East Asian socialization or the challenge of acculturation? *Cultural Diversity and Ethnic Minority Psychology*, *18*, 181–191. Journal Article. http://doi.org/10.1037/a0027690

Hu, L., & Bentler, P. M. (1998). Fit indices in covariance structure modeling: Sensitivity to underparameterized model misspecification. *Psychological Methods*. JOUR DESCRIPTORS - *Errors; *Mathematical Modeling; *Statistical Estimation; Least Squares, US: American Psychological Association. http://doi.org/10.1037/1082-989X.3.4.424

Huang, Y., Tang, S., Daiga, H., Shioiri, T., & Someya, T. (2001). Differential judgement of static facial expressions of emotions in three cultures. *Psychiatry and Clinical Neurosciences*, *55*, 479–483. MGZN. http://doi.org/10.1046/j.1440-1819.2001.00893.x

Hughes, A. A., Heimberg, R. G., & Coles, M. E. (2006). Relations of the factors of the tripartite model of anxiety and depression to types of social anxiety. *Behaviour Research and Therapy*, *44*, 1629–1641. http://doi.org/10.1016/j.brat.2005.10.015

Hunt, C., Keogh, E., & French, C. C. (2007). Anxiety sensitivity, conscious awareness and selective attentional biases in children. *Behaviour Research and Therapy*, *45*, 497–509. Web Page. http://doi.org/10.1016/j.brat.2006.04.001

Imada, T., & Ellsworth, P. C. (2011). Proud Americans and lucky Japanese: Cultural differences in appraisal and corresponding emotion. *Emotion*, *11*, 329–345. Journal Article. http://doi.org/10.1037/a0022855

Itti, C., Niebur, L., & Koch, E. (1998). A Model of Saliency-Based Visual Attention for Rapid Scene Analysis. *IEEE Transactions on Pattern Analysis and Machine Intelligence*, *20*, 1254–1259. JOUR.

Izard, C. E. (1971). *The face of emotion*. Book, East Norwalk, CT, US: Appleton-Century-Crofts.

James, W. (1890). *The principles of psychology*. Dover, NY.

Ji, L.-J. (2001). *Culture, language, and categorization* (Thesis). ProQuest Information & Learning, US.

Ji, L.-J., Nisbett, R., & Zhang, Z. (2001). *Categorization, Language, and Culture*. Ann Arbor, MI.

Ji, L.-J., Peng, K., & Nisbett, R. E. (2000). Culture, control, and perception of relationships in the environment. *Journal of Personality and Social Psychology*, *78*, 943–955. Journal Article. http://doi.org/10.1037/0022-3514.78.5.943

Kampman, M., Keijsers, G. P. ., Verbraak, M. J. P. ., Näring, G., & Hoogduin, C. A. . (2002). The

emotional Stroop: a comparison of panic disorder patients, obsessive–compulsive patients, and normal controls, in two experiments. *Journal of Anxiety Disorders*, *16*, 425–441. JOUR. http://doi.org/10.1016/S0887-6185(02)00127-5

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. JOUR.

Kessler, R. C., Stein, M. B., & Berglund, P. (1998). Social Phobia Subtypes in the National Comorbidity Survey. *American Journal of Psychiatry*, *155*, 613–619. http://doi.org/10.1176/ajp.155.5.613

Kingstone, A., Smilek, D., Ristic, J., Friesen, C. K., & Eastwood, J. D. (2003). Attention, Researchers! It Is Time to Take a Look at the Real World. *Current Directions in Psychological Science*, *12*, 176–180. Web Page. http://doi.org/10.1111/1467-8721.01255

Kitayama, S., Duffy, S., Kawamura, T., & Larsen, J. T. (2003). Perceiving an object and its context in different cultures: A cultural look at New Look. *Psychological Science*, *14*, 201–206. Journal Article. http://doi.org/10.1111/1467-9280.02432

Kitayama, S., Duffy, S., & Uchida, Y. (2007). Self as cultural model of being. In S. K. D. Cohen (Ed.), *Handbook of cultural psychology* (pp. 136–174). CHAP DESCRIPTORS - *Culture (Anthropological); *Psychology; *Self Concept; *Socialization; *Sociocultural Factors; Cross Cultural Differences; Social Interaction, New York, NY, US: Guilford Press.

Kitayama, S., King, A., Hsu, M., Liberzon, I., & Yoon, C. (2016). Dopamine-system genes and cultural acquisition: the norm sensitivity hypothesis. *Current Opinion in Psychology*, *8*, 167–174. JOUR. http://doi.org/10.1016/j.copsyc.2015.11.006

Kitayama, S., King, A., Yoon, C., Tompson, S., Huff, S., & Liberzon, I. (2014). The dopamine D4 receptor gene (DRD4) moderates cultural difference in independent versus interdependent social orientation. *Psychological Science*, *25*, 1169–1177. JOUR. http://doi.org/10.1177/0956797614528338

Kitayama, S., & Markus, H. R. (1994). *Emotion and culture: Empirical studies of mutual influence*. (S. Kitayama & H. R. Markus, Eds.). Book, Washington, DC, US: American Psychological Association. http://doi.org/10.1037/10152-000

Kitayama, S., Markus, H. R., Matsumoto, H., & Norasakkunkit, V. (1997). Individual and collective processes in the construction of the self: self-enhancement in the United States and self-criticism in Japan. *Journal of Personality and Social Psychology*, *72*, 1245.

Kitayama, S., Park, H., Sevincer, A. T., Karasawa, M., & Uskul, A. K. (2009). A cultural task analysis of implicit independence: Comparing North America, Western Europe, and East Asia. *Journal of Personality and Social Psychology*, *97*, 236–255. Journal Article. http://doi.org/10.1037/a0015999

Kitayama, S., & Park, J. (2014). Error-related brain activity reveals self-centric motivation: Culture matters. *Journal of Experimental Psychology: General*, *143*, 62–70. JOUR. http://doi.org/10.1037/a0031696

Kitayama, S., & Tompson, S. (2010). Envisioning the future of cultural neuroscience. *Asian Journal of Social Psychology*, *13*, 92–101. http://doi.org/10.1111/j.1467-839X.2010.01304.x

Kitayama, S., & Uskul, A. K. (2011). Culture, Mind, and the Brain: Current Evidence and Future Directions. *Annual Review of Psychology, Vol 62*, *62*, 419–449. JOUR.

http://doi.org/10.1146/annurev-psych-120709-145357

Klein, R. M. (2000). Inhibition of return. *Trends in Cognitive Sciences*, *4*, 138–147. JOUR. http://doi.org/10.1016/S1364-6613(00)01452-2

Kleinknecht, R. A., Dinnel, D. L., Kleinknecht, E. E., Hiruma, N., & Harada, N. (1997). Cultural factors in social anxiety: A comparison of social phobia symptoms and Taijin Kyofusho. *Journal of Anxiety Disorders*, *11*, 157–177. Journal Article. http://doi.org/10.1016/s0887-6185(97)00004-2

Kline, R. B. (2011). *Principles and practice of structural equation modeling*. *Structural Equation Modeling* (Vol. 156). http://doi.org/10.1038/156278a0

Kobiella, A., Reimold, M., Ulshöfer, D. E., Ikonomidou, V. N., Vollmert, C., Vollstädt-Klein, S., … Smolka, M. N. (2011). How the serotonin transporter 5-HTTLPR polymorphism influences amygdala function: the roles of in vivo serotonin transporter expression and amygdala structure. *Translational Psychiatry*, *1*, e37. JOUR. http://doi.org/10.1038/tp.2011.29

Kocovski, N. L., Fleming, J. E., & Rector, N. A. (2009). Mindfulness and Acceptance-Based Group Therapy for Social Anxiety Disorder: An Open Trial. *Cognitive and Behavioral Practice*, *16*, 276–289. JOUR. http://doi.org/10.1016/j.cbpra.2008.12.004

Koszycki, D., Benger, M., Shlik, J., & Bradwejn, J. (2007). Randomized trial of a meditation-based stress reduction program and cognitive behavior therapy in generalized social anxiety disorder. *Behaviour Research and Therapy*, *45*, 2518–2526. JOUR. http://doi.org/10.1016/j.brat.2007.04.011

Krieg, A., & Xu, Y. (2015). Ethnic differences in social anxiety between individuals of Asian

heritage and European heritage: A meta-analytic review. *Asian American Journal of Psychology*, *6*, 66–80. http://doi.org/10.1037/a0036993

Krieg, A., Xu, Y., & Cicero, D. C. (n.d.). Comparing Social Anxiety between Asian Americans and European Americans: An Examination of Measurement Invariance. *Assessment*.

Kuckertz, J. M., Gildebrant, E., Liliequist, B., Karlström, P., Väppling, C., Bodlund, O., … Carlbring, P. (2014). Moderation and mediation of the effect of attention training in social anxiety disorder. *Behaviour Research and Therapy*, *53*, 30–40. http://doi.org/10.1016/j.brat.2013.12.003

Kujawa, A., Torpey, D., Kim, J., & Hajcak, G. (2011). Attentional biases for emotional faces in young children of mothers with chronic or recurrent depression. *Journal of Abnormal Child Psychology*, *39*, 125–135. JOUR.

La Greca, A. M., & Harrison, H. M. (2005). Adolescent Peer Relations, Friendships, and Romantic Relationships: Do They Predict Social Anxiety and Depression? *Journal of Clinical Child & Adolescent Psychology*, *34*, 49–61. JOUR. http://doi.org/10.1207/s15374424jccp3401_5

La Greca, A. M., & Lopez, N. (1998). Social anxiety among adolescents: Linkages with peer relations and friendships. *Journal of Abnormal Child Psychology*, *26*, 83–94. JOUR.

Laible, D., McGinley, M., Carlo, G., Augustine, M., & Murphy, T. (2014). Does engaging in prosocial behavior make children see the world through rose-colored glasses? *Developmental Psychology*, *50*, 872–880. Journal Article. http://doi.org/10.1037/a0033905

Lane, R. D., Chua, P. M. L., & Dolan, R. J. (1999). Common effects of emotional valence, arousal and attention on neural activation during visual processing of pictures.

Neuropsychologia, *37*, 989–997. Journal Article. http://doi.org/http://dx.doi.org/10.1016/S0028-3932(99)00017-2

Lang, P. J., Bradley, M. M., Fitzsimmons, J. R., Cuthbert, B. N., Scott, J. D., Moulder, B., & Nangia, V. (1998). Emotional arousal and activation of the visual cortex: An fMRI analysis. *Psychophysiology*, *35*, 199–210. Journal Article. http://doi.org/10.1017/s0048577298001991

Lange, W.-G., Heuer, K., Reinecke, A., Becker, E. S., & Rinck, M. (2008). Inhibition of return is unimpressed by emotional cues. *Cognition & Emotion*, *22*, 1433–1456. JOUR. http://doi.org/10.1080/02699930701809451

Lau, A. S., Fung, J., Wang, S., & Kang, S.-M. (2009). Explaining elevated social anxiety among Asian Americans: Emotional attunement and a cultural double bind. *Cultural Diversity and Ethnic Minority Psychology*, *15*, 77–85. Journal Article. http://doi.org/10.1037/a0012819

LeDoux, J. E. (1995). Emotion: Clues from the brain. *Annual Review of Psychology*, *46*, 209–235. Journal Article. http://doi.org/10.1146/annurev.ps.46.020195.001233

Lee, M. R., Okazaki, S., & Yoo, H. C. (2006). Frequency and intensity of social anxiety in Asian Americans and European Americans. *Cultural Diversity and Ethnic Minority Psychology*, *12*, 291–305. Journal Article. http://doi.org/10.1037/1099-9809.12.2.291

Lesch, K.-P., Bengel, D., Heils, A., Sabol, S. Z., Greenberg, B. D., Petri, S., … Murphy, D. L. (1996). Association of anxiety-related traits with a polymorphism in the serotonin transporter gene regulatory region. *Science*. http://doi.org/10.1126/science.274.5292.1527

Linetzky, M., Pergamin-Hight, L., Pine, D. S., & Bar-Haim, Y. (2015). Quantitative Evaluation of the Clinical Efficacy of Attention Bias Modification Treatment for Anxiety Disorders.

Depression and Anxiety, *9*, 1–9. http://doi.org/10.1002/da.22344

Lissek, S., Pine, D. S., & Grillon, C. (2006). The strong situation: A potential impediment to studying the psychobiology and pharmacology of anxiety disorders. *Biological Psychology*, *72*, 265–270. JOUR. http://doi.org/10.1016/j.biopsycho.2005.11.004

Little, T. D. (1997). Mean and covariance structures (MACS) analyses of cross-cultural data: Practical and theoretical issues. *Multivariate Behavioral Research*, *32*, 53–76. JOUR DESCRIPTORS - *Cross Cultural Differences; *Measurement; *Structural Equation Modeling; Mathematical Modeling. http://doi.org/10.1207/s15327906mbr3201_3

Lorenzo-Seva, U., Timmerman, M. E., & Kiers, H. A. L. (2011). The Hull method for selecting the number of common factors. *Multivariate Behavioral Research*, *46*, 340–364. JOUR.

Luthar, S. S., & Blatt, S. J. (1993). Dependent and self-critical depressive experiences among inner-city adolescents. *Journal of Personality*, *61*, 365–386. Journal Article. http://doi.org/10.1111/j.1467-6494.1993.tb00285.x

MacKinnon, D. P. (2008). *Introduction to Statistical Mediation Analysis*. Routledge.

MacKinnon, D. P., Lockwood, C. M., Hoffman, J. M., West, S. G., & Sheets, V. (2002). A comparison of methods to test mediation and other intervening variable effects. *Psychological Methods*, *7*, 83–104. JOUR. http://doi.org/10.1037/1082-989X.7.1.83

MacLeod, C., Mathews, A., & Tata, P. (1986). Attentional bias in emotional disorders. *Journal of Abnormal Psychology*, *95*, 15–20. Journal Article. http://doi.org/10.1037/0021-843x.95.1.15

MacLeod, C., Rutherford, E., Campbell, L., Ebsworthy, G., & Holker, L. (2002). Selective attention and emotional vulnerability: Assessing the causal basis of their association through the experimental manipulation of attentional bias. *Journal of Abnormal Psychology*, *111*,

107–123. Web Page. http://doi.org/10.1037/0021-843x.111.1.107

Magnúsdóttir, I., & Smári, J. (1999). Social anxiety in adolescents and appraisal of negative events: Specificity or generality of bias? *Behavioural and Cognitive Psychotherapy*, *27*, 223–230. Journal Article.

Mak, W. W. S., Law, R. W., & Teng, Y. (2011). Cultural model of vulnerability to distress: The role of self-construal and sociotropy on anxiety and depression among Asian Americans and European Americans. *Journal of Cross-Cultural Psychology*, *42*, 75–88. Journal Article. http://doi.org/10.1177/0022022110361713

Manera, V., Samson, A. C., Pehrs, C., Lee, I. A., & Gross, J. J. (2014). The eyes have it: The role of attention in cognitive reappraisal of social stimuli. *Emotion*, *14*, 833–839. JOUR DESCRIPTORS - *Attention; *Cognitive Appraisal; *Emotional Regulation; *Eye Fixation; Social Cognition PMID - 25046244. http://doi.org/10.1037/a0037350

Markus, H. R., & Conner, A. (2013). *Clash!: How to Thrive in a Multicultural World*. BOOK, Penguin.

Markus, H. R., & Kitayama, S. (1991). Culture and the self: Implications for cognition, emotion, and motivation. *Psychological Review*, *98*, 224–253. Journal Article. http://doi.org/10.1037/0033-295x.98.2.224

Masuda, T., & Nisbett, R. E. (2001). Attending holistically versus analytically: Comparing the context sensitivity of Japanese and Americans. *Journal of Personality and Social Psychology*, *81*, 922–934. Journal Article. http://doi.org/10.1037/0022-3514.81.5.922

Matsumoto, D. (1990). Cultural similarities and differences in display rules. *Motivation and Emotion*, *14*, 195–214. Journal Article. http://doi.org/10.1007/bf00995569

Matsumoto, D. (1992). American-Japanese cultural differences in the recognition of universal facial expressions. *Journal of Cross-Cultural Psychology*, *23*, 72–84. Journal Article. http://doi.org/10.1177/0022022192231005

Matsumoto, D., & Ekman, P. (1988). *Japanese and Caucasian Facial Expressions of Emotion (JACFEE) Slides* (Dataset). (D. of P. Intercultural and Emotion Research Laboratory San Fransisco State University, Ed.). San Fransisco, CA.

Matsumoto, D., & Ekman, P. (1989). American-Japanese cultural differences in intensity ratings of facial expressions of emotion. *Motivation and Emotion*, *13*, 143–157. Journal Article. http://doi.org/10.1007/bf00992959

Matsumoto, D., Kasri, F., & Kooken, K. (1999). American–Japanese cultural differences in judgements of expression intensity and subjective experience. *Cognition & Emotion*, *13*, 201–218. Journal Article. http://doi.org/10.1080/026999399379339

Matsumoto, D., Yoo, S. H., & Nakagawa, S. (2008). Culture, emotional regulation, and adjustment. *Journal of Personality and Social Psychology*, *94*, 925–937. http://doi.org/10.1037/0022-3514.94.6.925

Mattick, R. P., & Clarke, J. C. (1998). Development and validation of measures of social phobia scrutiny fear and social interaction anxiety. *Behaviour Research and Therapy*, *36*, 455–470. Journal Article. http://doi.org/10.1016/s0005-7967(97)10031-6

Maurer, D. (1985). Infants' perception of facedness. In T. Field & N. Fox (Eds.), *Social perception in infants* (pp. 73–100). Electronic Book, Norwood, NJ: Ablex.

Mesquita, B., & Frijda, N. H. (1992). Cultural variations in emotions: A review. *Psychological Bulletin*, *112*, 179–204. Journal Article. http://doi.org/10.1037/0033-2909.112.2.179

Mogg, K., & Bradley, B. P. (1999). Orienting of attention to threatening facial expressions presented under conditions of restricted awareness. *Cognition & Emotion*, *13*, 713–740. Web Page. http://doi.org/10.1080/026999399379050

Monk, C. S., Telzer, E. H., Mogg, K., Bradley, B. P., Mai, X., Louro, H. M. C., … Pine, D. S. (2008). Amygdala and ventrolateral prefrontal cortex activation to masked angry faces in children and adolescents with generalized anxiety disorder. *Archives of General Psychiatry*, *65*, 568–576. Journal Article. http://doi.org/10.1001/archpsyc.65.5.568

Moriguchi, Y., Ohnishi, T., Kawachi, T., Mori, T., Hirakata, M., Yamada, M., … Komaki, G. (2005). Specific brain activation in Japanese and Caucasian people to fearful faces. *NeuroReport: For Rapid Communication of Neuroscience Research*, *16*, 133–136. Journal Article. http://doi.org/10.1097/00001756-200502080-00012

Morling, B., Kitayama, S., & Miyamoto, Y. (2002). Cultural practices emphasize influence in the United States and adjustment in Japan. *Personality and Social Psychology Bulletin*, *28*, 311–323. JOUR.

Mulac, A., & Sherman, A. R. (1974). Behavioral assessment of speech anxiety. *Quarterly Journal of Speech*, *60*, 134–143. Journal Article. http://doi.org/10.1080/00335637409383219

Munafò, M. R., Brown, S. M., & Hariri, A. R. (2008). Serotonin transporter (5-HTTLPR) genotype and amygdala activation: a meta-analysis. *Biological Psychiatry*, *63*, 852–857. JOUR. http://doi.org/10.1016/j.biopsych.2007.08.016

Murata, A., Moser, J. S., & Kitayama, S. (2013). Culture shapes electrocortical responses during emotion suppression. *Social Cognitive and Affective Neuroscience*, *8*, 595–601.

http://doi.org/10.1093/scan/nss036

Nelson, D. A., & Crick, N. R. (1999). Rose-colored glasses: Examining the social information-processing of prosocial young adolescents. *The Journal of Early Adolescence*, *19*, 17–38. Journal Article. http://doi.org/10.1177/0272431699019001002

Nesse, R. M. (1999). Proximate and evolutionary studies of anxiety, stress and depression: Synergy at the interface. *Neuroscience and Biobehavioral Reviews*, *23*, 895–903. Journal Article. http://doi.org/10.1016/s0149-7634(99)00023-8

Neubauer, K., von Auer, M., Murray, E., Petermann, F., Helbig-Lang, S., & Gerlach, A. L. (2013). Internet-delivered attention modification training as a treatment for social phobia: A randomized controlled trial. *Behaviour Research and Therapy*, *51*, 87–97. Journal Article. http://doi.org/10.1016/j.brat.2012.10.006

Nisbett, R. E. (1998). Essence and accident. In *Attribution processes, person perception, and social interaction: The legacy of Ned Jones* (pp. 169–200). Journal Article.

Nisbett, R. E., Peng, K., Choi, I., & Norenzayan, A. (2001). Culture and systems of thought: Holistic versus analytic cognition. *Psychological Review*, *108*, 291–310. Journal Article. http://doi.org/10.1037/0033-295x.108.2.291

Norasakkunkit, V., & Kalick, S. M. (2002). Culture, ethnicity, and emotional distress measures: The role of self-construal and self-enhancement. *Journal of Cross-Cultural Psychology*, *33*, 56–70. Journal Article. http://doi.org/10.1177/0022022102033001004

Norasakkunkit, V., & Kalick, S. M. (2009). Experimentally detecting how cultural differences on social anxiety measures misrepresent cultural differences in emotional well-being. *Journal of Happiness Studies*, *10*, 313–327. Journal Article. http://doi.org/10.1007/s10902-007-

9082-1

Norasakkunkit, V., Kitayama, S., & Uchida, Y. (2012). Social Anxiety and Holistic Cognition: Self-Focused Social Anxiety in the United States and Other-Focused Social Anxiety in Japan. *Journal of Cross-Cultural Psychology*, *43*, 742–757. JOUR. http://doi.org/10.1177/0022022111405658

Norasakkunkit, V., & Uchida, Y. (2011). Psychological Consequences of Postindustrial Anomie on Self and Motivation Among Japanese Youth. *Journal of Social Issues*, *67*, 774–786. http://doi.org/10.1111/j.1540-4560.2011.01727.x

Oguri, M., & Gudykunst, W. B. (2002). The influence of self construals and communication styles on sojourners' psychological and sociocultural adjustment. *International Journal of Intercultural Relations*, *26*, 577–593. Journal Article. http://doi.org/10.1016/s0147-1767(02)00034-2

Okazaki, S. (1997). Sources of ethnic differences between Asian American and White American college students on measures of depression and social anxiety. *Journal of Abnormal Psychology*, *106*, 52–60. Journal Article. http://doi.org/10.1037/0021-843x.106.1.52

Okazaki, S. (2000). Asian American and White American differences on affective distress symptoms: Do symptom reports differ across reporting methods? *Journal of Cross-Cultural Psychology*, *31*, 603–625. Journal Article. http://doi.org/10.1177/0022022100031005004

Okazaki, S. (2002). Self-other agreement on affective distress scales in Asian Americans and White Americans. *Journal of Counseling Psychology*, *49*, 428–437. Journal Article. http://doi.org/10.1037/0022-0167.49.4.428

Okazaki, S., & Kallivayalil, D. (2002). Cultural Norms and Subjective Disability as Predictors of

Symptom Reports among Asian Americans and White Americans. *Journal of Cross-Cultural Psychology*, *33*, 482–491. JOUR. http://doi.org/10.1177/0022022102033005004

Okazaki, S., Liu, J. F., Longworth, S. L., & Minn, J. Y. (2002). Asian American-White American differences in expressions of social anxiety: A replication and extension. *Cultural Diversity and Ethnic Minority Psychology*, *8*, 234–247. Journal Article. http://doi.org/10.1037/1099-9809.8.3.234

Otto, M. W., Smits, J. A. J., & Reese, H. E. (2004). Cognitive-Behavioral Therapy for the Treatment of Anxiety Disorders. *Journal of Clinical Psychiatry*, *65*, 34–41. Journal Article.

Oyserman, D., Coon, H. M., & Kemmelmeier, M. (2002). Rethinking individualism and collectivism: Evaluation of theoretical assumptions and meta-analyses. *Psychological Bulletin*, *128*, 3–72. JOUR. http://doi.org/10.1037/0033-2909.128.1.3

Park, D. C., Nisbett, R., & Hedden, T. (1999). Aging, culture, and cognition. *The Journals of Gerontology: Series B: Psychological Sciences and Social Sciences*, *54B*, P75–P84. Journal Article. http://doi.org/10.1093/geronb/54B.2.P75

Park, I. J. K., Sulaiman, C., Schwartz, S. J., Kim, S. Y., Ham, L. S., & Zamboanga, B. L. (2011). Self-construals and social anxiety among Asian American college students: Testing emotion suppression as a mediator. *Asian American Journal of Psychology*, *2*, 39–50. Journal Article. http://doi.org/10.1037/a0023183

Peirce, J. W. (2007). PsychoPy--psychophysics software in Python. *Journal of Neuroscience Methods*, *162*, 8–13. Journal Article.

Peng, K., & Nisbett, R. E. (1999). Culture, dialectics, and reasoning about contradiction. *American Psychologist*, *54*, 741–754. Journal Article. http://doi.org/10.1037/0003-

066x.54.9.741

Pérez-edgar, K., Bar-haim, Y., Mcdermott, J. M., Gorodetsky, E., Hodgkinson, A., Goldman, D., … Fox, N. A. (2011). Variations in the serotonin transporter gene are associated with attention bias patterns to positive and negative emotion faces. *Biological Psychiatry*, *83*, 269–271. http://doi.org/10.1016/j.biopsycho.2009.08.009.Variations

Pergamin-Hight, L., Naim, R., Bakermans-kranenburg, M. J., van IJzendoorn, M. H., & Bar-Haim, Y. (2015). Content specificity of attention bias to threat in anxiety disorders: A meta-analysis. *Clinical Psychology Review*, *35*, 10–18. http://doi.org/10.1016/j.cpr.2014.10.005

Peters, L., Sunderland, M., Andrews, G., Rapee, R. M., & Mattick, R. P. (2011). Development of a short form Social Interaction Anxiety (SIAS) and Social Phobia Scale (SPS) using nonparametric item response theory: The SIAS-6 and the SPS-6. *Psychological Assessment*, *24*, 66–76. Journal Article. http://doi.org/10.1037/a0024544

Petersen, S. E., & Posner, M. I. (2012). The attention system of the human brain: 20 years after. *Annual Review of Neuroscience*, *35*, 73. JOUR.

Pinheiro, J., Bates, D., DebRoy, S., Sarkar, D., & R Core Team. (2015). nlme: Linear and Nonlineat Mixed Effects Models.

Podsakoff, P. M., MacKenzie, S. B., Lee, J.-Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology*, *88*, 879–903. JOUR. http://doi.org/10.1037/0021-9010.88.5.879

Posner, M. I., & Cohen, Y. (1984). Components of visual orienting. In *Attention and performance: Control of language processes* (Vol. 32, pp. 531–556). JOUR, Hilldale, NJ.

http://doi.org/10.1162/jocn.1991.3.4.335

Posner, M. I., & Petersen, S. E. (1990). Attention systems in the human brain. *Annual Review of Neuroscience*, *13*, 25–42.

Python Software Foundation. (2013). Python Language Reference, version 2.7. Report, Available at http://www.python.org.

R Core Team. (2014). R: A language and environment for statistical computing. Vienna, Austria: R Foundation for Statistical Computing.

Rapee, R. M., & Heimberg, R. G. (1997). A cognitive-behavioral model of anxiety in social phobia. *Behaviour Research and Therapy*, *35*, 741–756. Journal Article. http://doi.org/10.1016/s0005-7967(97)00022-3

Robins, C. J., & Block, P. (1988). Personal vulnerability, life events, and depressive symptoms: A test of a specific interactional model. *Journal of Personality and Social Psychology*, *54*, 847–852. Journal Article. http://doi.org/10.1037/0022-3514.54.5.847

Roy, A. K., Vasa, R. A., Bruck, M., Mogg, K., Bradley, B. P., Sweeney, M., … Pine, D. S. (2008). Attention bias toward threat in pediatric anxiety disorders. *Journal of the American Academy of Child & Adolescent Psychiatry*, *47*, 1189–1196. Journal Article. http://doi.org/10.1097/CHI.0b013e3181825ace

Rule, R. R., Shimamura, A. P., & Knight, R. T. (2002). Orbitofrontal cortex and dynamic filtering of emotional stimuli. *Cognitive, Affective & Behavioral Neuroscience*, *2*, 264–270. Journal Article. http://doi.org/10.3758/cabn.2.3.264

Rumelhart, D. E., McClelland, J. L., & Group, P. D. P. R. (1986). *Parallel Distributed Processing: Explorations in the Microstructure of Cognition* (Vol. 1). Electronic Book, The

Massachusetts Institute of Technology.

Ruscio, A. M., Brown, T. A., Chiu, W. T., Sareen, J., Stein, M. B., & Kessler, R. C. (2008). Social fears and social phobia in the USA: Results from the National Comorbidity Survey Replication. *Psychological Medicine*, *38*, 15–28. Journal Article. http://doi.org/10.1017/s0033291707001699

Russell, J. A., Suzuki, N., & Ishida, N. (1993). Canadian, Greek, and Japanese freely produced emotion labels for facial expressions. *Motivation and Emotion*, *17*, 337–351. Journal Article. http://doi.org/10.1007/bf00992324

Ryder, A. G., Alden, L. E., & Paulhus, D. L. (2000). Is acculturation unidimensional or bidimensional? A head-to-head comparison in the prediction of personality, self-identity, and adjustment. *Journal of Personality and Social Psychology*, *79*, 49–65. Journal Article. http://doi.org/10.1037/0022-3514.79.1.49

Schaefer, S. M., Jackson, D. C., Davidson, R. J., Aguirre, G. K., Kimberg, D. Y., & Thompson-Schill, S. L. (2002). Modulation of amygdalar activity by the conscious regulation of negative emotion. *Journal of Cognitive Neuroscience*, *14*, 913–921. Journal Article. http://doi.org/10.1162/089892902760191135

Schirmer, A., Zysset, S., Kotz, S. A., & Yves von Cramon, D. (2004). Gender differences in the activation of inferior frontal cortex during emotional speech perception. *NeuroImage*, *21*, 1114–1123. JOUR. http://doi.org/10.1016/j.neuroimage.2003.10.048

Schlenker, B. R., & Leary, M. R. (1982). Social anxiety and self-presentation: A conceptualization model. *Psychological Bulletin*, *92*, 641–669. Journal Article. http://doi.org/10.1037/0033-2909.92.3.641

Schmidt, N. B., Richey, J. A., Buckner, J. D., & Timpano, K. R. (2009). Attention training for generalized social anxiety disorder. *Journal of Abnormal Psychology*, *118*, 5–14. Journal Article. http://doi.org/10.1037/a0013643

Shafran, R., Lee, M., Cooper, Z., Palmer, R. L., & Fairburn, C. G. (2007). Attentional bias in eating disorders. *The International Journal of Eating Disorders*, *40*, 369–380. JOUR. http://doi.org/10.1002/eat

Shechner, T., Britton, J. C., Pérez‐Edgar, K., Bar‐Haim, Y., Ernst, M., Fox, N. a, … Bar-Haim, Y. (2012). Attention biases, anxiety, and development: Toward or away from threats or rewards? *Depression and Anxiety*, *29*, 282–294. Journal Article. http://doi.org/10.1002/da.20914

Shimizu, M., Park, H., & Greenfield, P. M. (2014). Infant sleeping arrangements and cultural values among contemporary Japanese mothers. *Frontiers in Psychology*, *5*, 718. JOUR. http://doi.org/10.3389/fpsyg.2014.00718

Shimmer, S. (2013). *Shimmer GSR + User Guide*.

Shimmer Sensing. (2014). *Shimmer GSR+ Model Technical Specifications* (Report).

Shioiri, T., Someya, T., Helmeste, D., & Tang, S. W. (1999). Misinterpretation of facial expression: A cross-cultural study. *Psychiatry and Clinical Neurosciences*, *53*, 45–50. Journal Article. http://doi.org/10.1046/j.1440-1819.1999.00469.x

Singelis, T. M. (1994). The measurement of independent and interdependent self-construals. *Personality and Social Psychology Bulletin*, *20*, 580–591. Journal Article. http://doi.org/10.1177/0146167294205014

Smári, J., Pétursdóttir, G., & Porsteinsdóttir, V. (2001). Social anxiety and depression in

adolescents in relation to perceived competence and situational appraisal. *Journal of Adolescence*, *24*, 199–207. http://doi.org/10.1006/jado.2000.0338

Stein, M. B., Torgrud, L. J., & Walker, J. R. (2000). Social Phobia Symptoms, Subtypes, and Severity. *Archives of General Psychiatry*, *57*, 1046. JOUR. http://doi.org/10.1001/archpsyc.57.11.1046

Stern, R. M., Ray, W. J., & Quigley, K. S. (2001). *Psychophysiological recording*. Book, New York, NY: Oxford University Press.

Stroop, J. R. (1935). Studies of interference in serial verbal reactions. *Journal of Experimental Psychology*, *18*, 643–662. Journal Article. http://doi.org/10.1037/h0054651

Sue, D. M., Sue, D. M., & Ino, S. (1983). Nonassertiveness of Asian Americans: An inaccurate assumption? *Journal of Counseling Psychology*, *30*, 581–588. Journal Article. http://doi.org/10.1037/0022-0167.30.4.581

Sue, D., Sue, D. M., & Ino, S. (1990). Assertiveness and social anxiety in Chinese-American women. *The Journal of Psychology: Interdisciplinary and Applied*, *124*, 155–163. Journal Article. http://doi.org/10.1080/00223980.1990.10543212

Telzer, E. H., Mogg, K., Bradley, B. P., Mai, X., Ernst, M., Pine, D. S., & Monk, C. S. (2008). Relationship between trait anxiety, prefrontal cortex, and attention bias to angry faces in children and adolescents. *Biological Psychology*, *79*, 216–222. Journal Article. http://doi.org/10.1016/j.biopsycho.2008.05.004

Theeuwes, J., & Van der Stigchel, S. (2006). Faces capture attention: Evidence from inhibition of return. *Visual Cognition*, *13*, 657–665. JOUR. http://doi.org/10.1080/13506280500410949

Todd, R. M., Cunningham, W. A., Anderson, A. K., & Thompson, E. (2012). Affect-biased

attention as emotion regulation. *Trends in Cognitive Sciences*, *16*, 365–372. Journal Article. http://doi.org/10.1016/j.tics.2012.06.003

Triandis, H. C. (1995). *Individualism & collectivism.* BOOK, Westview Press.

Triandis, H. C., & Gelfand, M. J. (2012). A theory of individualism and collectivism. In *Handbook of Theories of Social Psychology* (Vol. 2, pp. 498–520). JOUR, Sage Los Angeles. http://doi.org/10.4135/9781446249222

Tsai, J. L. (2007). Ideal Affect: Cultural Causes and Behavioral Consequences. *Perspectives on Psychological Science*, *2*, 242–259. http://doi.org/10.1111/j.1745-6916.2007.00043.x

Turner, S. M., Beidel, D. C., & Larkin, K. T. (1986). Situational determinants of social anxiety in clinic and nonclinic samples: physiological and cognitive correlates. *Journal of Consulting and Clinical Psychology*, *54*, 523.

Turner, S. M., Beidel, D. C., & Townsley, R. M. (1992). Social phobia: A comparison of specific and generalized subtypes and avoidant personality disorder. *Journal of Abnormal Psychology*, *101*, 326–331. http://doi.org/10.1037/0021-843X.101.2.326

van Buuren, S., Brand, J. P. L., Groothuis-Oudshoorn, C. G. M., & Rubin, D. B. (2006). Fully conditional specification in multivariate imputation. *Journal of Statistical Computation and Simulation*, *76*, 1049–1064. http://doi.org/10.1080/10629360600810434

van Buuren, S., & Groothuis-Oudshoom, K. (2011). mice: Multivariate Imputation by Chained Equations in R. *Journal of Statistical Software*, *45*, 1–67.

Vandenberg, R. J., & Lance, C. E. (2000). A Review and Synthesis of the Measurement Invariance Literature: Suggestions, Practices, and Recommendations for Organizational Research. *Organizational Research Methods*, *3*, 4–70. JOUR.

http://doi.org/10.1177/109442810031002

Waters, A. M., Mogg, K., Bradley, B. P., & Pine, D. S. (2008). Attentional Bias for Emotional Faces in Children With Generalized Anxiety Disorder. *Journal of the American Academy of Child & Adolescent Psychiatry*, *47*, 435–442. Journal Article. http://doi.org/http://dx.doi.org/10.1097/CHI.0b013e3181642992

Watson, D., & Friend, R. (1969). Measurement of social-evaluative anxiety. *Journal of Consulting and Clinical Psychology*, *33*, 448–457. JOUR PMID - 5810590. http://doi.org/10.1037/h0027806

Watts, S. E., & Weems, C. F. (2006). Associations Among Selective Attention, Memory Bias, Cognitive Errors and Symptoms of Anxiety in Youth. *Journal of Abnormal Child Psychology*, *34*, 841–852. Web Page. http://doi.org/10.1007/s10802-006-9066-3

Way, B. M., & Lieberman, M. D. (2010). Is there a genetic contribution to cultural differences? Collectivism, individualism and genetic markers of social sensitivity. *Social Cognitive and Affective Neuroscience*, *5*, 203–11. JOUR. http://doi.org/10.1093/scan/nsq059

Williams, J. M. G., Mathews, A., & MacLeod, C. (1996). The emotional Stroop task and psychopathology. *Psychological Bulletin*, *120*, 3–24. Journal Article. http://doi.org/10.1037/0033-2909.120.1.3

Wittchen, H.-U. U., & Beloch, E. (1996). The impact of social phobia on quality of life. *International Clinical Psychopharmacology*, *11*, 15–23. Journal Article. http://doi.org/10.1097/00004850-199606003-00004

Wong, Q. J. J., & Rapee, R. M. (2016). The aetiology and maintenance of social anxiety disorder: A synthesis of complimentary theoretical models and formulation of a new

integrated model. *Journal of Affective Disorders*, *203*, 84–100. JOUR. http://doi.org/10.1016/j.jad.2016.05.069

Woody, S. R., Miao, S., & Kellman-McFarlane, K. (2015). Cultural Differences in Social Anxiety: A Meta-Analysis of Asian and European Heritage Samples. *Asian American Journal of Psychology*, *6*, 47–55. JOUR. http://doi.org/10.1037/a0036548

Xu, Y., Schneier, F., Heimberg, R. G., Princisvalle, K., Liebowitz, M. R., Wang, S., & Blanco, C. (2012). Gender differences in social anxiety disorder: results from the national epidemiologic sample on alcohol and related conditions. *Journal of Anxiety Disorders*, *26*, 12–19. http://doi.org/10.1016/j.janxdis.2011.08.006

Yoon, E., Chang, C.-T., Kim, S., Clawson, A., Cleary, S. E., Hansen, M., … Gomes, A. M. (2013). A meta-analysis of acculturation/enculturation and mental health. *Journal of Counseling Psychology*, *60*, 15–30. http://doi.org/10.1037/a0030652

Zheng, X., & Berry, J. W. (1991). Psychological Adaptation of Chinese Sojourners in Canada. *International Journal of Psychology*, *26*, 451–470. Journal Article. http://doi.org/10.1080/00207599108247134

Figure 1. Cognitive Behavioral Model of Social Anxiety Disorder. Reprinted from "A cognitive behavioral model of social anxiety disorder: Update and extension" by R. Heimberg, F. A. Brozovich, and R. Rapee, 2010, Social anxiety: Clinical, developmental, and social perspectives, 395-422. Copyright 2010 by Sage Publications.

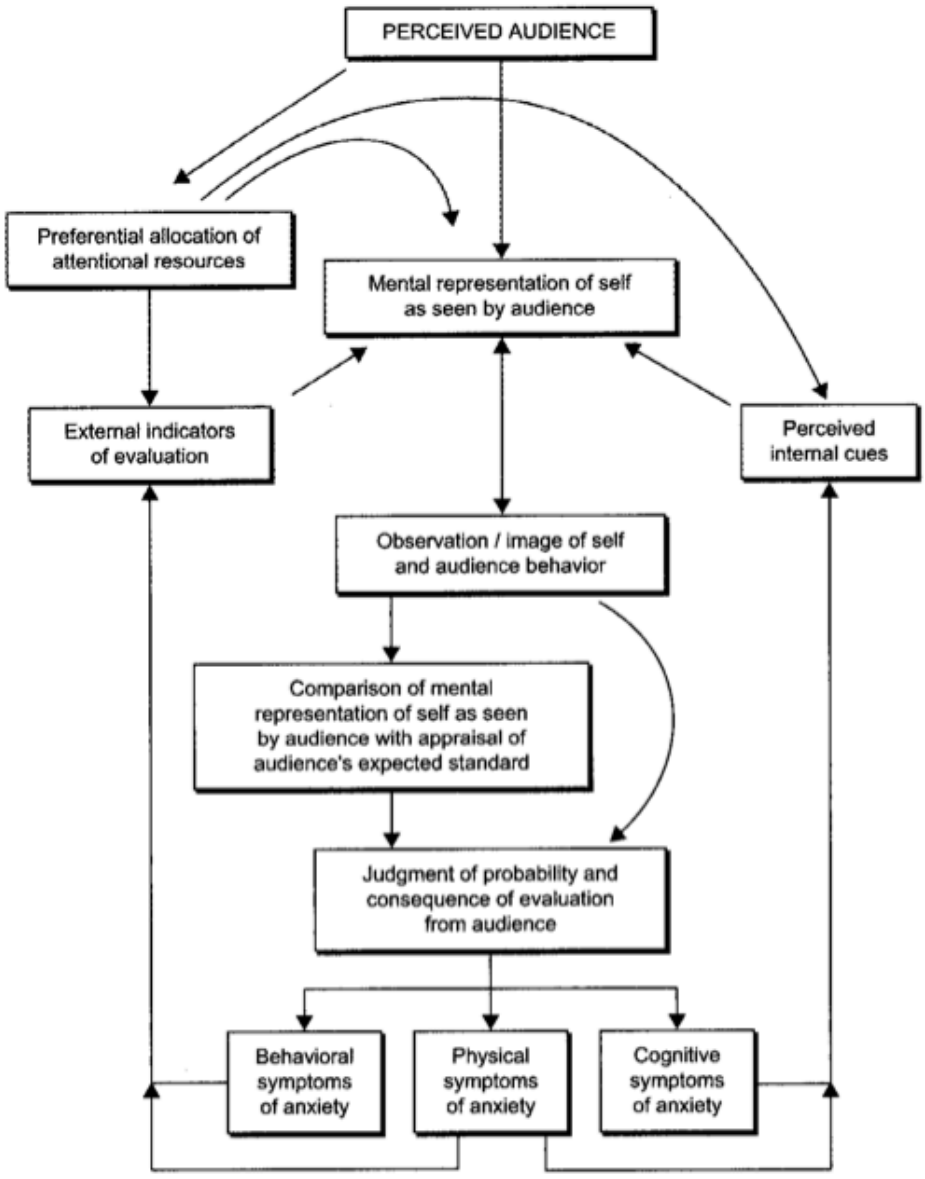


Figure 2. Model acceptable fit predicting distress from self-construal. Reprinted from "Cultural Model of Vulnerability to Distress: The Role of Self-Construal and Sociotropy on Anxiety and Depression Among Asian Americans and European Americans," by W. S. Mak, 2011, Journal of Cross-Cultural Psychology, 42 (1), 83. Copyright 2011 by Sage Publications.

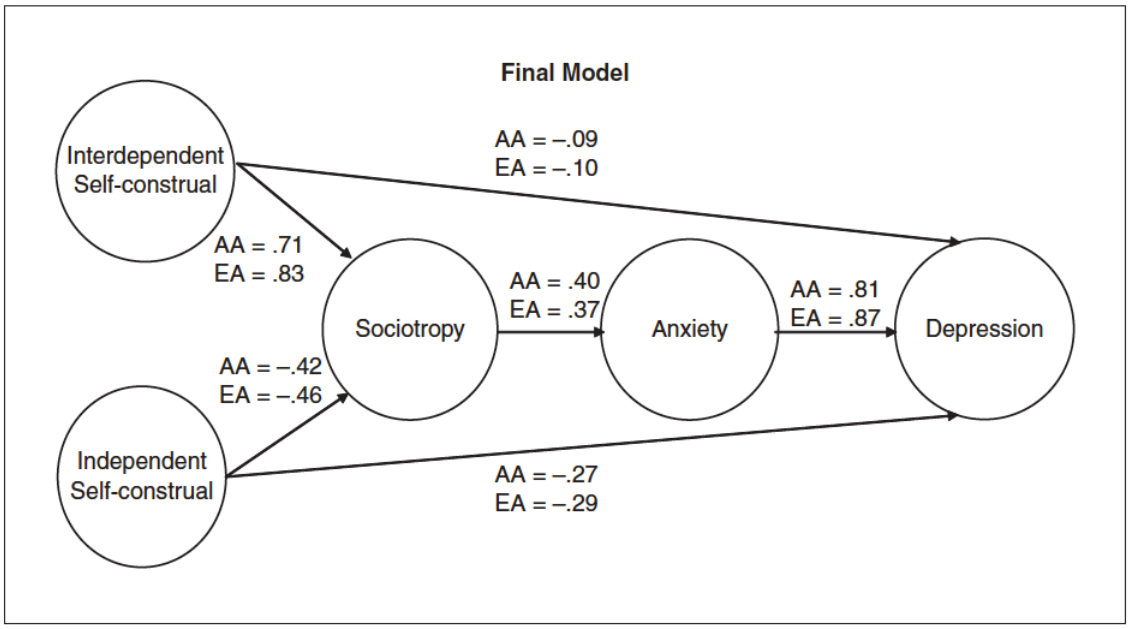


Figure 3. Conceptual model: Emotion suppression as a mediator in the relation between interdependent and independent self-construals and social anxiety. Reprinted from "Self-Construals and Social Anxiety Among Asian American College Students: Testing Emotion Suppression as a Mediator" by I. J. K. Park, C. Sulaiman, S. J. Schwartz, S. Y. Kim, L. S. Ham, B. L. Zamboanga, 2011, Asian American Journal of Psychology, 2 (1), 43. Copyright 2011 by American Psychological Association.

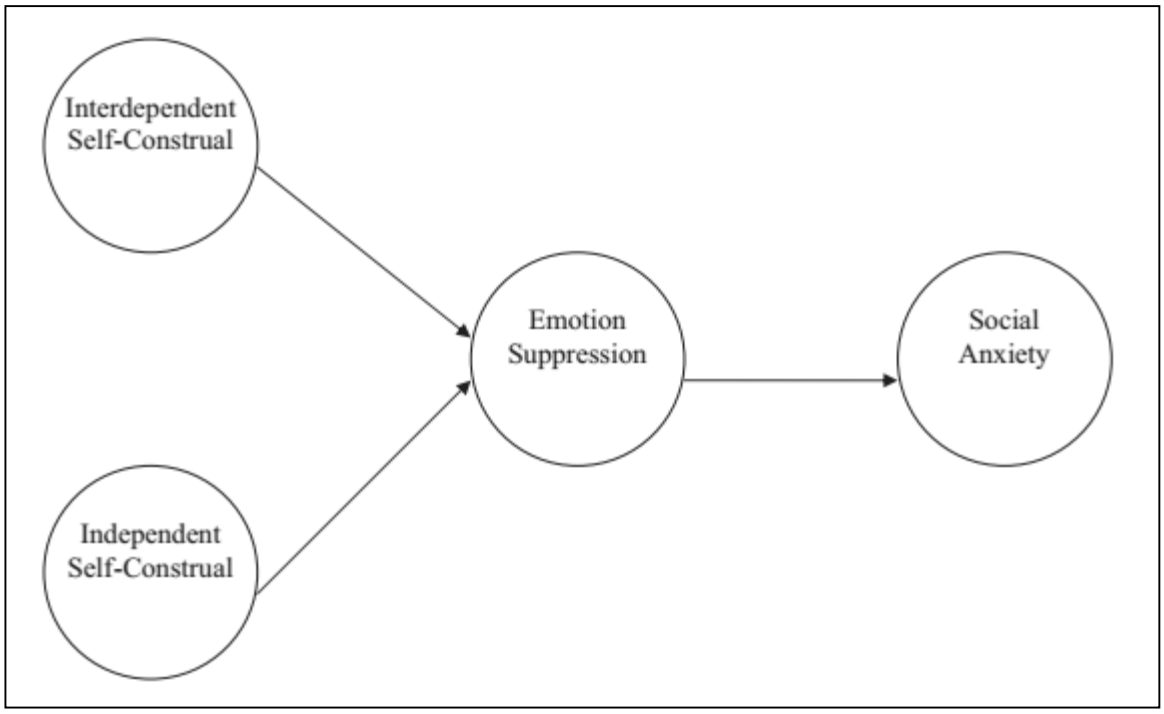


Figure 4. Summary of path analysis with multiple mediators of the association between ethnicity and social anxiety. Reprinted from "Explaining Elevated Social Anxiety Among Asian Americans: Emotional Attunement and a Cultural Double Bind" by A. S. Lau, J. Fung, S. Wang, S. Kang, 2009, Culture Diversity and Ethnic Minority Psychology, 15 (1), 83. Copyright 2009 by American Psychological Association.

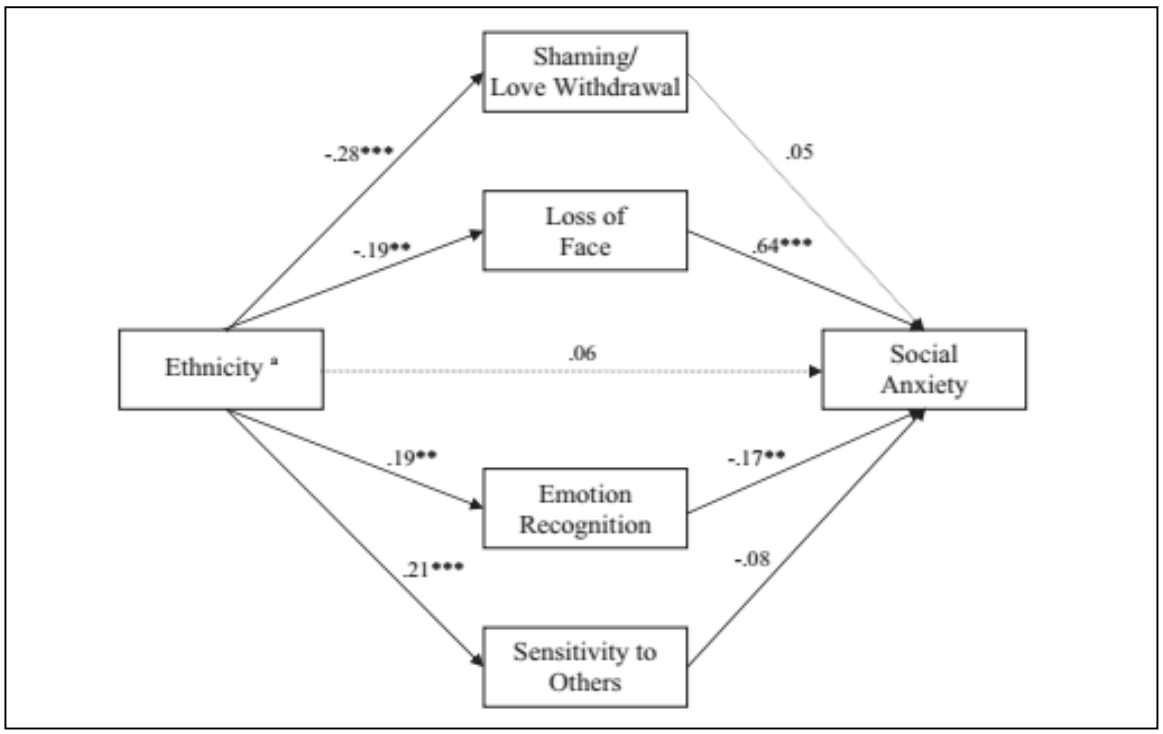


Figure 5. Depiction of Nisbett et al.'s (2001) theoretical model for cognitive differences across cultures.

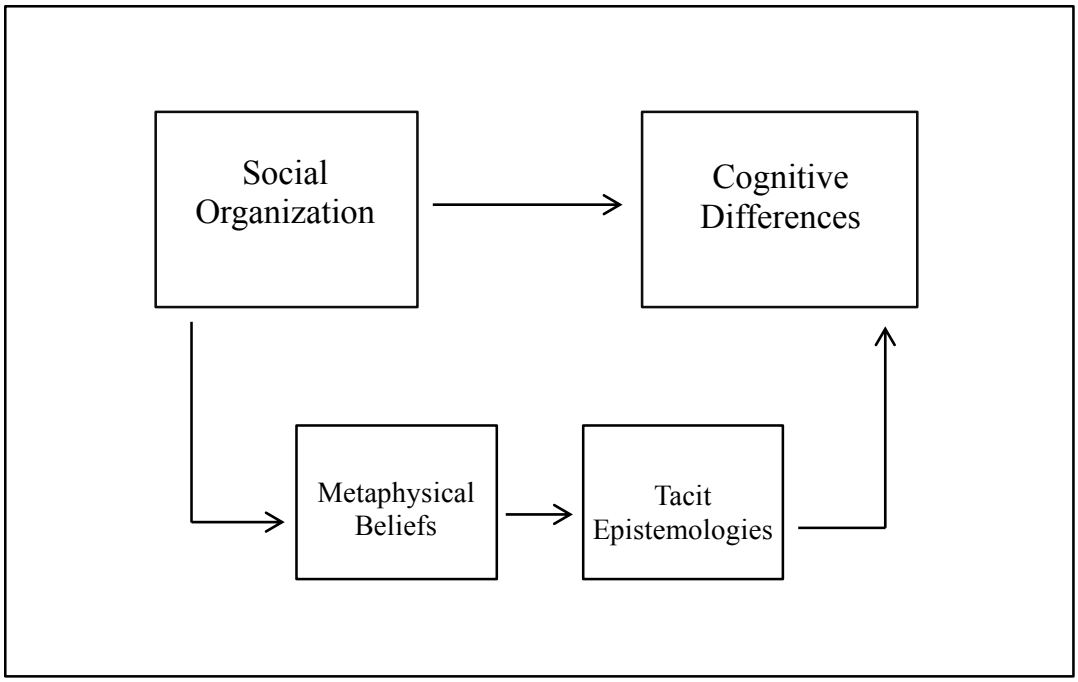


Figure 6. Model for Culturally-Tuned Attention in Explaining Cultural Group Differences in Social Anxiety

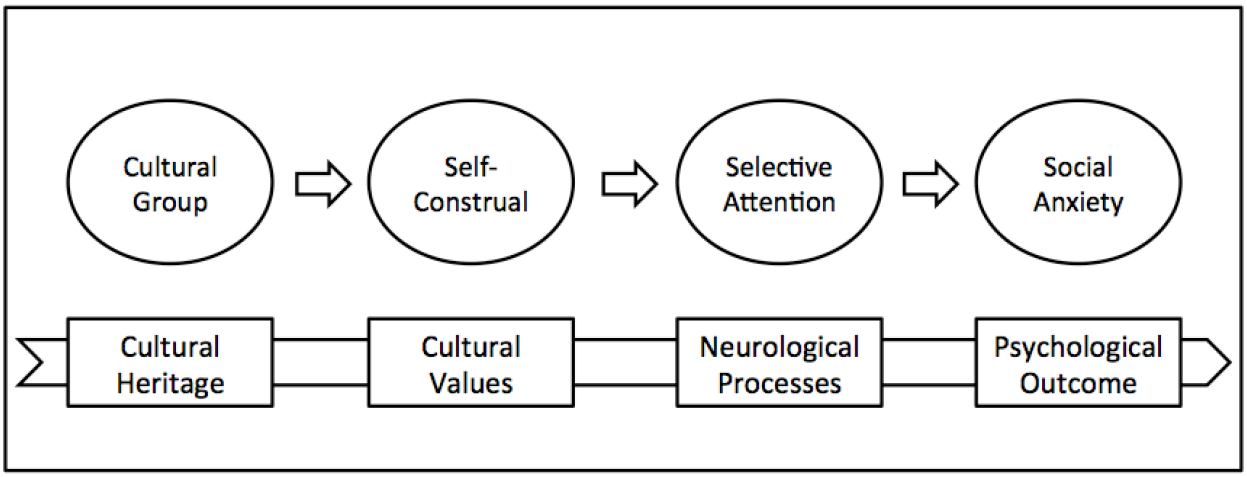


Figure 7. Flowchart of Study 2 procedures.

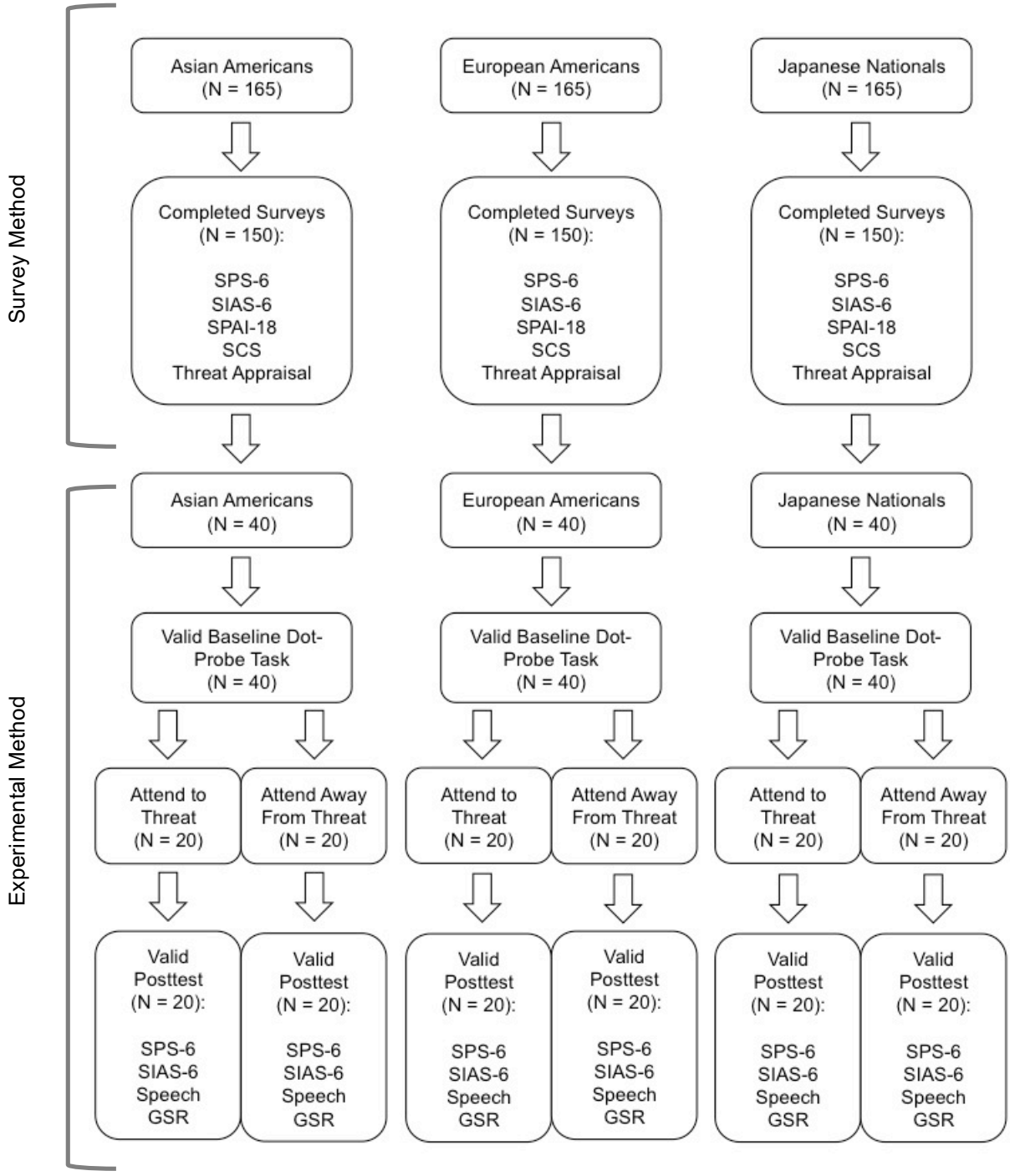
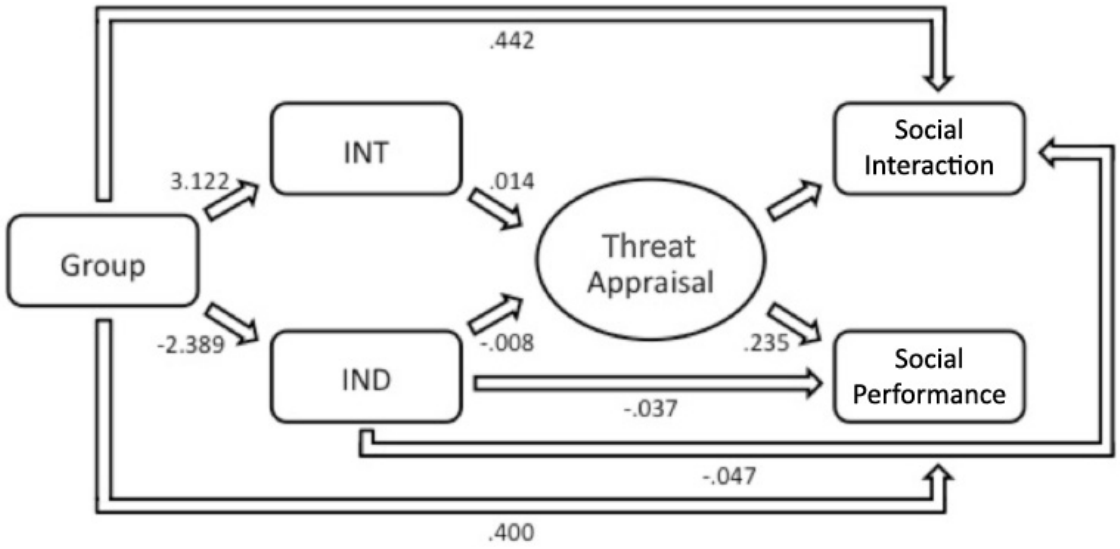
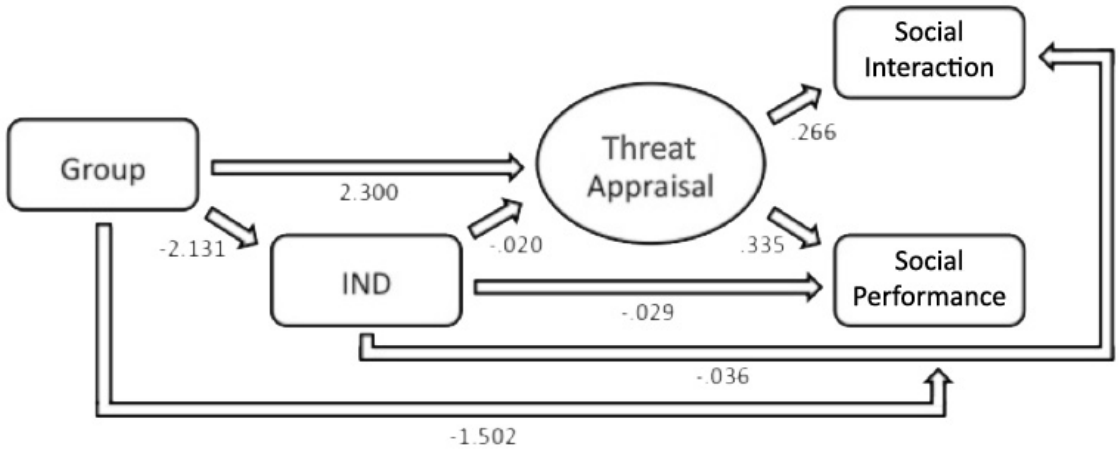


Figure 8. Study 1 Path Diagram for Asian American / European American Comparison.



Note: All values represent unstandardized path coefficients; all coefficients are statistically significant

Figure 9. Study 1 Path Diagram for Japanese Nationals / European American Comparison.



Note: All values represent unstandardized path coefficients; all coefficients are statistically significant

Table 1. Study 1 Demographics and Descriptive Statistics by Cultural Group.

Demographics						
	Asian Americans (*n* = 310)		European Americans (*n* = 249)		Japanese nationals (*n* = 212)	
Variable	*Mean* (%)	*SD*	*Mean* (%)	*SD*	*Mean* (%)	*SD*
Gender (Female)	78.57%	---	84.09%	---	54.72%	--
Age (in years)	20.08	3.11	21.14	5.01	20.89	2.23
Mother Education (in years)	14.61	2.55	15.46	1.99	14.70	1.78
Father Education (in years)	14.72	2.76	15.37	2.32	15.55	1.75
Descriptive Statistics						
	Asian Americans (*n* = 310)		European Americans (*n* = 249)		Japanese nationals (*n* = 212)	
Variable	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*
IND SC	66.92	9.59	69.31	10.94	67.17	9.70
INT SC	70.93	10.05	67.81	9.70	67.34	9.72
SPS-6	7.88	4.54	5.81	4.61	3.71	4.23
SIAS-6	8.07	4.24	6.01	4.15	9.42	5.25
Threat Appraisal	-.27	.83	-.39	.68	.99	.62

Note: EA = European American; AA = Asian American; NJ = Japanese nationals; IND SC = Independent Self-Construal; INT SC = Interdependent Self-Construal; SPS-6 = Social Phobia Scale-Six Item Version; SIAS-6 = Social Interaction Anxiety Scale-Six Item Version

All threat appraisal scores reflect a z-score distribution

Table 2. Study 2 Demographics and Descriptive Statistics by Cultural Group.

Demographics						
	Asian Americans (*n* = 42)		European Americans (*n* = 28)		Japanese nationals (*n* = 34)	
Variable	*Mean* (%)	*SD*	*Mean* (%)	*SD*	*Mean* (%)	*SD*
Gender (Female)	62.79%	---	64.29%	---	73.53%	--
Age (in years)	22.95	6.11	20.89	2.77	21.82	1.73
Mother Education (in years)	14.61	2.90	14.54	2.16	15.41	1.35
Father Education (in years)	14.95	2.59	14.72	2.24	15.82	1.42
Descriptive Statistics for Pretests						
	Asian Americans (*n* = 42)		European Americans (*n* = 28)		Japanese nationals (*n* = 34)	
Variable	*Mean*	*SD*	*Mean*	*SD*	Mean	*SD*
IND SC	67.90	6.70	64.09	11.72	71.67	8.61
INT SC	72.95	10.05	60.09	8.51	69.00	8.90
SPS-6	10.19	5.25	8.09	3.86	8.65	5.04
SIAS-6	9.57	4.26	7.72	3.31	14.79	4.39
Threat appraisal	-.29	.92	-.12	1.13	.36	.57
Threat Bias	1.01	.028	.979	.028	1.01	0.04
Study 2 Posttests						
	Asian Americans (*n* = 42)		European Americans (*n* = 28)		Japanese nationals (*n* = 34)	
Variable	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*
SPS-6	9.43	6.09	3.91	3.67	3.55	4.92
SIAS-6	9.24	5.60	4.82	3.84	8.56	4.92
Change in GSR	1.22	.32	1.18	.36	1.40	1.39

BASA Score	38.12	9.22	34.49	3.79	38.46	8.73

Note: EA = European American; AA = Asian American; NJ = Japanese nationals; IND SC = Independent Self-Construal; INT SC = Interdependent Self-Construal; SPS-6 = Social Phobia Scale-Six Item Version; SIAS-6 = Social Interaction Anxiety Scale-Six Item Version, GSR = Galvanized Skin Reactance, BASA = Behavioral Assessment of Speech Anxiety

All threat appraisal scores reflect a z-score distribution

Table 3. List of situations generated by Asian Americans, European Americans, and Japanese Nationals as well as the frequency by which they were resampled to the participants in Study 1.

ID	Situation	Group Made By	Administration Frequency
1	Going on a first date	Asian American	105
2	Talking to a romantic interest	Asian American	61
3	Farting loudly in public	Asian American	94
4	Not knowing what to talk about when meeting someone	Asian American	114
5	Talking to a professor	Asian American	84
6	Answering a question wrong in front of the class	Asian American	111
7	Answering a teacher's question	Asian American	120
8	Being stared at by everyone at the same time	Asian American	100
9	Being the oldest in the group and having to take charge	Asian American	85
10	Being the only one of your gender in a large group of the other gender	Asian American	66
11	Confronting your romantic partner	Asian American	61
12	Falling down in front of people	Asian American	80
13	Farting in public	Asian American	63
14	Giving a speech in front of an audience	Asian American	85
15	Interacting with an intimidating professor	Asian American	71
16	Performing in front of an audience	Asian American	77
17	Singing loudly in public	Asian American	72
18	Speaking before a large crowd	Asian American	82
19	Starting a conversation with someone you find interesting	Asian American	47
20	Talking to your boss	Asian American	59
21	Walking out of the bathroom with toilet paper stuck on your shoe	Asian American	69
22	Waving back to someone who was actually waving to someone else	Asian American	51
23	Accidentally giving a cashier the wrong amount of money	Asian American	62
24	Accidentally walking out of a store with something you did not pay for	Asian American	67
25	Answering a question because you thought your name was called	Asian American	57
26	Answering the wrong question in class	Asian American	54
27	Arguing at work	Asian American	52
28	Arguing with a stranger	Asian American	103
29	Arguing with family members	Asian American	97

30	Arguing with friends	Asian American	69
31	Arguing with multiple people	Asian American	44
32	Arguing with someone	Asian American	74
33	Arguing with your parents in public	Asian American	63
34	Arguing with your romantic partner in public	Asian American	52
35	Asking a professor a question in front of other students	Asian American	62
36	Asking a stranger for money	Asian American	56
37	Asking a stupid question in class	Asian American	88
38	Asking for a favor	Asian American	53
39	Asking my parent's permission to go out with friends	Asian American	35
40	Asking someone out on a date when you do not know their answer	Asian American	48
41	Asking someone to spend time together	Asian American	70
42	Asking your friends why they can't hang out	Asian American	54
43	Being "given attitude" in public	Asian American	59
44	Being a leader	Asian American	70
45	Being accused of cheating with someone's partner	Asian American	56
46	Being alone with a romantic interest	Asian American	50
47	Being amongst older peers	Asian American	31
48	Being approached by someone who is really attractive	Asian American	45
49	Being around a friend crying in public	Asian American	59
50	Being asked a personal question by a stranger	Asian American	51
51	Being asked for money by a stranger	Asian American	101
52	Being asked if you lied	Asian American	104
53	Being at a job interview	Asian American	53
54	Being at a mall	Asian American	71
55	Being at a sports game	Asian American	76
56	Being at school	Asian American	69
57	Being attracted to someone	Asian American	54
58	Being attracted to someone who is physically attractive	Asian American	56
59	Being attracted to someone, but unable to make the first move	Asian American	64
60	Being boo-ed after a performance	Asian American	68
61	Being bothered by a kiosk salesperson when you are walking by	Asian American	89
62	Being called in to an office without knowing if you are in trouble or not	Asian American	96
63	Being called names	Asian American	100

64	Being called out by your boss	Asian American	108
65	Being called to the dean's office	Asian American	76
66	Being criticized	Asian American	70
67	Being criticized by customers at your job	Asian American	60
68	Being criticized by someone in front of a crowd while receiving an award	Asian American	63
69	Being criticized by someone who is harsh and brutally honest	Asian American	77
70	Being criticized by your boss on your job performance	Asian American	92
71	Being criticized in public	Asian American	41
72	Being demanded to give up your money or valuables by someone who is bigger	Asian American	48
73	Being faced with an unwanted verbal altercation	Asian American	60
74	Being flirted with	Asian American	61
75	Being followed by a cop while driving	Asian American	57
76	Being given an ugly look by a stranger when you tried to be friendly	Asian American	28
77	Being given many tasks to finish soon	Asian American	28
78	Being handed a mic in karaoke	Asian American	67
79	Being in a business meeting	Asian American	41
80	Being in a festival	Asian American	34
81	Being in a group and having to take responsibility for others	Asian American	41
82	Being in a group where your friends know everyone, but you do not	Asian American	42
83	Being in a job meeting	Asian American	96
84	Being in a lecture hall	Asian American	52
85	Being in a parade	Asian American	52
86	Being in a police station	Asian American	53
87	Being in a public place	Asian American	59
88	Being in a restaurant when the waiter is taking your order	Asian American	64
89	Being in a restaurant when the waiter is trying to start a conversation with you	Asian American	45
90	Being in an elevator together with a potential love interest	Asian American	109
91	Being in class	Asian American	51
92	Being in front of the class	Asian American	58
93	Being in the same room as a group of people you do not like	Asian American	42
94	Being in the same room as someone you do not like	Asian American	40
95	Being introduced to a friend's friend	Asian American	74
96	Being introduced to mutual friends	Asian American	86

97	Being made fun of by everyone	Asian American	91
98	Being on a crowded bus	Asian American	96
99	Being on a judge's panel	Asian American	90
100	Being on an elevator	Asian American	53
101	Being put in charge of a project	Asian American	81
102	Being rejected as the group's leader	Asian American	61
103	Being reviewed at work	Asian American	91
104	Being scolded	Asian American	82
105	Being scolded by a teacher	Asian American	70
106	Being scolded by your parents in public	Asian American	81
107	Being scolded by your teacher	Asian American	66
108	Being scolded in front of people you know	Asian American	79
109	Being seen by everyone in public	Asian American	54
110	Being set up to do something in front of a crowd by a friend	Asian American	55
111	Being short changed when buying something	Asian American	70
112	Being short on vocabulary	Asian American	65
113	Being singled out for doing badly in a group performance	Asian American	88
114	Being singled out in class for doing something wrong	Asian American	91
115	Being spoken to by a pushy stranger	Asian American	108
116	Being spoken to by a stranger	Asian American	52
117	Being spoken to by a stranger when stuck on an elevator	Asian American	76
118	Being spoken to by a stranger when you do not want to speak to them	Asian American	98
119	Being spoken to by a stranger while waiting for the bus	Asian American	97
120	Being spoken to by an intimidating stranger	Asian American	100
121	Being talked about in a non-constructive way after your speech	Asian American	56
122	Being the only one in a group who doesn't know anyone	Asian American	84
123	Being the only one who doesn't understand the joke	Asian American	87
124	Being the only person on the scene of an accident	Asian American	61
125	Being told by your boss that you are fired in front of everyone	Asian American	72
126	Being told off in front of others for a minor offense	Asian American	33
127	Being told that you are not good at something	Asian American	68
128	Being told that you did a good job on something when you are worried about failing others in the future	Asian American	75
129	Being told that you do not have talent after you perform	Asian American	86
130	Being told that your pants had ripped	Asian American	63

131	Being told that your zipper is down	Asian American	117
132	Being too close to a stranger	Asian American	64
133	Being treated dismissively by a stranger	Asian American	63
134	Being unable to answer the question when you are called on	Asian American	87
135	Being unsure of what an authority is going to do	Asian American	75
136	Being used as the center of a joke and everyone laughs at you	Asian American	65
137	Being yelled at by a bully	Asian American	65
138	Being yelled at by an authority figure	Asian American	81
139	Being yelled at by parents	Asian American	86
140	Being yelled at by your boss for not accomplishing something on time	Asian American	66
141	Being yelled at by your parents	Asian American	83
142	Breaking terrible news to someone	Asian American	74
143	Cleaning up after your roommates when they do not clean up after themselves	Asian American	77
144	Confronting a close friend about a serious problem in a public place	Asian American	74
145	Confronting a romantic partner about something you did wrong and lied about	Asian American	47
146	Confronting random people	Asian American	76
147	Confronting someone about a lie they told	Asian American	48
148	Confronting someone about something that happened in the past	Asian American	49
149	Confronting someone in a crowded area	Asian American	59
150	Confronting someone in front of loved ones	Asian American	89
151	Confronting someone on the street	Asian American	75
152	Confronting someone who doesn't take it well	Asian American	114
153	Confronting someone who gets bad at you	Asian American	82
154	Confronting someone who has higher rank than you	Asian American	66
155	Confronting someone with an issue that you need help with	Asian American	62
156	Confronting your boss at work	Asian American	72
157	Confronting your friends	Asian American	102
158	Confronting your parents	Asian American	57
159	Confronting your parents about something you did wrong and lied about	Asian American	32
160	Confronting your teacher at school	Asian American	66
161	Creating a group for a class project in a class where you do not know anyone	Asian American	51
162	Criticizing a friend	Asian American	71

163	Criticizing someone with higher authority	Asian American	52
164	Crying in public	Asian American	51
165	Dancing in public	Asian American	49
166	Dining in a restaurant with other people	Asian American	42
167	Dining with unfamiliar people	Asian American	99
168	Directing all group members to perform correctly	Asian American	53
169	Disappointing older family members	Asian American	80
170	Doing a group project	Asian American	125
171	Doing schoolwork when you would rather do something else	Asian American	58
172	Doing something bad and wondering how it will affect your reputation	Asian American	107
173	Doing something that you thought was appropriate, but turns out it wasn't	Asian American	39
174	Doing something wrong that affects everyone	Asian American	76
175	Eating with your mouth open	Asian American	62
176	Embarrassing yourself in front of someone you find attractive	Asian American	56
177	Explaining to an officer what happened on the crime scene	Asian American	79
178	Explaining to your parents why something happened	Asian American	47
179	Failing to do something in front of the whole school	Asian American	94
180	Falling down in mud	Asian American	48
181	Falling down in public	Asian American	65
182	Farting loudly in church	Asian American	64
183	Farting loudly in class	Asian American	54
184	Flirting	Asian American	59
185	Forgetting someone's name a second after them telling it to you	Asian American	75
186	Forgetting to put on deodorant in hot weather	Asian American	96
187	Forming a group with classmates	Asian American	100
188	Getting a question wrong in class	Asian American	80
189	Getting hurt in public	Asian American	49
190	Getting people to gather around to see something	Asian American	83
191	Getting pranked in public	Asian American	67
192	Giving a presentation in front of a large crowd	Asian American	34
193	Giving a presentation in front of your class and forgetting all of the information	Asian American	67
194	Giving a presentation when not confident in what you are presenting	Asian American	41
195	Giving a speech in public	Asian American	102

196	Giving the cashier the wrong amount of money when buying something	Asian American	66
197	Going on a blind date with someone attractive	Asian American	53
198	Going on a tour with other groups	Asian American	73
199	Going out to dinner	Asian American	72
200	Going to a meeting	Asian American	28
201	Going to a movie theater	Asian American	94
202	Going to a new school	Asian American	36
203	Going to a party	Asian American	65
204	Going to a public place with a friend who is acting goofy	Asian American	38
205	Going to an interview	Asian American	48
206	Going to class	Asian American	70
207	Going to school	Asian American	58
208	Going to social events where you do not know anyone	Asian American	48
209	Going to the mall	Asian American	39
210	Having a stranger point out that there is something stuck in your teeth	Asian American	64
211	Having a stranger promote their cause to you in a forceful manner	Asian American	57
212	Having a teacher take away your phone during class	Asian American	59
213	Having an apartment manager interrupt your party	Asian American	74
214	Having an awkward conversation	Asian American	42
215	Having many people talk to you at one time	Asian American	91
216	Having my name shouted out by a friend	Asian American	53
217	Having no one generate ideas for a group project	Asian American	57
218	Having nobody follow your initiative	Asian American	66
219	Having someone talk bad about you to others in front of you	Asian American	80
220	Having someone tell you that your work is bad after they critique your paper	Asian American	66
221	Having someone use the bathroom stall next to me	Asian American	86
222	Having something that you worked on for a long time criticized by your friend	Asian American	64
223	Having to correct your professor because of a mistake s/he made on a problem	Asian American	33
224	Having to talk to a professor during office hours because you do not understand something	Asian American	66
225	Having too much eye-contact with a stranger	Asian American	62
226	Having your boss get mad at you about something	Asian American	71
227	Having your classwork criticized	Asian American	55

228	Having your followers doubt your leadership ability	Asian American	64
229	Having your mom embarrass you in front of your friends	Asian American	57
230	Having your name yelled by a friend in a group of people	Asian American	97
231	Having your opinions criticized in a debate	Asian American	66
232	Having your performance critiqued by a teacher in front of your peers	Asian American	75
233	Having your presentation criticized by an audience member	Asian American	39
234	Having your project reviewed by a peer	Asian American	70
235	Having your work criticized	Asian American	47
236	Hearing complicated vocabulary from an authority	Asian American	61
237	Hearing negative things spoken about you	Asian American	76
238	Hearing people say something about your outfit	Asian American	53
239	Hearing that you are not attractive	Asian American	44
240	Hearing your name followed by laughter	Asian American	92
241	Initiating a conversation in class where you do not know anyone	Asian American	76
242	Initiating a conversation with a stranger	Asian American	50
243	Interacting with a car salesman	Asian American	73
244	Interacting with a group of strangers that are members of a different ethnicity	Asian American	43
245	Interacting with a group of strangers that speak a foreign language that you do not speak	Asian American	61
246	Interacting with a romantic interest	Asian American	52
247	Interacting with a romantic interest at school	Asian American	83
248	Interacting with a romantic interest in front of others	Asian American	47
249	Interacting with angry people	Asian American	68
250	Interacting with annoying people	Asian American	55
251	Interacting with crazy religious people	Asian American	48
252	Interacting with mean people	Asian American	50
253	Interacting with overly-dressed people	Asian American	49
254	Interacting with people who have a mental illness	Asian American	64
255	Interacting with people who have low self-esteem	Asian American	49
256	Interacting with police officers	Asian American	46
257	Interacting with shy people	Asian American	79
258	Interacting with someone that uses difficult words	Asian American	63
259	Interacting with someone who has higher status than you	Asian American	58
260	Interacting with strange people	Asian American	54

261	Interacting with strangers in an unfamiliar place	Asian American	90
262	Interacting with superstitious people	Asian American	63
263	Interacting with the police	Asian American	53
264	Interacting with unsocial people	Asian American	88
265	Interacting with your boss at work	Asian American	54
266	Introducing yourself	Asian American	68
267	Joining in on class discussion	Asian American	71
268	Leading a group	Asian American	47
269	Leading a group activity	Asian American	102
270	Leading a group of strangers	Asian American	63
271	Leading a group that is a different ethnicity than you	Asian American	78
272	Leading timid group members	Asian American	51
273	Lying about something and being caught	Asian American	47
274	Making an announcement randomly in public	Asian American	75
275	Making an appointment with a professor	Asian American	51
276	Making loud noises in the bathroom when others are around	Asian American	65
277	Marching in a strike	Asian American	37
278	Meeting a public figure who you admire	Asian American	89
279	Meeting an authority figure for the first time	Asian American	64
280	Meeting new people at a group event	Asian American	96
281	Meeting someone in a party	Asian American	69
282	Meeting someone in class	Asian American	34
283	Meeting the current or former president of the US	Asian American	38
284	Messing up a speech in front of the class	Asian American	69
285	Needing help from a professor, but not knowing how to ask	Asian American	67
286	Not agreeing with a classmate	Asian American	48
287	Not being able to respond to something someone said to you while flirting	Asian American	41
288	Not knowing how someone will respond when you confront them	Asian American	72
289	Not knowing how to counter argue your opponent's points in a debate	Asian American	92
290	Not knowing what to say to a romantic interest	Asian American	45
291	Not making good eye-contact	Asian American	52
292	Not scolding your group members for not helping	Asian American	32
293	Not understanding what others are saying	Asian American	82
294	Noticing audience members smirking and making snide	Asian American	94

	comments while you are giving a presentation		
295	Noticing that a stranger is upset with you	Asian American	64
296	Ordering at a restaurant that has an unusual ordering procedure	Asian American	73
297	Participating in a debate	Asian American	74
298	Participating in a singing contest	Asian American	46
299	Participating in group work	Asian American	41
300	Partnering up with a stranger for a class	Asian American	109
301	Peer-editing for a research paper	Asian American	51
302	Performing a courageous act	Asian American	65
303	Preparing for a public speech	Asian American	51
304	Proposing to your romantic partner	Asian American	71
305	Realizing one day that there is a problem with your personal hygiene and it is too late to do anything about it	Asian American	48
306	Realizing that you didn't use correct grammar when emailing your professor	Asian American	70
307	Receiving bad service at a restaurant	Asian American	39
308	Receiving compliments from others	Asian American	55
309	Receiving criticism from a superior	Asian American	78
310	Receiving criticism from your elders	Asian American	87
311	Receiving criticism from your family	Asian American	36
312	Receiving criticism from your friends	Asian American	48
313	Receiving criticism from your parents	Asian American	63
314	Receiving criticism from your teachers	Asian American	104
315	Receiving non-constructive criticism	Asian American	53
316	Renewing your license in a crowded DMV	Asian American	76
317	Requesting a favor from someone who may be unwilling at first	Asian American	37
318	Saying something wrong	Asian American	67
319	Saying the wrong answer	Asian American	69
320	Seeing a bad review of a play that you acted in	Asian American	70
321	Seeing a bad review of the restaurant you work in	Asian American	104
322	Seeing a doctor	Asian American	60
323	Selecting group members for a group project	Asian American	47
324	Sending an email to the entire class when you were just trying to bring up and issue to just your lab mate	Asian American	80
325	Sharing ideas for a group project	Asian American	65
326	Shopping with unfamiliar people	Asian American	81

327	Sitting next to a stranger on an airplane	Asian American	48
328	Speaking in front of the class	Asian American	57
329	Speaking to someone you find attractive with a friend	Asian American	90
330	Spilling food in public	Asian American	55
331	Spilling food on yourself in public	Asian American	69
332	Standing up for what you believe	Asian American	21
333	Standing up for your friend to a stranger in front of others	Asian American	92
334	Standing up for yourself to a stranger in front of others	Asian American	51
335	Standing up to a bully	Asian American	53
336	Stepping or sitting on poop in public	Asian American	42
337	Stuttering while talking	Asian American	93
338	Suggesting something in a meeting	Asian American	55
339	Swearing at someone because you think it's someone you know, but it really isn't	Asian American	54
340	Taking charge amidst the chaos of an emergency	Asian American	73
341	Taking initiative in the classroom	Asian American	60
342	Talking about something private	Asian American	27
343	Talking on a blue tooth	Asian American	49
344	Talking to a celebrity	Asian American	42
345	Talking to a counselor	Asian American	63
346	Talking to a lawyer	Asian American	72
347	Talking to a pastor	Asian American	67
348	Talking to a romantic interest for the first time	Asian American	67
349	Talking to a teacher about why you got a bad grade	Asian American	40
350	Talking to new people	Asian American	56
351	Talking to someone new	Asian American	54
352	Talking to the dean	Asian American	64
353	Talking to your parents	Asian American	73
354	Talking while eating	Asian American	49
355	Talking with a stranger who is mean or judgmental	Asian American	72
356	Talking with intelligent classmates during class discussion	Asian American	40
357	Telling a group member that they are not doing as much work as they should be	Asian American	45
358	Telling a joke and nobody thinks it is funny	Asian American	77
359	Telling a peer to start pulling their weight in a project	Asian American	89
360	Telling someone to stop bothering someone else	Asian American	39

361	Telling someone to stop doing something you dislike	Asian American	46
362	Tripping and falling on someone	Asian American	53
363	Tripping in front of a large group	Asian American	59
364	Tripping in front of someone	Asian American	28
365	Tripping on the street	Asian American	72
366	Trying to confront someone without hurting them	Asian American	37
367	Trying to help someone	Asian American	51
368	Trying to start a conversation	Asian American	58
369	Trying to talk to a stranger who is purposely ignoring you	Asian American	74
370	Trying to talk to someone who doesn't want to talk to you	Asian American	42
371	Turning around awkwardly in public because you forgot where you were headed	Asian American	63
372	Voicing your opinion in a group project	Asian American	54
373	Volunteering to do something because no one else in the group wants to	Asian American	60
374	Waiting for an editor to critique your work	Asian American	73
375	Walking in public	Asian American	48
376	Walking into a classroom full of strangers	Asian American	76
377	Walking into the wrong bathroom	Asian American	112
378	Wanting to ask your professor a question, but not wanting to sound stupid	Asian American	102
379	Waving at someone you thought you knew	Asian American	72
380	Wearing different clothes than everyone around you	Asian American	60
381	Wearing flashy clothing	Asian American	87
382	Working at a restaurant	Asian American	65
383	Yelling at the top of your lungs when people pass by	Asian American	42
384	Going on a first date	European American	76
385	Being pulled over by the police	European American	166
386	Being stared at by everyone at the same time	European American	52
387	Arguing with a romantic partner	European American	89
388	Asking a stranger for directions	European American	79
389	Being on the bus	European American	58
390	Arguing with a stranger	European American	74
391	Asking a stupid question in class	European American	76
392	Being asked a personal question	European American	64
393	Being yelled at in front of people	European American	113
394	Doing something that is so embarrassing it is not easily	European American	70

	forgotten		
395	Falling down in public	European American	79
396	Interacting with strangers at a party	European American	84
397	Accidentally taking someone else's coffee	European American	106
398	Admitting a fault	European American	84
399	Admitting a mistake	European American	90
400	Answering a question in class	European American	41
401	Answering the wrong question in class	European American	62
402	Approaching a stranger	European American	85
403	Approaching someone to tell them something	European American	122
404	Arguing with family	European American	132
405	Arguing with friends	European American	78
406	Arguing with your romantic partner in public	European American	94
407	Asking for a favor	European American	75
408	Asking for a favor from your supervisor	European American	95
409	Asking for advice from your supervisor	European American	114
410	Asking permission for something when you do not know what the answer will be	European American	87
411	Asking someone for help because you lost something	European American	104
412	Asking someone you've never met to be your partner in class	European American	77
413	Asking strangers if you and your friend could sit at the two empty places at their table	European American	132
414	Being accused for lacking forethought	European American	89
415	Being accused of being immodest	European American	91
416	Being afraid of hurting someone's feelings	European American	100
417	Being alone with other people	European American	66
418	Being around authority figures	European American	110
419	Being asked a question that you do not know the answer to	European American	90
420	Being asked for money by a stranger	European American	92
421	Being asked on a date by someone you do not like	European American	126
422	Being asked questions by the police	European American	97
423	Being asked questions by your parents	European American	66
424	Being asked questions on a topic that you are unfamiliar with	European American	79
425	Being asked questions that you do not know the answer to	European American	85
426	Being at a farmer's market	European American	112
427	Being at a job interview	European American	81

428	Being at school	European American	72
429	Being at school orientation	European American	135
430	Being at work with a co-worker	European American	111
431	Being at work with a superior	European American	50
432	Being attracted to someone who is physically attractive	European American	107
433	Being blamed for something you did not do	European American	80
434	Being blatantly told that you are ugly	European American	119
435	Being called by your manager	European American	114
436	Being called names	European American	80
437	Being called on in class when you do not know the answer to the question	European American	70
438	Being called on to give an answer in class	European American	99
439	Being called out for something in front of a group that thinks highly of you	European American	111
440	Being caught illegally parking	European American	112
441	Being caught speeding	European American	82
442	Being confronted by someone who heard you gossiping about them	European American	96
443	Being confronted by someone who heard you say something negative about them	European American	80
444	Being confronted by someone who is unpredictable	European American	93
445	Being confronted in front of others for a poor job you did on a task	European American	89
446	Being confronted in front of people	European American	97
447	Being criticized by a stranger	European American	72
448	Being criticized by someone who is close to you	European American	79
449	Being criticized by someone you respect	European American	77
450	Being criticized by your family	European American	56
451	Being criticized for something you worked hard on	European American	101
452	Being criticized in a new workplace	European American	89
453	Being criticized mean-spiritedly	European American	142
454	Being criticized on how you do things	European American	85
455	Being criticized on the job	European American	55
456	Being criticized while on the spotlight	European American	79
457	Being graded	European American	51
458	Being hit on by a random stranger	European American	101
459	Being hurt by a friend and not knowing how to bring it up	European American	88
460	Being hurt by family and not knowing how to bring up the	European American	91

	situation		
461	Being in a coffee shop	European American	104
462	Being in a group of strangers	European American	97
463	Being in a new environment with someone you have a crush on	European American	95
464	Being in a police station	European American	81
465	Being in a situation you cannot control	European American	93
466	Being in charge of a group for a class project	European American	78
467	Being in class and working with a romantic interest as partners	European American	59
468	Being in front of large crowds	European American	92
469	Being in trouble for being late to work	European American	146
470	Being in trouble with a professor	European American	72
471	Being introduced to someone you haven't met	European American	60
472	Being judged romantically	European American	70
473	Being lab partners with a romantic interest	European American	76
474	Being looked at by a stranger	European American	63
475	Being looked down upon	European American	85
476	Being made fun of	European American	90
477	Being mentioned in the local paper	European American	94
478	Being noticed in public for your appearance	European American	126
479	Being observed in a classroom	European American	122
480	Being observed while on public transportation	European American	81
481	Being pulled aside after class by a teacher	European American	66
482	Being put on the "big screen" at a sports game	European American	92
483	Being scolded by a teacher	European American	95
484	Being scolded by your boss	European American	73
485	Being spoken to by a stranger	European American	86
486	Being star struck by a famous person	European American	86
487	Being stared at when arguing with someone	European American	54
488	Being the center of attention in public	European American	50
489	Being told that what you are doing is wrong	European American	99
490	Being told that you didn't do something right	European American	77
491	Being told to try harder	European American	63
492	Being unaware that there is a guest in your home	European American	99
493	Being uninformed of a situation	European American	116
494	Being unsure of the clothes you are wearing	European American	62

495	Being unsure of what to say to your interest's family	European American	102
496	Being wary of being approached romantically	European American	92
497	Being with a boss/colleague	European American	90
498	Being with a stranger	European American	66
499	Being yelled at	European American	72
500	Bringing forth ideas that may be rejected	European American	77
501	Bringing up a controversial topic	European American	112
502	Bumping into someone in a doorway	European American	99
503	Buying an embarrassing item at a store	European American	88
504	Calling out members in your group for not working	European American	99
505	Calling someone on the phone	European American	90
506	Causing an inconvenience for others when dealing with authority	European American	84
507	Competing for the same person's affection as someone else is	European American	137
508	Confessing your love to someone and finding that they do not feel the same	European American	72
509	Confronting a friend after an argument	European American	100
510	Confronting someone that they cut in line and need to go to the end	European American	97
511	Confronting someone who's obviously having a tough day	European American	89
512	Confronting your boss on something you disagree with	European American	100
513	Contacting people for a job	European American	135
514	Controlling a group project	European American	134
515	Crying in public	European American	126
516	Debating whether to say hi to someone you just met	European American	81
517	Deciding to shake hands or not	European American	89
518	Describing a medical condition that you suffer from	European American	84
519	Discussing the future with your romantic partner	European American	66
520	Doing a group project with people you don't know	European American	111
521	Doing something by yourself that you normally wouldn't do	European American	47
522	Doing something embarrassing in public	European American	87
523	Doing something that you are uncomfortable with	European American	95
524	Doing something weird in front of people you do know	European American	77
525	Doing something you are not supposed to do	European American	112
526	Drawing attention to yourself in class in order to impress the teacher	European American	62
527	Drawing unnecessary attention to yourself	European American	63

528	Dropping all of your things	European American	80
529	Eating alone in front of others	European American	108
530	Exchanging phone numbers with a romantic interest	European American	75
531	Explaining why you failed to complete something that everyone else has done	European American	91
532	Failing a performance	European American	98
533	Failing to grasp a concept in class	European American	108
534	Falling down in class	European American	104
535	Falling down on the street	European American	95
536	Falling in front of people	European American	77
537	Farting in class	European American	75
538	Flirting	European American	74
539	Forgetting words to a speech	European American	59
540	Freezing up when talking to someone	European American	94
541	Getting hit on randomly	European American	94
542	Getting in an argument	European American	73
543	Getting ready to go on a date with your crush	European American	132
544	Giving a presentation when not confident in what you are presenting	European American	115
545	Giving a presentation when not confident in yourself	European American	52
546	Giving a speech in class	European American	78
547	Giving a speech to coworkers	European American	95
548	Giving out orders	European American	63
549	Going to a concert	European American	144
550	Going to a new school	European American	74
551	Going to physical education class	European American	52
552	Going to your first day at a new job	European American	56
553	Having a lie you told be uncovered	European American	73
554	Having a lot of pressure to be good at something	European American	85
555	Having a teacher praise you in front of the class	European American	125
556	Having a teacher say that they are disappointed in you	European American	86
557	Having a teacher tell you that you gave the wrong answer	European American	90
558	Having a teacher tell you what you could have done better on a speech	European American	57
559	Having an awkward conversation	European American	68
560	Having everyone's attention on you	European American	85
561	Having lunch with someone new	European American	72

562	Having one of your flaws pointed out while in a large group of people	European American	99
563	Having someone ask to speak with you when calling on a telephone	European American	78
564	Having someone confront you for saying something that they thought was about them	European American	88
565	Having someone open the bathroom stall door	European American	93
566	Having someone walk in while you are in an intimate position	European American	73
567	Having something of yours put down by someone	European American	53
568	Having stuff on your face	European American	111
569	Having the answer to the question, but not saying it	European American	72
570	Having to ask a sales associate for help	European American	82
571	Having to provide crucial information for firemen	European American	55
572	Having your boss tell you that you are terrible at your job	European American	49
573	Having your contributions disregarded and disvalued	European American	66
574	Having your eccentricities exposed	European American	68
575	Having your flaws made apparent	European American	64
576	Having your friends criticize you for your body	European American	77
577	Having your friends criticize you for your car	European American	75
578	Having your friends criticize you for your clothes	European American	126
579	Having your friends criticize you for your family	European American	126
580	Having your friends criticize you for your grades	European American	65
581	Having your friends criticize you for your looks	European American	87
582	Having your friends criticize you for your neighborhood	European American	96
583	Having your friends criticize you for your other friends	European American	71
584	Having your friends criticize you for your romantic partner	European American	136
585	Having your friends tell you what to do	European American	92
586	Having your idea ignored by someone	European American	66
587	Having your mistakes pointed out	European American	83
588	Having your parents not agree with what you are doing	European American	60
589	Having your performance reviewed	European American	88
590	Having your romantic interest ride in the car with you	European American	84
591	Having your stomach growl in a quiet classroom	European American	83
592	Hearing rumors going on behind your back	European American	106
593	Hearing someone say something bad about something you like	European American	102
594	Hearing that a friend told your romantic interest that you like them	European American	86

595	Interacting with a stranger	European American	88
596	Interacting with a stranger that is very different than you	European American	81
597	Interacting with a stranger who is acting oddly	European American	78
598	Interacting with authority	European American	88
599	Interacting with someone at a coffee shop	European American	78
600	Interacting with someone in authority	European American	103
601	Interacting with strangers at a barber shop	European American	117
602	Interacting with strangers at a school	European American	75
603	Interacting with strangers at a store	European American	124
604	Interacting with strangers at work	European American	97
605	Interacting with strangers on an elevator	European American	113
606	Interacting with strangers on the bus	European American	101
607	Interacting with the police	European American	45
608	Leading a class discussion	European American	83
609	Leading a group	European American	76
610	Leaving a situation because you are so embarrassed	European American	74
611	Making a mistake after summoning the courage to speak	European American	78
612	Making new friends	European American	50
613	Meeting a group of people	European American	123
614	Meeting a romantic interest for the first time	European American	64
615	Meeting a romantic partner's parents for the first time	European American	109
616	Meeting your romantic interest's family	European American	84
617	Misreading romantic signals	European American	97
618	Missing calls from your parents	European American	85
619	Not agreeing with a friend	European American	55
620	Not agreeing with a parent	European American	88
621	Not being able to say the right thing	European American	76
622	Not being good at confrontation	European American	52
623	Not doing what you were supposed to do	European American	87
624	Not knowing the answer to a question asked about your topic while presenting	European American	77
625	Not knowing what is going to happen	European American	53
626	Not knowing what to do when hanging out	European American	90
627	Not knowing what to say to a romantic interest	European American	77
628	Not knowing why you have been called in to the office	European American	76
629	Not sharing the same interest as everyone else in the group	European American	68

630	Noticing someone feeling uncomfortable and not knowing how to help them	European American	84
631	Noticing someone interesting and wanting to talk to them	European American	80
632	Presenting your research	European American	66
633	Presenting your research to an expert in the field	European American	90
634	Pronouncing something wrong in front of people	European American	48
635	Realizing that your work was not as good as it should have been	European American	83
636	Receiving criticism for the project you put out	European American	69
637	Receiving harsh criticism about something you are sensitive about	European American	99
638	Remembering a mistake you made in a social situation	European American	80
639	Saying hello to someone	European American	82
640	Saying something really loud in a room full of people	European American	85
641	Saying the wrong answer	European American	113
642	Sharing personal information with a romantic interest	European American	91
643	Showing people your artwork	European American	43
644	Sitting by a romantic interest	European American	110
645	Sitting down at a stranger's table	European American	81
646	Sitting in a group waiting for someone to take charge	European American	80
647	Speaking before a large crowd	European American	64
648	Speaking in class	European American	56
649	Spilling food in public	European American	99
650	Spilling food on the floor while walking to a table	European American	55
651	Spilling milk in the cafeteria	European American	69
652	Spilling your coffee	European American	57
653	Standing out above everyone else	European American	117
654	Taking charge of a lab project because your partner will not	European American	67
655	Taking initiative on something that you are unfamiliar with	European American	65
656	Talking about something sensitive with a stranger	European American	85
657	Talking at a party	European American	48
658	Talking in front of the class	European American	70
659	Talking to new people	European American	59
660	Talking to someone new	European American	70
661	Talking to someone who is in a higher position	European American	95
662	Talking to someone who is more intelligent	European American	96
663	Telling someone that their zipper is down	European American	65

664	Telling someone that they have food on their face	European American	77
665	Thinking you know the right way to do something and then screwing it up	European American	57
666	Training someone at work	European American	89
667	Tripping in front of a large group	European American	107
668	Tripping in front of someone	European American	74
669	Tripping on the stairs	European American	29
670	Trying something new	European American	44
671	Trying something new for the first time	European American	92
672	Trying to call someone out when seeing them engage in problematic activities	European American	71
673	Trying to make a good impression	European American	37
674	Unwittingly drawing attention to a sensitive topic	European American	70
675	Walking down the street	European American	81
676	Walking into the wrong bathroom	European American	67
677	Waving back to someone who was actually waving to someone else	European American	83
678	Wearing something ugly in public	European American	55
679	Working in a group project at school	European American	86
680	Working on a team	European American	59
681	Failing in doing something	Japanese Nationals	134
682	Being alone with a romantic interest	Japanese Nationals	73
683	Being in a conversation that dies down	Japanese Nationals	108
684	Being looked down upon	Japanese Nationals	103
685	Being the center of attention	Japanese Nationals	64
686	Being unable to maintain a conversation	Japanese Nationals	64
687	Doing something that has never been done before	Japanese Nationals	69
688	Taking initiative when no one supports me	Japanese Nationals	43
689	Accidently giving someone a bad impression about the places or people that I cherish	Japanese Nationals	73
690	Accidently hurting someone in conversation	Japanese Nationals	78
691	Accidently setting off an alarm	Japanese Nationals	52
692	Acting in a way that delivers the wrong message	Japanese Nationals	68
693	Answering a question in class	Japanese Nationals	59
694	Apologizing and making excuses when I was late to the appointment	Japanese Nationals	69
695	Asking a friend not to use a word that someone else is sensitive to	Japanese Nationals	92

696	Asking a stranger to take a group picture for you and your friends	Japanese Nationals	71
697	Asking for directions	Japanese Nationals	73
698	Asking someone to stand on the right side of the escalator	Japanese Nationals	98
699	Asserting my opinion	Japanese Nationals	65
700	Becoming a leader of the classroom	Japanese Nationals	108
701	Becoming aware of your own behavior	Japanese Nationals	88
702	Beginning a new semester	Japanese Nationals	88
703	Behaving after receiving criticism on my behavior	Japanese Nationals	61
704	Behaving very differently from others	Japanese Nationals	69
705	Being a leader	Japanese Nationals	59
706	Being a MC at a party	Japanese Nationals	43
707	Being about to be defeated in an argument	Japanese Nationals	67
708	Being accused by others unreasonably	Japanese Nationals	87
709	Being around a stranger who is acting strange	Japanese Nationals	40
710	Being around authority figures	Japanese Nationals	84
711	Being around someone who is superior than me in a team	Japanese Nationals	54
712	Being asked a personal question by a stranger	Japanese Nationals	86
713	Being asked for directions	Japanese Nationals	125
714	Being asked for directions by a tourist	Japanese Nationals	41
715	Being asked for directions when you are sightseeing	Japanese Nationals	108
716	Being asked for your opinion suddenly in class	Japanese Nationals	80
717	Being asked if I am having a good time	Japanese Nationals	61
718	Being asked to respond to an unreasonable request	Japanese Nationals	80
719	Being at a train/bus station	Japanese Nationals	96
720	Being bullied	Japanese Nationals	72
721	Being criticized at work	Japanese Nationals	80
722	Being criticized by a stranger	Japanese Nationals	80
723	Being criticized by many people	Japanese Nationals	90
724	Being criticized by opponents	Japanese Nationals	111
725	Being criticized by your friends	Japanese Nationals	94
726	Being criticized by your parents	Japanese Nationals	71
727	Being criticized without suggestions for improvement	Japanese Nationals	49
728	Being defeated in an argument	Japanese Nationals	74
729	Being evaluated by someone in authority	Japanese Nationals	72
730	Being expected to perform well as a leader	Japanese Nationals	86

731	Being given an empty compliment by a romantic interest	Japanese Nationals	62
732	Being hated by an authority figure	Japanese Nationals	130
733	Being hated by someone	Japanese Nationals	105
734	Being hated by someone one-way	Japanese Nationals	90
735	Being ignored after confronting someone about something	Japanese Nationals	67
736	Being in a national assembly	Japanese Nationals	113
737	Being in an elevator alone with an authority figure	Japanese Nationals	112
738	Being in charge of a group	Japanese Nationals	63
739	Being in front of others	Japanese Nationals	94
740	Being interested in someone but unconfident about myself	Japanese Nationals	59
741	Being late to an important meeting	Japanese Nationals	96
742	Being laughed at because of my failure	Japanese Nationals	118
743	Being looked at by other people	Japanese Nationals	87
744	Being made fun of by someone in authority	Japanese Nationals	98
745	Being made to carry all of the responsibility	Japanese Nationals	45
746	Being misunderstood by someone	Japanese Nationals	98
747	Being near a stranger who is acting strange or suspicious	Japanese Nationals	95
748	Being overconfident about your knowledge of something	Japanese Nationals	60
749	Being pointed out in front of people	Japanese Nationals	75
750	Being rejected because of your personality	Japanese Nationals	68
751	Being reprimanded by your boss for poor quality work	Japanese Nationals	72
752	Being rude to others	Japanese Nationals	76
753	Being sarcastic	Japanese Nationals	85
754	Being scolded	Japanese Nationals	79
755	Being scolded by a superior	Japanese Nationals	78
756	Being successful in class or in sports	Japanese Nationals	61
757	Being surrounded by people giggling at you	Japanese Nationals	91
758	Being the first or the last person in an activity	Japanese Nationals	85
759	Being the one who has to make the action	Japanese Nationals	80
760	Being the only one that says something when a coworker does something wrong	Japanese Nationals	70
761	Being the only one with a different opinion	Japanese Nationals	51
762	Being too physically close to a stranger	Japanese Nationals	48
763	Being unable to communicate in my second language	Japanese Nationals	105
764	Being unable to find someone to help me with my initiative	Japanese Nationals	97
765	Being unable to follow the flow of the conversation	Japanese Nationals	86

766	Being unable to foresee what would happen next	Japanese Nationals	92
767	Being unable to make someone laugh	Japanese Nationals	115
768	Being unable to reach an agreement despite your efforts to reconcile	Japanese Nationals	127
769	Being unable to see someone's face or reaction when talking over the phone	Japanese Nationals	77
770	Being unable to tell what a person is thinking	Japanese Nationals	64
771	Being uncertain if the relationship will last in the future	Japanese Nationals	64
772	Being under the authority of someone who is strict	Japanese Nationals	82
773	Being unsure if I was right	Japanese Nationals	49
774	Being unsure if people are doing something because they want to or out of obligation	Japanese Nationals	63
775	Being unsure if your romantic interest likes you	Japanese Nationals	85
776	Being with someone who doesn't like me	Japanese Nationals	90
777	Being with someone who talks too loudly	Japanese Nationals	95
778	Causing trouble to others	Japanese Nationals	55
779	Coming off as rude	Japanese Nationals	104
780	Coming off as rude or insensitive to someone	Japanese Nationals	76
781	Dealing with someone whose authority status is unknown	Japanese Nationals	69
782	Deciding what you are supposed to do/should do at that moment	Japanese Nationals	87
783	Deciding whether or not to start a conversation with someone you do not know	Japanese Nationals	45
784	Dissolving someone's misunderstanding	Japanese Nationals	37
785	Doing a project where many other people's promotion is at stake	Japanese Nationals	63
786	Doing business	Japanese Nationals	85
787	Doing something embarrassing in public	Japanese Nationals	80
788	Doing something in front of others	Japanese Nationals	79
789	Doing something that you are not confident in	Japanese Nationals	102
790	Doing something you have never tried/done before	Japanese Nationals	97
791	During meeting	Japanese Nationals	96
792	Eating meals	Japanese Nationals	105
793	Entering a crowd by yourself	Japanese Nationals	63
794	Explaining things that you are not an expert on	Japanese Nationals	79
795	Failing as a result of taking initiative	Japanese Nationals	137
796	Failing in front of a subordinate	Japanese Nationals	68
797	Failing in front of people	Japanese Nationals	61

798	Failing in front of someone who is evaluating you	Japanese Nationals	90
799	Failing to make an action	Japanese Nationals	103
800	Falling down in front of people	Japanese Nationals	105
801	Finding another person attractive	Japanese Nationals	110
802	Forgetting someone's name or failing to recognize their face and coming off as rude	Japanese Nationals	43
803	Forgetting your homework	Japanese Nationals	82
804	Getting attention from someone that you don't get along with	Japanese Nationals	78
805	Getting attention including scornful laughter	Japanese Nationals	86
806	Getting involved in some sort of incident	Japanese Nationals	97
807	Giving a class presentation	Japanese Nationals	47
808	Giving a presentation in front of people	Japanese Nationals	74
809	Giving a speech in front of an audience	Japanese Nationals	60
810	Giving up a seat in a bus or train to an older person or a pregnant woman	Japanese Nationals	105
811	Going against opponents	Japanese Nationals	55
812	Going on the loose in public	Japanese Nationals	81
813	Going out on a date	Japanese Nationals	83
814	Going out with a romantic interest	Japanese Nationals	87
815	Going out with friends	Japanese Nationals	103
816	Going outside with mismatching clothing or shoes	Japanese Nationals	81
817	Going to eat out alone with a superior	Japanese Nationals	90
818	Going too far in an argument with someone	Japanese Nationals	56
819	Greeting someone for the first time	Japanese Nationals	68
820	Having a confrontation at work	Japanese Nationals	99
821	Having a confrontation go in a bad direction	Japanese Nationals	69
822	Having a confrontation with friends	Japanese Nationals	70
823	Having a confrontation with parents	Japanese Nationals	88
824	Having a confrontation with someone who only pushes their opinion	Japanese Nationals	75
825	Having a confrontation with teachers	Japanese Nationals	73
826	Having a different opinion than your coach	Japanese Nationals	92
827	Having a long silence in a conversation	Japanese Nationals	76
828	Having a negative opinion about me insinuated in conversation	Japanese Nationals	90
829	Having a one-way conversation with someone	Japanese Nationals	101
830	Having a relationship with a romantic interest be unclear	Japanese Nationals	93
831	Having a romantic interest hold a negative feeling against you	Japanese Nationals	63

832	Having a romantic interest show no facial expression in conversation	Japanese Nationals	79
833	Having an authority figure talks to me in order to make a big decision	Japanese Nationals	89
834	Having an opinion that nobody agrees with	Japanese Nationals	54
835	Having difficulties with regulating my emotions	Japanese Nationals	61
836	Having my mistakes revealed to others	Japanese Nationals	93
837	Having my weaknesses pointed out in front of others	Japanese Nationals	104
838	Having no one agree with me	Japanese Nationals	60
839	Having no one follow your initiative	Japanese Nationals	104
840	Having no topics in common to talk about	Japanese Nationals	138
841	Having other support your opponent in an argument	Japanese Nationals	106
842	Having seen a person but having never talked before	Japanese Nationals	80
843	Having someone fundamentally deny what I believe to be right	Japanese Nationals	72
844	Having someone let me know that they are romantically interested in me	Japanese Nationals	68
845	Having someone not be true to you or reveal who they really are	Japanese Nationals	100
846	Having someone not make eye contact with you	Japanese Nationals	45
847	Having someone point out my weaknesses that I already know about	Japanese Nationals	95
848	Having someone reject you for your personality or who you are	Japanese Nationals	73
849	Having something important to talk to with someone	Japanese Nationals	120
850	Having to make a decision	Japanese Nationals	53
851	Having to react to opposing opinions	Japanese Nationals	51
852	Having to say a funny joke as a first year employee to your boss	Japanese Nationals	70
853	Having whether or not the result is successful depend on you	Japanese Nationals	85
854	Having your boss not leave you in charge of a project	Japanese Nationals	59
855	Having your pride hurt	Japanese Nationals	73
856	Having your romantic interest not understand your hobby	Japanese Nationals	61
857	Having your secrets and embarrassing things disclosed to others.	Japanese Nationals	114
858	Having your taste/style does not match that of your romantic interest	Japanese Nationals	98
859	Hearing a bad reputation about the person in authority	Japanese Nationals	81
860	Hearing groundless criticism	Japanese Nationals	61
861	Hearing my stomach make a big sound in class	Japanese Nationals	94
862	Hearing someone say something negative about me	Japanese Nationals	100

863	Hearing something negative said about you over and over	Japanese Nationals	58
864	Holding a conversation with someone your are interested in	Japanese Nationals	56
865	Hosting a party that doesn't go well	Japanese Nationals	98
866	Hurting a future trusting relationship	Japanese Nationals	59
867	Initiating a conversation and stating your opinion in a group project	Japanese Nationals	78
868	Interacting with a romantic interest at school	Japanese Nationals	62
869	Interacting with a romantic interest at work	Japanese Nationals	68
870	Interacting with a romantic interest by chance	Japanese Nationals	62
871	Interacting with a stranger that acts too friendly	Japanese Nationals	62
872	Interacting with a stranger who has a bad appearance	Japanese Nationals	83
873	Interacting with a stranger who's atmosphere seems strange	Japanese Nationals	34
874	Interacting with authority at school	Japanese Nationals	87
875	Interacting with authority at work	Japanese Nationals	65
876	Interacting with customers after working overtime and being too tired to make a good impression	Japanese Nationals	79
877	Interacting with different factions of senior employees/students	Japanese Nationals	57
878	Interacting with loosely related friends of friends in a group	Japanese Nationals	73
879	Interacting with senior students in a club	Japanese Nationals	85
880	Interacting with someone I do not know well	Japanese Nationals	71
881	Interacting with someone that does not speak the same language as you	Japanese Nationals	68
882	Interacting with someone who I haven't spoken to in the past	Japanese Nationals	73
883	Interacting with someone who looks scary	Japanese Nationals	62
884	Interacting with someone who's facial expression or attitude is scary	Japanese Nationals	76
885	Interaction with strangers at school	Japanese Nationals	71
886	Interaction with strangers at work	Japanese Nationals	69
887	Interviewing with someone who looks scary	Japanese Nationals	96
888	Introducing yourself	Japanese Nationals	62
889	Introducing yourself to an authority figure	Japanese Nationals	75
890	Lacking confidence in my physical appearance (clothes, hairstyle, etc.)	Japanese Nationals	71
891	Making a compliment to someone in authority	Japanese Nationals	57
892	Making a speech	Japanese Nationals	63
893	Making a statement in a group	Japanese Nationals	60
894	Making inappropriate remarks	Japanese Nationals	50
895	Making mistakes	Japanese Nationals	100

896	Meeting an authority figure for the first time	Japanese Nationals	81
897	Meeting and holding a conversation with a superior	Japanese Nationals	67
898	Missing the bus	Japanese Nationals	59
899	Not agreeing with everyone on something	Japanese Nationals	70
900	Not being able to get recognition	Japanese Nationals	76
901	Not being able to get recognition any longer	Japanese Nationals	70
902	Not being able to have a friendly chat with a stranger	Japanese Nationals	87
903	Not being able to trust a person you do not know well	Japanese Nationals	61
904	Not being confident about the contents of a certain topic	Japanese Nationals	102
905	Not being recognized as member of a group	Japanese Nationals	73
906	Not finding anything in common we could talk about with a romantic interest	Japanese Nationals	96
907	Not fully understanding the contents of the criticism I receive	Japanese Nationals	87
908	Not harmonizing with others around me	Japanese Nationals	110
909	Not having a common topic to talk about with your romantic interest	Japanese Nationals	100
910	Not knowing if you did something right	Japanese Nationals	49
911	Not knowing the reason why other person doesn't do a task	Japanese Nationals	81
912	Not knowing the steps to achieve the goal	Japanese Nationals	76
913	Not knowing what the other person thinks of me	Japanese Nationals	58
914	Not knowing what to talk about with an authority figure	Japanese Nationals	76
915	Not paying enough courtesy to another person	Japanese Nationals	66
916	Not returning feelings for someone who is romantically interested in you	Japanese Nationals	49
917	Not saying anything no matter how wrong the other person is	Japanese Nationals	83
918	Not waiting to start eating until someone in authority begins eating	Japanese Nationals	67
919	Not waiting until someone in authority gets off the elevator before me	Japanese Nationals	86
920	Participating in a debate	Japanese Nationals	43
921	Participating in a discussion	Japanese Nationals	61
922	Participating in a group project for class	Japanese Nationals	56
923	Participating in a Social Networking Service	Japanese Nationals	62
924	Paying respect being courteous to a person in authority	Japanese Nationals	91
925	Performing a task that carries a lot of responsibilities	Japanese Nationals	71
926	Pointing out things to someone in authority	Japanese Nationals	69
927	Presenting my work	Japanese Nationals	84
928	Pushing your opinion too well	Japanese Nationals	95

929	Raising your hand in the classroom	Japanese Nationals	73
930	Realizing that small conflicts have creating a gap in a group working relationship	Japanese Nationals	83
931	Realizing that someone is "your type"	Japanese Nationals	57
932	Realizing that something you taught your friends was wrong	Japanese Nationals	78
933	Realizing that your behavior or attitude came off as a little rude	Japanese Nationals	122
934	Realizing that your conversation partner is not interested in what you are saying	Japanese Nationals	99
935	Realizing that your like someone romantically	Japanese Nationals	112
936	Realizing that your romantic interest is not interested in what you are saying	Japanese Nationals	109
937	Receiving an award in front of people at school	Japanese Nationals	71
938	Receiving an unexpected reaction from others	Japanese Nationals	119
939	Receiving criticism	Japanese Nationals	100
940	Receiving criticism from a superior	Japanese Nationals	78
941	Receiving criticism from many people	Japanese Nationals	53
942	Receiving criticism in front of people	Japanese Nationals	46
943	Receiving no reaction and no facial expression from a conversation partner	Japanese Nationals	83
944	Receiving one-way criticism unreasonably	Japanese Nationals	57
945	Running relay races	Japanese Nationals	84
946	Saying something rude or inappropriate by mistake	Japanese Nationals	79
947	Saying the wrong answer in class	Japanese Nationals	76
948	Seeing a conflict between many vs. and individual	Japanese Nationals	79
949	Seeing someone above me make a small mistake	Japanese Nationals	59
950	Seeing someone who you have seen his/her face before but haven never talked	Japanese Nationals	95
951	Seeing that a person is trying to keep distance from me during the conversation	Japanese Nationals	109
952	Sharing ideas	Japanese Nationals	138
953	Speaking as a representative on stage in front of people	Japanese Nationals	56
954	Speaking in a meeting	Japanese Nationals	79
955	Speaking up in class	Japanese Nationals	49
956	Standing in front of people	Japanese Nationals	50
957	Standing on a stage in a school's gym to receive an award	Japanese Nationals	82
958	Stating my opinion against someone in authority	Japanese Nationals	70
959	Stating my opinion in class	Japanese Nationals	106
960	Stating your opinion that is different from others and many	Japanese Nationals	93

	disgareed with		
961	Taking initiative on a project at school	Japanese Nationals	97
962	Taking initiative on something that requires a lot of responsibility	Japanese Nationals	52
963	Taking initiative on something that there is a long precedent of	Japanese Nationals	65
964	Taking the advice from an older coworker that disagrees with your boss in a new job	Japanese Nationals	84
965	Talking assertively in a group	Japanese Nationals	76
966	Talking at a lecture meeting in front of the audience	Japanese Nationals	53
967	Talking in order to gain recognition or evaluation	Japanese Nationals	55
968	Talking to a romantic interest	Japanese Nationals	40
969	Talking to a romantic interest who is trying to keep distance in the conversation	Japanese Nationals	82
970	Talking to a stranger	Japanese Nationals	77
971	Talking to a stranger who does not react well	Japanese Nationals	68
972	Talking to a superior for the first time	Japanese Nationals	71
973	Talking to an authority figure who does not speak at all	Japanese Nationals	78
974	Talking to someone in a very close distance in a crowded train	Japanese Nationals	63
975	Talking to someone of opposite sex in a group	Japanese Nationals	97
976	Talking to someone older than me	Japanese Nationals	52
977	Talking to someone who is dirty/filthy	Japanese Nationals	62
978	Talking to someone who you thought you knew but didn't	Japanese Nationals	110
979	Talking to someone with a psychological disturbance	Japanese Nationals	53
980	Talking with a romantic interest when they are in a bad mood	Japanese Nationals	72
981	Telling someone to get back in line	Japanese Nationals	101
982	Telling someone to push the button to get to the desired floor in an elevator	Japanese Nationals	76
983	Telling the coach or teacher that you am going to quit the club	Japanese Nationals	44
984	Texting someone privately	Japanese Nationals	86
985	Trying to make a good impression of yourself	Japanese Nationals	106
986	Turning in a late assignment to a teacher	Japanese Nationals	107
987	Volunteering to help when I see someone on a wheel chair or someone who is physically challenged	Japanese Nationals	77
988	When I am not sure if it is a right thing or bad thing (to do)	Japanese Nationals	71
989	When much is expected out of me	Japanese Nationals	98
990	When no one is doing it with me	Japanese Nationals	77
991	When visiting friend's house, asking the host if there is anything I could help them out with	Japanese Nationals	80

992	Winning a conflict and feeling concerned for the person who lost	Japanese Nationals	87
993	Working as a cashier as the line of customers keeps on getting longer	Japanese Nationals	81

Table 4. Summary of Internal Consistency Estimates (*Cronbach's alphas*) by Cultural Group.

Study 1			
Variable	Asian Americans (n = 310)	European Americans (n = 249)	Japanese nationals (n = 212)
IND SC	α = .72	α = .85	α = .78
INT SC	α = .79	α = .78	α = .75
SPS-6	α = .82	α = .77	α = .84
SIAS-6	α = .72	α = .74	α = .81
Threat appraisal	α = .88	α = .92	α = .80
Study 2 Pretests			
	Asian Americans (n = 42)	European Americans (n = 28)	Japanese nationals (n = 34)
IND SC	α = .75	α = .86	α = .68
INT SC	α = .75	α = .78	α = .74
SPS-6	α = .83	α = .91	α = .80
SIAS-6	α = .91	α = .75	α = .88
Threat appraisal	α = .95	α = .96	α = .72
Study 2 Posttests			
	Asian Americans (n = 42)	European Americans (n = 28)	Japanese nationals (n = 34)
SPS-6	α = .84	α = .82	α = .80
SIAS-6	α = .89	α = .88	α = .93
BASA Score	α = .84	α = .82	α = .79

Note: IND SC = Independent Self-Construal; INT SC = Interdependent Self-Construal; SPS-6 = Social Phobia Scale-Six Item Version; SIAS-6 = Social Interaction Anxiety Scale-Six Item Version, BASA = Behavioral Assessment of Speech Anxiety

Table 5. Study 1 Correlations Among Variables by Cultural Group.

Asian Americans (n = 310)					
	SPS-6	SIAS-6	IND SC	INT SC	Threat
SPS-6	---				
SIAS-6	.71	---			
IND SC	-.26	-.32	---		
INT SC	.16	.11	.23	---	
Threat	.16	.14	-.01	.17	---
European Americans (n = 249)					
	SPS-6	SIAS-6	IND SC	INT SC	Threat
SPS-6	---				
SIAS-6	.77	---			
IND SC	-.39	-.45	---		
INT SC	.09	.09	.24	---	
Threat	.34	.32	-.23	.01	---
Japanese nationals (n = 212)					
	SPS-6	SIAS-6	IND SC	INT SC	Threat
SPS-6	---				
SIAS-6	.54	---			
IND	-.21	-.30	---		
INT	.08	-.03	.20	---	
Threat	.38	.49	-.22	-.07	---

Note: IND SC = Independent Self-Construal; INT SC = Interdependent Self-Construal; SPS-6 = Social Phobia Scale-Six Item Version; SIAS-6 = Social Interaction Anxiety Scale-Six Item Version

Table 6. Summary of Study 1 Mediation Analyses for the Asian American / European American and Japanese National/ European American Comparisons.

Step 1 Asian American / European American Comparison													
										Direct Effect	Indirect Effect		
Model	Description	*df*	# NS Paths	CFI	TLI	RMSEA	SRMR	AIC	BIC	Group -> ThApp	Group -> IND -> ThApp	Group -> INT -> ThApp	---
AAS1A	Partial Mediation of ThApp through INT SC and IND SC	2	1	.988	.938	.082	.014	11296.970	11366.188	.109	.034	.047	---
AAS1B	Full Mediation of ThApp through INT SC and IND SC	3	0	.988	.959	.066	.019	11295.781	11360.673	---	.034	.047	---
AAS1C	Partial Mediation of ThApp through IND SC only	3	1	.988	.938	.082	.014	11296.970	11366.188	.173	---	.028	---
AAS1D	Partial Mediation of ThApp through INT SC only	3	---	---	---	---	---	---	---	.006	-.001	---	---
AAS1E	Full Mediation of ThApp through INT SC only	4	0	.976	.941	.080	.042	11301.698	11362.264	---	---	.038	---
AAS1F	Full Mediation of ThApp through IND SC only	4	0	.976	.941	.079	.047	11301.612	11362.178	---	-.024	---	---
Step 2 Asian American / European American Comparison													
										Direct Effect	Indirect Effect		
										Group -> SocAnx	Group -> IND -> SocAnx	Group -> INT -> SocAnx	Group - INT & IND -> ThApp > SocAn
AAS2A	Partial Mediation of SocAnx through ThApp, INT SC, and	108	1	.963	0.954	0.045	0.034	28227.879	28487.448	.344	.117	.073	.025

	IND SC												
AAS2B	Full Mediation of SocAnx through ThApp, INT SC, and IND SC	110	1	.959	0.95	0.047	0.044	28238.451	28489.368	---	.122	.083	.022
AAS2C	Partial Mediation of SocAnx through ThApp and INT SC	110	1	.930	0.914	0.061	0.072	28334.333	28585.25	.426	---	.041	.011
AAS2D	Partial Mediation of SocAnx through ThApp and IND SC	110	0	.955	0.945	0.049	0.045	28251.522	28502.439	.421	.088	---	.007
AAS2E	Full Mediation of Soc.Anx through ThApp and INT SC only	112	1	.923	0.907	0.064	0.086	28356.395	28598.659	---	---	.05	.039
AAS2F	Full Mediation of SocAnx through ThApp and IND SC only	112	1	.949	0.939	0.052	0.06	28269.588	28511.852	---	.104	---	.008
AAS2G	Partial Mediation of SocAnx through ThApp only	112	0	.929	0.913	0.062	0.071	28338.601	28580.865	.483	---	---	.031
AAS2H	Full Mediation of SocAnx through ThApp only	114	0	.920	.905	.064	.087	28363.950	28597.562	---	---	---	.015

Step 1 Japanese / European American Comparison

										Direct Effect	Indirect Effect		
Model	Description	*df*	# NS Paths	CFI	TLI	RMSEA	SRMR	AIC	BIC	Group -> ThApp	Group -> IND -> ThApp	Group -> INT -> ThApp	---
JNS1A	Partial Mediation of ThApp through IND SC	1	0	.999	.994	.046	.007	5765.15	5810.617	2.277	.043	---	---
JNS1B	Full Mediation of ThApp through IND SC	2	0	.664	-.008	.613	.257	6109.584	6150.918	---	.045	---	---

Step 2 Japanese / European American Comparison

										Direct	Indirect Effect		

										Effect			
										Group -> SocAnx	**Group -> IND SC -> SocAnx**	**Group -> INT SC -> SocAnx**	**Group -> IND SC -> ThAp -> SocAn**
JNS2A	Partial Mediation of SocAnx through ThApp and IND SC	96	1	.958	.947	.057	.058	20012.895	20236.099	-0.569	-.001	---	.011
JNS2Am	Partial Mediation of Soc.Anx through ThApp and IND SC	97	0	.958	.948	.057	.059	20012.739	20231.810	-1.502	-.001	---	.002
JNS2B	Full Mediation of SocAnx through ThApp and IND SC	98	1	.925	.909	.075	.067	20122.057	20336.993	---	.066	---	.005
JNS2C	Partial Mediation of SocAnx through ThApp only	98	1	.943	.930	.066	.080	20062.95	20277.886	-1.434	---	---	.015
JNS2D	Full Mediation of Soc.Anx through ThApp only	100	1	.909	.891	.082	.090	20175.655	20382.325	---	---	---	-.067

Note: df = degrees of freedom; CFI = Comparative Fit Index; TLI = Tucker-Lewis Index; RMSEA = root mean square error of approximation; group = (Asian American [AA] = 1, European heritage [EA] = 0 *or* Japanese [JN] = 1, European heritage [EA] = 0); ThApp = Threat Appraisal; SocAnx = social anxiety; IND SC = independent self-construal; INT SC = interdependent self-construal.

NS Paths = Number of non-statistically significant paths

Direct Effects were calculated by averaging the path coefficient from group to SPS-6 and SIAS-6

Indirect effects were calculated as the product of two direct effects (Group -> IND/INT and IND/INT -> ThApp) or by averaging the double mediation effect of IND/INT and ThApp on SPS-6 and SIAS-6

Table 7. Overview of Study 1 Results and their Respective Hypotheses

Variable	Hypothesized Direction	Observed Direction
Social Anxiety		
SPS-6	EA < AA; EA < JN	EA < AA; EA > JN
SIAS-6	EA < AA; EA < JN	EA < AA; EA < JN
Self-Construal		
Independent	EA > AA; EA > JN	EA > AA; EA > JN
Interdependent	EA < AA; EA < JN	EA < AA; EA = JN
Selective Attention		
Threat Appraisal	EA < AA; EA < JN	EA < AA; EA < JN

Note: AA = Asian American; EA = European American; JN = Japanese National

Table 8. Study 2 Descriptive Statistics for Reaction Time Test

Pretest/Posttest	Culture Group	Condition	Mean	SD
Pretest	AH	Anger	470.52	99.14
Pretest	AH	NonAnger	511.35	112.89
Pretest	EH	Anger	494.85	98.50
Pretest	EH	NonAnger	510.39	108.64
Pretest	JN	Anger	431.30	85.90
Pretest	JN	NonAnger	445.57	92.67
Posttest	AH	Anger	479.33	109.18
Posttest	AH	NonAnger	486.93	110.77
Posttest	EH	Anger	492.72	116.81
Posttest	EH	NonAnger	496.10	113.52
Posttest	JN	Anger	434.28	99.36
Posttest	JN	NonAnger	436.19	107.53

Note: AA = Asian American; EA = European American; JN = Japanese National

Table 9. Study 2 Linear mixed-effects model for cultural groups differences in selective attention.

Variable	Estimate	Std. Error	DF	T-value	P-value
(Intercept)	496.16	14.795	101	33.536	0
Asian American	-3.549	19.164	101	-0.185	0.85346
Japanese National	-52.265	20.085	101	-2.602	0.01066
Face Type	6.418	2.843	342	2.257	0.02462
Key Preference	-4.795	1.522	29	-3.15	0.0038
Asian American x Face Type	-7.93	3.656	9470	-2.169	0.03011
Japanese National x Face Type	-10.466	3.836	9470	-2.729	0.00637

Table 10. Study 2 Regression model coefficients for experiment outcome variables.

Outcome Variable	Predictor Variable	Estimate	Std. Error	*t*-value	*p*-value
SPS-6	(Intercept)	-.609	.748	-.813	.418
	Training Condition	.754	1.104	.683	.496
	Japanese	-3.805	1.091	-3.488	.001*
	Asian American	3.199	1.009	3.171	.002*
	Training Condition ^{x} Japanese National	2.751	1.552	1.773	.079*
	Training Condition ^{x} Asian American	-1.654	1.477	-1.12	.266
SIAS-6	(Intercept)	-.446	.626	-.713	.478
	Training Condition	.683	.924	.739	.462
	Japanese	1.972	.913	2.161	.033*
	Asian American	1.114	.845	1.319	.190
	Training Condition ^{x} Japanese National	-1.999	1.299	-1.539	.127
	Training Condition ^{x} Asian American	-.056	1.236	-.045	.964
ΔGSR	(Intercept)	1.095	.044	25.026	.000*
	Training Condition	.183	.065	2.834	.006*
	Japanese	-.013	.064	-.201	.841
	Asian American	.063	.059	1.07	.287
	Training Condition ^{x} Japanese National	.056	.091	.616	.540
	Training Condition ^{x} Asian American	-.107	.086	-1.234	.220
BASA	(Intercept)	.585	.886	.661	.510
	Training Condition	-1.096	1.308	-.838	.404
	Japanese	1.652	1.292	1.279	.204
	Asian American	.075	1.195	.062	.950
	Training Condition ^{x} Japanese National	2.077	1.838	1.13	.261
	Training Condition ^{x} Asian American	3.631	1.749	2.076	.041*

Note: IND SC = Independent Self-Construal; INT SC = Interdependent Self-Construal; SPS-6 = Social Phobia Scale-Six Item Version; SIAS-6 = Social Interaction Anxiety Scale-Six Item Version; ΔGSR = Change in GSR; BASA = Behavioral Assessment of Speech Anxiety

Appendix A: Full list of measures to be completed by all participants during the study. Upon completing the informed consent and demographic questionnaire, the order of administration is randomized. Japanese versions of each questionnaire will be made available upon request.

1. Informed Consent

University of Hawai'i

Consent to Participate in Research Project:
Social Anxiety and Selective Attention Toward Social Threat

My name is Alexander Krieg, M.A. I am a graduate student at the University of Hawai'i at Manoa (UH), in the Department of Psychology. As a part of my dissertation studies, I am conducting a research project. The purpose of this research project is to examine differences in self-reported social anxiety, self-construal, and selective attention toward potentially social threatening stimuli. I am interested in learning from the experiences of people like you who are participating in this project as a part of their psychology coursework.

What activities will you do in the study and how long will the activities last? If you participate, I will measure your heart rate and skin conductance (how readily your skin can conduct electricity) with a safe, non-invasive monitor that rests lightly on your hand. These measurements will be taken after a simple reaction time task to measure selective attention towards different faces appearing on a screen. The experiment will last for about 30 to 45 minutes. I will record your heart rate, skin conductance, and reaction time using a computer program. Additionally, experiment procedures will be video (but not audio) recorded in order to ensure standardization. I am recording the information so that it can later be easily accessed for statistical analysis. If you participate, you will be one of a total of eighty (80) participants who will participate in this experiment.

Benefits and Risks: There may be no direct benefits to you in participating in my research project, but the results of this project might help me and other researchers learn more about social anxiety and how things like selective attention can be modified to reduce this anxiety. I believe there is little or no risk to you in participating in this project, although participants could experience minor discomfort from the skin conductance monitor device. There is a possibility you may become a bit fatigued after having focused on completing the reaction time test by the end of the experiment. However, there will be breaks and rests throughout the experiment, and you can take an extra break or stop at any time. You may also withdraw from the project altogether.

Confidentiality and Privacy: I will keep all information from the experiment in a locked file cabinet. Data from the skin conductance monitor will be stored on an encrypted hard drive here in the lab. Only my research assistants and I will have access to the information. Other agencies that have legal permission have the right to review research records. The University of Hawaii Human Studies Program has the right to review research records for this study.

I will be reporting the results of my research project in a published research article, but will not use any information that could potentially identify you or any other participant. If you would like a copy of my final report, please contact me at the email address listed near the end of this consent form.

Voluntary Participation: Participation in this research project is completely voluntary. You are free to choose to participate or not to participate in this project. At any point during this project, you can withdraw your permission without any loss of benefits.

Questions: If you have any questions about this project, please contact me at via phone (808) 956-5843 or e-mail (awkrieg@hawaii.edu).

If you have any questions about your rights in this project, you can contact the University of Hawaii, Human Studies Program, by phone at (808) 956-5007 or by e-mail at uhirb@hawaii.edu.

Please keep the section above for your records.
If you agree to participate in this project, please sign the following signature portion of this consent form and return it to the study administrator.

Tear or cut here

Signature(s) for Consent:

I agree to join in the research project entitled, "Social Anxiety and Selective Attention Toward Social Threat." I understand that I can change my mind about being in this project, at any time, by notifying the researcher.

I agree to be videotaped during the experiment. ☐Yes ☐No

I agree to the use of skin conductance monitor. ☐Yes ☐No

Your Name (Print): _____

Your Signature: _____

Date: _____

2. Demographic Questionnaire

What is your gender?

- ❍ Male
- ❍ Female
- ❍ Other

How old are you?

_____ Years

How long have you lived in Hawaii?

_____ Years

Where were you born?

_____

What is your ethnicity? (Check all that apply)

- ❑ Japanese
- ❑ Chinese
- ❑ Korean
- ❑ Fillipino
- ❑ Samoan
- ❑ Caucasian/White
- ❑ Portuguese
- ❑ Micronesian (Chuukese, Kosraean, Pohnpeian, Yapese)
- ❑ Vietnamese
- ❑ Native Hawaiian
- ❑ African-American/Black
- ❑ Hispanic/Latino
- ❑ Laotian
- ❑ Tongan
- ❑ Puerto Rican
- ❑ Asian Indian
- ❑ Native American/Alaska Native
- ❑ Thai
- ❑ Malaysian
- ❑ Javanese
- ❑ Jewish
- ❑ Marshallese
- ❑ Palauan
- ❑ Tahitian
- ❑ Okinawan
- ❑ Fijian
- ❑ Guamanian or Chamorro
- ❑ Other _____

In terms of ethnic groups, I consider myself to be (please specify):

_____

Where was your mother born?

_____

What is your mother's highest level of education?

- ❍ Elementary School
- ❍ Middle School
- ❍ High School (or G.E.D.)
- ❍ Trade School or an Associate's Degree
- ❍ Some College
- ❍ Bachelor's Degree
- ❍ Graduate or Professional Degree

What is your father's highest level of education?

- ❍ Elementary School
- ❍ Middle School
- ❍ High School (or G.E.D.)
- ❍ Trade School or an Associate's Degree
- ❍ Some College
- ❍ Bachelor's Degree
- ❍ Graduate or Professional Degree

Where was your father born?

_____

3. Social Anxiety Questionnaires

SPS-6 and SIAS-6

Instructions: For each question, please circle a number to indicate the degree to which you feel the statement is characteristic or true of you. The rating scale is as follows:

0	1	2	3	4
Not at all characteristic or true of me	Slightly characteristic or true of me	Moderately characteristic or true of me	Very characteristic or true of me	Extremely characteristic or true of me

1.	I have difficulty making eye contact with others.	0	1	2	3	4
2.	I find it difficult mixing comfortably with people I work with.	0	1	2	3	4
3.	I tense up if I meet an acquaintance on the street.	0	1	2	3	4
4.	I feel tense if I am alone with just one person.	0	1	2	3	4
5.	I have difficulty talking with other people.	0	1	2	3	4
6.	I find it difficult to disagree with another's point of view.	0	1	2	3	4
7.	I get nervous that people are staring at me as I walk down the street.	0	1	2	3	4
8.	I worry about shaking or trembling when I'm watched by other people.	0	1	2	3	4
9.	I would get tense if I had to sit facing other people on a bus or train.	0	1	2	3	4
10.	I worry I might do something to attract the attention of other people.	0	1	2	3	4
11.	When in an elevator, I am tense if people look at me.	0	1	2	3	4
12.	I can feel conspicuous standing in a line.	0	1	2	3	4

4. Self-Construal Questionnaire

SCS

This is a questionnaire that measures a variety of feelings and behaviors in various situations. Listed below are a number of statements. Read each one as if it referred to you. Beside each statement circle the number that best matches your agreement or disagreement. Please respond to every statement.

1=STRONGLY DISAGREE	4=DON'T AGREE OR	5=AGREE SOMEWH
2=DISAGREE	DISAGREE	6=AGREE
3=SOMEWHAT DISAGREE		7=STRONGLY AGRI

1. I enjoy being unique and different from others in many respects.	①	②	③	④	⑤	⑥	⑦
2. I can talk openly with a person who I meet for the first time, even when this person is much older than I am.	①	②	③	④	⑤	⑥	⑦
3. Even when I strongly disagree with group members, I avoid an argument.	①	②	③	④	⑤	⑥	⑦
4. I have respect for the authority figures with whom I interact.	①	②	③	④	⑤	⑥	⑦
5. I do my own thing, regardless of what others think.	①	②	③	④	⑤	⑥	⑦
6. I respect people who are modest about themselves.	①	②	③	④	⑤	⑥	⑦
7. I feel it is important for me to act as an independent person.	①	②	③	④	⑤	⑥	⑦
8. I will sacrifice my self interest for the benefit of the group I am in.	①	②	③	④	⑤	⑥	⑦
9. I'd rather say "No" directly, than risk being misunderstood.	①	②	③	④	⑤	⑥	⑦
10. Having a lively imagination is important to me.	①	②	③	④	⑤	⑥	⑦
11. I should take into consideration my parents' advice when making education/career plans.	①	②	③	④	⑤	⑥	⑦
12. I feel my fate is intertwined with the fate of those around me.	①	②	③	④	⑤	⑥	⑦
13. I prefer to be direct and forthright when dealing with people I've just met.	①	②	③	④	⑤	⑥	⑦
14. I feel good when I cooperate with others.	①	②	③	④	⑤	⑥	⑦
15. I am comfortable with being singled out for praise or rewards.	①	②	③	④	⑤	⑥	⑦
16. If my brother or sister fails, I feel responsible.	①	②	③	④	⑤	⑥	⑦
17. I often have the feeling that my relationships with others are more important than my own accomplishments.	①	②	③	④	⑤	⑥	⑦

(Continued…)

1=STRONGLY DISAGREE	4=DON'T AGREE OR	5=AGREE SOMEWHA
2=DISAGREE	DISAGREE	6=AGREE
3=SOMEWHAT DISAGREE		7=STRONGLY AGREI

18. Speaking up during a class (or a meeting) is not a problem for me.	① ② ③ ④ ⑤ ⑥ ⑦
19. I would offer my seat in a bus to my professor (or my boss).	① ② ③ ④ ⑤ ⑥ ⑦
20. I act the same way no matter who I am with.	① ② ③ ④ ⑤ ⑥ ⑦
21. My happiness depends on the happiness of those around me.	① ② ③ ④ ⑤ ⑥ ⑦
22. I value being in good health above everything.	① ② ③ ④ ⑤ ⑥ ⑦
23. I will stay in a group if they need me, even when I am not happy with the group.	① ② ③ ④ ⑤ ⑥ ⑦
24. I try to do what is best for me, regardless of how that might affect others.	① ② ③ ④ ⑤ ⑥ ⑦
25. Being able to take care of myself is a primary concern for me.	① ② ③ ④ ⑤ ⑥ ⑦
26. It is important to me to respect decisions made by the group.	① ② ③ ④ ⑤ ⑥ ⑦
27. My personal identity, independent of others, is very important to me	① ② ③ ④ ⑤ ⑥ ⑦
28. It is important for me to maintain harmony within my group.	① ② ③ ④ ⑤ ⑥ ⑦
29. I act the same way at home that I do at school (or work).	① ② ③ ④ ⑤ ⑥ ⑦
30. I usually go along with what others want to do, even when I would rather do something different.	① ② ③ ④ ⑤ ⑥ ⑦

5. Threat Appraisal of Social Situations Questionnaire (Example)

For each of the following questions, please read the situation in the left column and answer the questions to the right by selecting the choice that reflects the way you think about the situation. In the last column, please explain why you see the situation that way.	How likely is this situation going to occur? 0=Not Likely At All 1=Somewhat Likely 2=More Than Likely 3=Very Likely	How bad would the consequences be? 0=Not Bad At All 1=Somewhat Bad 2=Fairly Bad 3=Extremely Bad
1. Going on a first date	0 1 2 3	0 1 2 3
2. Being pulled over by the police	0 1 2 3	0 1 2 3
3. Arguing with a stranger	0 1 2 3	0 1 2 3
4. Being on the bus	0 1 2 3	0 1 2 3
5. Falling down in public	0 1 2 3	0 1 2 3
6. Answering a question in class	0 1 2 3	0 1 2 3
7. Being criticized on how you do things	0 1 2 3	0 1 2 3
8. Being hit on by a random stranger	0 1 2 3	0 1 2 3
9. Having your performance reviewed at work	0 1 2 3	0 1 2 3
10. Having your idea ignored by someone	0 1 2 3	0 1 2 3
11. Leading a class discussion	0 1 2 3	0 1 2 3
12. Admitting a mistake you made	0 1 2 3	0 1 2 3
13. Noticing someone interesting and wanting to talk to them	0 1 2 3	0 1 2 3
14. Pronouncing something wrong in front of people	0 1 2 3	0 1 2 3
15. Being rejected by the group because of your personality	0 1 2 3	0 1 2 3
16. Being successful in class or sports	0 1 2 3	0 1 2 3
17. Being the first or last person in an activity	0 1 2 3	0 1 2 3
18. Deciding whether to start a conversation with someone you do not know	0 1 2 3	0 1 2 3
19. Eating meals by yourself in front of others	0 1 2 3	0 1 2 3
20. Failing at something after taking initiative	0 1 2 3	0 1 2 3
21. Forgetting someone's name	0 1 2 3	0 1 2 3
22. Finding someone attractive	0 1 2 3	0 1 2 3
23. Getting involved in some sort of incident	0 1 2 3	0 1 2 3
24. Greeting someone for the first time	0 1 2 3	0 1 2 3

For each of the following questions, please read the situation in the left column and answer the questions to the right by selecting the choice that reflects the way you think about the situation. In the last column, please explain why you see the situation that way.	How likely is this situation going to occur? 0=Not Likely At All 1=Somewhat Likely 2=More Than Likely 3=Very Likely				How bad would the consequences be? 0=Not Bad At All 1=Somewhat Bad 2=Fairly Bad 3=Extremely Bad			
25. Having a confrontation with someone who pushes their opinion	0	1	2	3	0	1	2	3
26. Having a different opinion than your coach	0	1	2	3	0	1	2	3
27. Introducing yourself to an authority figure	0	1	2	3	0	1	2	3
28. Making a compliment on someone's clothes	0	1	2	3	0	1	2	3
29. Missing the bus in front of people	0	1	2	3	0	1	2	3
30. Raising your had in the classroom	0	1	2	3	0	1	2	3

Appendix B: Abbreviated list of measures to be completed by participants recruited solely for the experiment phase of the study. Upon completing the informed consent (same as above), participants will complete demographic questions, the SPS-6 and SIAS-6, and finally the SCS. Japanese versions of each questionnaire will be made available upon request.

1. Demographic Questions

What is your gender?

- ❍ Male
- ❍ Female
- ❍ Other

How old are you?

_____ Years

2. Social Anxiety Questionnaires

SPS-6 and SIAS-6

Instructions: For each question, please circle a number to indicate the degree to which you feel the statement is characteristic or true of you. The rating scale is as follows:

0	1	2	3	4
Not at all characteristic or true of me	Slightly characteristic or true of me	Moderately characteristic or true of me	Very characteristic or true of me	Extremely characteristic or true of me

13. I have difficulty making eye contact with others.	0	1	2	3	4
14. I find it difficult mixing comfortably with people I work with.	0	1	2	3	4
15. I tense up if I meet an acquaintance on the street.	0	1	2	3	4
16. I feel tense if I am alone with just one person.	0	1	2	3	4
17. I have difficulty talking with other people.	0	1	2	3	4
18. I find it difficult to disagree with another's point of view.	0	1	2	3	4
19. I get nervous that people are staring at me as I walk down the street.	0	1	2	3	4
20. I worry about shaking or trembling when I'm watched by other people.	0	1	2	3	4
21. I would get tense if I had to sit facing other people on a bus or train.	0	1	2	3	4
22. I worry I might do something to attract the attention of other people.	0	1	2	3	4
23. When in an elevator, I am tense if people look at me.	0	1	2	3	4
24. I can feel conspicuous standing in a line.	0	1	2	3	4

3. Self-Construal Questionnaire

SCS

This is a questionnaire that measures a variety of feelings and behaviors in various situations. Listed below are a number of statements. Read each one as if it referred to you. Beside each statement circle the number that best matches your agreement or disagreement. Please respond to every statement.

1=STRONGLY DISAGREE
2=DISAGREE
3=SOMEWHAT DISAGREE
4=DON'T AGREE OR DISAGREE
5=AGREE SOMEWH
6=AGREE
7=STRONGLY AGRI

1. I enjoy being unique and different from others in many respects.	①	②	③	④	⑤	⑥	⑦
2. I can talk openly with a person who I meet for the first time, even when this person is much older than I am.	①	②	③	④	⑤	⑥	⑦
3. Even when I strongly disagree with group members, I avoid an argument.	①	②	③	④	⑤	⑥	⑦
4. I have respect for the authority figures with whom I interact.	①	②	③	④	⑤	⑥	⑦
5. I do my own thing, regardless of what others think.	①	②	③	④	⑤	⑥	⑦
6. I respect people who are modest about themselves.	①	②	③	④	⑤	⑥	⑦
7. I feel it is important for me to act as an independent person.	①	②	③	④	⑤	⑥	⑦
8. I will sacrifice my self interest for the benefit of the group I am in.	①	②	③	④	⑤	⑥	⑦
9. I'd rather say "No" directly, than risk being misunderstood.	①	②	③	④	⑤	⑥	⑦
10. Having a lively imagination is important to me.	①	②	③	④	⑤	⑥	⑦
11. I should take into consideration my parents' advice when making education/career plans.	①	②	③	④	⑤	⑥	⑦
12. I feel my fate is intertwined with the fate of those around me.	①	②	③	④	⑤	⑥	⑦
13. I prefer to be direct and forthright when dealing with people I've just met.	①	②	③	④	⑤	⑥	⑦
14. I feel good when I cooperate with others.	①	②	③	④	⑤	⑥	⑦
15. I am comfortable with being singled out for praise or rewards.	①	②	③	④	⑤	⑥	⑦
16. If my brother or sister fails, I feel responsible.	①	②	③	④	⑤	⑥	⑦
17. I often have the feeling that my relationships with others are more important than my own accomplishments.	①	②	③	④	⑤	⑥	⑦

(Continued…)

1=STRONGLY DISAGREE	4=DON'T AGREE OR DISAGREE	5=AGREE SOMEWHA
2=DISAGREE		6=AGREE
3=SOMEWHAT DISAGREE		7=STRONGLY AGREI

18. Speaking up during a class (or a meeting) is not a problem for me.	①	②	③	④	⑤	⑥	⑦
19. I would offer my seat in a bus to my professor (or my boss).	①	②	③	④	⑤	⑥	⑦
20. I act the same way no matter who I am with.	①	②	③	④	⑤	⑥	⑦
21. My happiness depends on the happiness of those around me.	①	②	③	④	⑤	⑥	⑦
22. I value being in good health above everything.	①	②	③	④	⑤	⑥	⑦
23. I will stay in a group if they need me, even when I am not happy with the group.	①	②	③	④	⑤	⑥	⑦
24. I try to do what is best for me, regardless of how that might affect others.	①	②	③	④	⑤	⑥	⑦
25. Being able to take care of myself is a primary concern for me.	①	②	③	④	⑤	⑥	⑦
26. It is important to me to respect decisions made by the group.	①	②	③	④	⑤	⑥	⑦
27. My personal identity, independent of others, is very important to me	①	②	③	④	⑤	⑥	⑦
28. It is important for me to maintain harmony within my group.	①	②	③	④	⑤	⑥	⑦
29. I act the same way at home that I do at school (or work).	①	②	③	④	⑤	⑥	⑦
30. I usually go along with what others want to do, even when I would rather do something different.	①	②	③	④	⑤	⑥	⑦