

AMBIVALENCE OVER EMOTIONAL EXPRESSION AND PAIN SENSITIVITY: A
CROSS-CULTURAL COMPARISON

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DEDICATION

To my parents, Lee Hock Soon and Yeo Sok Ching, with greatest regard and deepest appreciation I can muster.

To my sister, Laura, with unending love, in fondest memories of our antics, and who will always be close to heart.

To my grandparents Yeo Khee Tat and Goh Fong Kim, whom I will never forget.

To my Family, from where I come and who built me.

ABSTRACT

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Pain is universally understood and frequently experienced. It is a complex phenomenon with multidimensional aspects, making it a highly subjective experience. Its prevalence and impact on socio-ecological levels are likely to continue increasing. Yet, most of what we comprehend about pain comes from a biomedical standpoint, leaving gaps in the full understanding of pain from a broader biopsychosocial perspective. Thus, it is imperative to expand the scope of knowledge of pain and its underlying mechanisms. With more insight into the range of experiences of pain, the hope is for better prevention and treatment of painful conditions – that are better personalized and culturally relevant – in the future.

The objectives of this study were to gather a better understanding of the associations of the pain experience from a psycho-socio-emotional perspective. More specifically, with a focus on the variables of pain sensitivity (PS) and ambivalence over emotional expression (AEE), embedded within the context of culturally distinct self-identified values (VS), and the extent to which these associations differ cross-culturally.

Responses were obtained from participants via a series of questionnaires online in Singapore (Sample 1) and the United States (Sample 2), forming two culturally separate samples. The measures used per the variables of interest were scores from the Asian Values Scale-Revised, Ambivalence over Emotional Expression, and Pain Sensitivity Questionnaire. The responses were analyzed and compared using SPSS with univariate analysis of variance and linear regression.

Results showed mixed findings and patterns of observation. Levels of AEE were significantly higher in Sample 1, $F(1, 67) = 2.98, p = .09$, to a medium effect size, and Sample 1 consistently scored higher on levels of PS. The samples endorsed opposite directions of associations for VS and PS, while endorsing similar directions in associations for VS and AEE. Patterns of associations between AEE and PS varied depending on the samples.

The overall relations among variables may be more complex than originally conceptualized. Several factors and limitations that might have influenced the outcome were discussed, along with considerations for refinement of future research directions.

KEY WORDS: Ambivalence over emotional expression, Pain Sensitivity Questionnaire, Asian Values Scale-Revised, Singapore, United States, Ethnicity, Culture

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CHAPTER I

Introduction

The phenomena of pain are universally understood and experienced by most, if not all, individuals regardless of age, language, or culture. Tens of millions of people in the United States alone are affected by pain (Institute of Medicine [IOM], 2011). It is the most frequently reported symptom within the field of health care, and its prevalence and impact on multiple socio-ecological levels is likely to continue increasing (IOM, 2011; Lumley et al., 2011; Nielsen, Staud, & Price, 2009). Pain has a multidimensional impact on the lives of those who suffer from it. While the direct impact of suffering comes from the misery of the sensation that is painful, indirect suffering as a consequence of the condition of pain can also manifest in the form of loss of productivity, decreased functioning or disability, loss in quality of life, and other health and mental health complications (e.g., medication effects, insomnia, depression, anxiety). Furthermore, the effects of pain perpetuate a ripple-effect, in which the burden spills over from the individual to the larger society, as observed with increased healthcare demands and utilization, increased misuse and abuse of controlled substances, and other significant individual as well as societal economic losses (American Academy of Pain Medicine, n.d.; Gaskin & Richard, 2012; IOM, 2011; Lumley et al., 2011). Yet, despite its widespread repercussions, there remain significant gaps in the knowledge and understanding of the pain; which in turn results in the lack of preventative, treatment, and overall management strategies (Davidhizar & Giger, 2004; IOM, 2011; Lumley et al., 2011).

In the quest to improve the prevention, treatment, and management of pain conditions, it is imperative to understand underlying mechanisms that give rise to the experience of pain. According to the International Association for the Study of Pain, pain is defined by Merskey and Bogduk (1994) as “an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage.” It is both a biological and psychological phenomenon, better described as consisting of unpleasant physical sensations and negative emotional experiences, and an inherently subjective and multidimensional experience (Rahim-Williams, Riley, Williams, & Fillingim, 2012). The development and validation of the McGill Pain Questionnaire (MPQ) supports this notion. The MPQ is the most extensively used instrument that measures the multi-dimensional quality and intensity of pain using 78 pain descriptors divided into four categories, namely, sensory, affective, evaluative, and miscellaneous (Menezes Costa, Maher, McAuley, & Costa, 2009). This illustrates that apart from the sensory aspect, individuals can describe pain in many other ways to capture or encompass the range of painful experiences (Menezes Costa et al., 2009). Despite its acknowledged multidimensional nature, pain often remains treated exclusively as a sensory experience in clinical and/or medical settings, thereby reflecting a focus on only the physical or sensory aspect of it (Lumley et al., 2011). This is perhaps due to an ongoing, still developing understanding of the extent to which psychological and emotional processes influence and contribute to the multidimensional experience of pain.

While the phenomena of pain are universal, pain experiences can vary widely due to its multidimensional and largely subjective nature. One way in which the pain experience could be influenced might be due to differences conditioned by one’s cultural

upbringing and cultural identity (Callister, 2003; Davidhizar & Giger, 2004). Fiske, Kitayama, Markus, and Nisbett (1998) defined culture as “the belief systems and value orientations that influence norms, customs, practices, social institutions, psychological processes including language, cognition, perception, and organizations (e.g., media, educational, political, and other systems)” (as cited in American Psychological Association, 2003); and it follows that one’s cultural identity refers to the extent to which an individual associates with or adheres to his or her identified culture (Markus & Kitayama, 2010; Yoon, Langrehr, & Lee, 2010; Zou, Morris, & Benet-Martinez, 2008). With that notion, cultural context can have a strong influence on an individual’s as well as communal worldview and experiences simply because it shapes how an individual or the community interprets, processes, and reacts to stimuli (Davidhizar & Giger, 2004; Markus & Kitayama, 2010). This conceptualization can be applied to the notion of pain itself. Take for instance, the interpretation of a painful stimulus or sensation, the processing or evaluation of that stimulus in terms of its intensity or other illustrative descriptors, and, finally, the reaction brought about in response to that stimulus. On the other hand, although pain experiences may vary widely, individuals coming from the same cultural backgrounds often experience pain in somewhat more analogous manner as compared to individuals from a different culture (Davidhizar & Giger, 2004). Such correlations point to how cultural variations in these internal processing aspects could perhaps significantly influence responses to pain and alter the pain experience between groups of people.

In a review of differences in pain sensitivity between cultural groups, Edwards, Fillingim, and Keefe (2001) cited several studies that, when taken together, provide

evidence suggesting African-Americans exhibit greater pain sensitivity to painful stimuli when compared to non-Hispanic Caucasians. This has been observed both within laboratory controlled experimental studies as well as in clinical studies of acute and persistent pain. Kim et al. (2004) also found that European Americans had higher tolerance in experiments with painful cold stimuli than African Americans, Hispanics, and Asian Americans. More recently, Rahim-Williams et al. (2012) identified in their systematic review, a total of 26 studies comparing pain experiences between ethnic cultural groups. They found that African-Americans had consistently lower pain tolerance reflecting moderate to large effect sizes, which held across multiple experimental pain stimulus modalities (i.e., thermal, cold, ischemic, mechanical pressure, and electrical). They also reported variable effect sizes for pain threshold and pain tolerance in studies comparing non-Hispanic Whites to other culturally diverse groups such as those of Chinese, Japanese, and Indian heritage.

Some authors assert that one's self-determined cultural identity is what influences and contributes to how pain is experienced due to the socialization of the individual's attitudes, beliefs, and practices (Davidhizar & Giger, 2004; Rahim-Williams et al., 2012). Rahim-Williams et al. (2012) highlighted specifically for African-Americans and Hispanics that having a stronger ethnic cultural identification was associated with greater pain sensitivity. Some studies also found that individuals with a more Eastern cultural identity may experience more pain sensitivity than those endorsing a Western cultural identity. Lu, Zelter, and Tsao (2013) indicated that within the United States, Asian children exhibited increased pain sensitivity than Caucasians for laboratory-induced pain stimuli of heat and pressure. Kim et al. (2013), while validating a cross-cultural

adaptation of the Pain Sensitivity Questionnaire with a Korean sample, also established that Koreans on average exhibited higher scores in pain sensitivity than their German counterparts; further noting that Asians in general exhibit greater pain sensitivity. Despite findings of cultural differences and its association with differing pain experiences, the underlying mechanisms for such associations remain unclear.

Some studies have cited complex biological interactions between genetic variation and environmental factors as underlying mechanisms that result in biological differences between cultural groups, and how that may be associated with differences in pain sensitivity (Kim, et al., 2004; Nielson, Staud, & Price, 2009). However, these interactions and genetic correlations remain inconsistent with different stimulus modalities and experimental methods, and the full range of environmental factors (e.g., psychosocial, cognitive factors) remains understudied (Lumley et al., 2011; Nielsen et al., 2009; Nielsen et al., 2008). On that note, it appears that more research is needed to increase the understanding of cultural group differences on the experience of pain and pain sensitivity (Davidhizar & Giger, 2004; Edwards et al., 2001; Rahim-Williams et al., 2012).

Another underlying mechanism that may mediate the relationship between cultural group differences in pain sensitivity could be cultural differences within the realms of emotional processing. Firstly, as mentioned, cultural context shapes all of an individual's acquired experiential processing mechanisms, including emotional processing, as well as that of a larger societal group's via learned systems of shared beliefs and values. Secondly, the experience of pain intricately consists of emotional experiences. Thus, it follows that a group's or an individual's mechanism for pain

processing also develops and forms as part of the acquired mechanisms in relation to emotional processing that occur within the context of culture, implicating the subjective experience of pain. Taken together, this suggests that the differences between cultural groups' experiences of pain may be connected in some way via culturally specific emotional processing pathways. These emotional processing differences would have developed or been learned due to differing cultural systems and may mediate the differential experiences and sensitivity of pain observed across different cultural groups. In essence, culture influences one's emotional processing (Davidhizar & Giger, 2004; Hong, Kim, & Wolfe, 2005; Kim & Hong, 2004; Markus & Kitayama, 2010), and emotional processing is very much involved in the processing and experience of pain (de Zwaan, Biener, Bach, Wiesnagrotzki, & Stacher, 1996; Lumley et al., 2011).

Research have postulated that emotional experiences and processing develop in relation to self-construal or self-identity, and that this self-identity is heavily dependent on cultural context and identification (Hong et al., 2005; Markus & Kitayama, 2010; Zou et al., 2008). In other words, one's cultural identity informs the development of one's emotional processing. Yoon et al. (2010) assert that cultural identity is multi-dimensional and can consist of aspects such as cultural values, behaviors, attitudes, and knowledge. These aspects are what essentially differ across cultures and are what shapes identity, as well as the mechanisms of emotional processing. In Eastern cultures, public emotional expressiveness may be viewed as a personal weakness and/or a lack of character, maturity, or self-control, and so emotional restraint is instead the preferred behavior (Sue & Sue, 2012). On the other hand, Western cultures encourage openly expressing emotions in social settings, and this contrasts with how individuals from Eastern cultures

process and regulate their emotions (Chen, Cheung, Bond, & Leung, 2005; Kim, Atkinson, & Yang, 1999; Lee, 2013; Sue & Sue, 2012). Western cultures identify more with individualistic values while Eastern cultures identify more with values of collectivism, and the nature of these two types of value systems in some ways distinctly oppose each other (Kim et al., 1999; Sue & Sue, 2012). Accordingly, adherence to different cultural values and cultural identities can result in differences in emotional processing (Hong et al., 2005; Kim & Hong, 2004; Markus & Kitayama, 2010).

In an attempt to assess for adherence to cultural values, Kim et al. (1999) developed the Asian Values Scale, which was later revised by Kim and Hong (2004) using the Rasch model to become the Asian Values Scale – Revised (AVS-R). This instrument sought to distinguish Asian or Eastern values from Western values, or more specifically European American values. It can aid in quantifying an individual's level of adherence to Asian values thus constituting a high or low Asian cultural identity. In its initial development, the authors identified six latent factors on which individuals from Eastern cultures more strongly value or differ relative to Western individuals: Conformity to Norms, Family Recognition Through Achievement, Emotional Self-Control, Collectivism, Humility, and Filial Piety. However, later analyses found the scale items to be better represented by a unidimensional factor model overall. Thus, the authors stated it was best to use the entire scale score to assess adherence or distinction from such values even with the revised version of the scale. The scale was developed based on empirical and theoretical literature on European American as well as Asian values. It utilized responses that contrasted and distinguished the differences between European Americans and first-generation Asians in America. It was developed to be sensitive to

both a high or low level of adherence to Asian cultural values (Hong et al., 2005; Kim & Hong, 2004).

Although the scale was developed to measure the extent of acculturation and enculturation of Asians within the United States (providing information to distinguish first-generation Asian Americans from the general European Americans), the scale construction, concepts, and cultural value system reflected the factors that could be readily generalized to individuals from other Asian countries. Chen et al. (2005) and Lee (2013) discussed the effects of globalization of Western influences into Eastern cultures/countries, with participants from China and Singapore respectively. They noted that individuals from Eastern cultures increasingly find themselves in a state of cultural adoption and assimilation of Western values and culture (acculturation to Western culture), while also holding on to their Eastern values and cultural identity (enculturation of their own cultures). Furthermore, Kim and Omizo (2005) and Kim (2007) asserted that an increase in adherence to values of one's culture does not necessitate the reduction of adherence to values of another culture. Thus, despite being in distinct geographical settings, individuals in Eastern Asian countries might in fact find themselves undergoing similar processes of acculturation and enculturation as experienced by Asian Americans in the United States.

On a more tangent note, there may also be a similar process akin to this operative within the United States that can help understand the cultural differences between communities identifying as African American, Hispanics, and European Americans. Hispanic and African Americans seem to culturally identify themselves differently from European Americans (Sue & Sue, 2012). Given that culture is multi-dimensional,

involving both values system and expressed behaviors (Kim et al., 1999; Yoon et al., 2010), it might be possible that Hispanics and African Americans on the surface adhere to Western behaviors, but internally hold values that may be more collectivistic in nature. They may reflect values involving extended kinship/family to a higher extent, mirroring a more collective cultural identity (Kim et al., 1999; Sue & Sue, 2012) somewhat like that of Asian/Eastern cultures. Considering that such differences in cultural upbringing and cultural identity can result in differences in emotional processing – which could in turn influence the emotional experience of pain – this could partially explain the cultural differences in pain sensitivity as mentioned by Rahim-Williams et al. (2012) between cultural groups within the United States as well.

In support of that idea, a review of pain and emotions by Lumley et al. (2011) found many studies demonstrating this connection of emotional processing influencing painful experiences. For example, some studies showed alexithymia – construed as the lack of or limitation in emotional awareness, differentiating, and the labeling processes – to be frequently related to increased pain severity (Lumley et al., 2011). It has been postulated that the lack of these emotional processes causes an increase in sensitivity of one's physiological changes, including painful experiences, and more verbalizing of emotional experiences in terms of pain (de Zwaan et al., 1996), potentially drawing more attention to the pain itself. This is perhaps due to the lack of distinction or the confounding of one's internal experiences with external pain. Furthermore, the concept of emotional modulation of pain illustrates how the state and level of emotional arousal can in turn modify the pain experience. Studies on pain catastrophizing and pain-related anxiety support this notion of emotional influence on pain (Lumley et al., 2011).

Catastrophizing and anxiety have been postulated to worsen pain experiences via an individual's own creation of a highly aroused, negative emotional state. This then exacerbates the already unpleasant experience from pain, directly alters the level of attention given to the pain, thereby amplifying the pain sensation (Burns, Quartana, & Bruehl, 2008; Lumley et al., 2011). Taken together, since culture shapes emotional processing, and emotional processing affects pain, it follows that emotional processing mechanisms as conditioned or learned within cultural contexts may explain the differential pain sensitivity found between cultural groups.

While there are a number of emotional processing mechanisms employed by individuals, one such process of particular interest, with several theories and studies showing its association with the pain experience, is King and Emmon's (1990) Ambivalence over Emotional Expression (AEE). AEE is manifested as the internal conflict that exists between one's goals and desires regarding emotional expression, and the actual engaged behaviors of expression. This results in the ambivalence of what the individual chooses to do or can do with his or her emotions, and a preoccupation of one's mind in that state of being stuck (King & Emmons, 1990; Pennebaker, 1985). It creates a kind of tension or tug-of-war within the individual because the individual cannot decide or conclude on what to do with his or her emotions and whether or not to behaviorally express them. This emotional process has been linked to increased psychological distress, poorer well-being and functioning, decreased life satisfaction, lowered self-esteem, and subsequent physical health problems (King & Emmons, 1990; Pennebaker, 1985). Indeed, several theories and studies have shown that AEE is also associated with increased pain ratings (see Lumley et al., 2011). In a study by Lu, Uysal, and Teo

(2011), higher levels of AEE were correlated with greater self-reported pain (during a regular week-long interval) on the MPQ. Although catastrophizing was found to fully mediate the relationship between AEE and scores on the MPQ, this may or may not hold in the relationship of AEE with other aspects of the experience of pain, such as pain sensitivity. In yet another study, with chronic low back pain patients, AEE was found to be associated with higher scores on the MPQ, as well as reflected in higher levels of anger, with state anger specifically mediating the relationship between AEE and pain ratings (Carson et al., 2007). Thus, it appears that AEE may serve as a factor when it comes to painful experiences.

Pennebaker (1985) explained that it is not the lack of emotional expression that causes a state of internal conflict or psychological pain, but rather the pain that arises from an obsession or conflict about the non-expression of oneself despite the desire to do so. It is this internal tension and stress that is particularly harmful about AEE. As such, the construct of AEE strives to distinguish individuals whose emotional processing may result in similar outward presentations as that of alexithymia or a less expressive personality, but whose emotional processing does not reflect the same ambivalence as that of AEE (King & Emmons, 1990). AEE can have three different forms: (1) having the desire to express emotions but actively preventing oneself from doing so, (2) having an expressed emotion but having no intention of doing so, and (3) having expressed an emotion but later on regretting it (King & Emmons, 1990). These three components have been phrased alternatively by Katz and Campbell (1994) as inhibited expression, reluctant expression, and regretted expression (as cited in Chen et al., 2005).

Although AEE was developed and conceptualized within a Western culture, the concept of ambivalence seems to be readily generalizable to Eastern cultures beyond the origins based in the West as demonstrated by studies done in China and Singapore (Chen et al., 2005; Lee, 2013, 2009). Lee (2009) showed ambivalence to be a valid in Singapore, along with similar factor structures via cluster analysis and confirmatory factor analysis. Chen et al. (2005) showed the concept to exist in China, although the factor structure was contested. Nonetheless, the authors showed AEE to be valid, further suggesting that AEE may be relevant as it relates to the globalization of Western influences into Eastern cultures. Individuals from Eastern cultures are increasingly adopting and assimilating Western values of emotional expressiveness personally (acculturation into the dominant Western culture) but have to do so within a larger community culture that does not value such expressiveness or are at odds with such Western values, or while holding on to their cultural identity (enculturation of their own Eastern culture) (Chen et al., 2005; Lee, 2013, 2009). Being at odds leads to much internal ambivalence, and therefore increased emotional distress. These situations and interactions, within the acculturation-like and enculturation-like processes, seem to illustrate the internal tension and conflict between desired goals of emotional expression as in AEE. In addition, since emotional processing mechanisms are cultivated differently in various cultures, with the Eastern culture preferring emotional restraint and control and the Western culture readily embracing emotional expressiveness, AEE may possibly be present at higher levels within individuals from an Eastern culture than individuals from a Western culture. Evidence for this possibility may be reflected in King and Emmons (1990) having found a mean score of 2.90 ($SD = 0.58$) from a sample of Michigan State

University students aged 18 to 26, while Lee (2013) found a mean score of 3.35 ($SD = 0.61$) from a sample of Singaporean high school students aged 14 to 18, both with similar factor structure. Despite age differences, it may be possible that cultural differences in AEE exist, with individuals from Eastern cultures scoring higher on average than individuals from Western cultures.

Accordingly, AEE as an emotional process could influence the experiences of pain by modifying the psychological/emotional component of pain. This modification of the pain experience may vary, according to the differing levels of AEE endorsed by individuals and their communities, which are embedded within larger cultural contexts. This could affect the way pain experiences are understood cross-culturally and managed in healthcare settings. Research suggests that unravelling cultural group differences in the experience of pain would serve to identify culturally unique variables that could have important influences on the pain experience and that are vital to developing treatment strategies so that clinical care and treatment for pain becomes more relevant and proficient cross-culturally (Burns et al., 2008; Carson et al., 2007; Davidhizar & Giger, 2004; Edwards et al., 2001; Lu, Zelter, & Tsao, 2013; Rahim-Williams et al., 2012).

Returning to the topic of pain itself, an additional aspect of interest is the notion of pain sensitivity. Pain sensitivity is the overall response tendency of individuals to potentially respond to pain stimuli. Individuals with higher pain sensitivity reflect a greater pain responsiveness, that is stronger and more intense, to painful stimuli. While pain sensitivity is dependent on subjective self-reports, it remains among the most reliable measures of the experience of pain (Callister, 2003; Nielsen et al., 2008), and therefore aids in the assessment of whether treatment for pain and pain management

strategies are working for the individual. According to Ruscheweyh, Marziniak, Stumpenhorst, Reinholz, and Knecht (2009), the concept of pain sensitivity is commonly used in experimental settings to capture and quantify the subjectivity of the pain experience. This has increasing importance as it presents an emerging functionality generalizable to clinical applications and settings. Research has shown that experimental pain sensitivity ratings may be able to predict later pain ratings and responses when assessed in a clinical setting, for example, pre-surgery experimental pain ratings predicting post-surgery pain (Ruscheweyh et al., 2009). In addition, it has been postulated that having higher pain sensitivity increases the risk for later development of chronic pain disorders, and that chronic pain patients with higher experimental pain sensitivity respond less well to treatment than patients with lower experimental pain sensitivity (Nielsen et al., 2009; Ruscheweyh et al., 2009). Thus, the measure of pain sensitivity may be useful in predicting clinical outcomes, aiding in personalizing pain treatment (that may perhaps be culturally relevant and therefore more effective), allowing for research conclusions to be more generalizable, and have a potentially greater clinical relevance than other pain dimensions such as pain tolerance or thresholds in some clinical outcomes.

Pain sensitivity can be assessed with the Pain Sensitivity Questionnaire (PSQ) as developed and validated by Ruscheweyh et al. (2009). The PSQ is a self-rating instrument that assesses the level of pain sensitivity based on the individual's responses, seeking to capture or predict the person's "general pain sensitivity." In developing the PSQ, the authors compared it against actual assessments of comprehensive laboratory pain experiments involving a range of modalities from heat, cold, pressure, and pinprick,

and showed the PSQ to be a valid measure for general pain sensitivity. Scores represented “an average over modalities, locations, and time points in healthy subjects” (Ruscheweyh et al., 2009), but uses subjective ratings of pain intensity or how painful a stimuli and/or experience is to the specific individual. The authors explained that experimental pain sensitivity assessments usually involve a battery of different stimuli modalities, which meant requiring a myriad of allocated equipment, manpower, time, and other related costs to execute. This also meant having to subject participants to actual painful stimuli during experiments, which could produce a number of logistical issues and/or confounding effects. Thus, another benefit of using the PSQ might be to help eliminate factors such as the catastrophizing and anticipatory anxiety that can arise from situational anticipation or expectation of a physically painful stimulus, in turn decreasing the risk and psychological consequences endured by participants. Thus, Ruscheweyh et al. (2009) developed the PSQ in aspiration for an effective alternative in assessing pain sensitivity, one without the actual tissue damage or stimulation.

In continuous consideration of pain as a multi-dimensional experience, there are also number of additional influential variables that have to be considered during an investigation of the pain experience. For example, as briefly mentioned, biological sex/gender is one factor that has been shown to correlate to differences in pain experiences and in individual variation of pain sensitivity; women are said to experience more pain than men, and women are at a greater risk for pain conditions (Courbalay, Deroche, & Woodman, 2015; Kim et al., 2004; Racine et al., 2012a; Racine et al., 2012b). However, in a recent review, some authors have concluded that the last 10 years of research on biological sex/gender and pain provided no definite or persistent pattern of

biological sex/gender-based differences in pain sensitivity (Racine et al., 2012a; Racine et al., 2012b). They reviewed 172 articles published between 1998 and 2008 and found that while biological factors were concluded as inconsistent, the aspects of social influences, cognitive factors, and differences in experimental methodology and statistical analyses may better account for the patterns of obtained biological sex/gender-related differences. As such, the authors advised to be mindful when analyzing such relationships. Nonetheless, despite mixed findings on the effects of biological sex/gender differences on pain, it remains an important factor to consider in any study on pain experiences until a better association or understanding can be established.

Yet another factor that has long been said to influence pain is personality. Specifically, neuroticism has been linked to individuals who experience more pain and who exhibit poorer coping and reactions to illness or pain (Boggero, Smart, Kniffinm & Walker, 2014; Courbalay et al., 2015; John, Naumann, & Soto, 2008; Payne, Seidman, Lung, Zeltzer, & Tsao, 2013). Neuroticism is the tendency to cognitively and emotionally appraise events more negatively, and can directly impact any personal experience, including the experience of pain. Studies have shown that neuroticism is associated to the pain experience via more negative internal affective and cognitive processing of the pain stimuli (Boggero et al., 2014; Courbalay et al., 2015; Payne et al., 2013), and providing more support to the notion of pain being influenced by an emotional process. Neuroticism was found to be positively associated to pain catastrophizing and pain-related anxiety (Kadimpati, Zale, Hooten, Ditre, & Warner, 2015) although the influences may be bidirectional. It was also found to partially influence pain responses even in healthy adults and youths (Boggero et al., 2014; Payne et al., 2013). While it has

been postulated that healthy individuals with higher levels of neuroticism may be more likely to have greater responses to pain, the exact relationship remains unclear. In a study using a sample of pain-free adults, Boggero et al. (2014) found that personality traits alone had no significant effects on pain tolerance but that they moderated the relationship between blood pressure and pain tolerance. Payne et al. (2014) found in their study, using a sample of healthy children, that anxiety sensitivity or the fear of anxiety-like physical sensations partially mediated the relationship between neuroticism and laboratory pain responses. These authors highlight the need for more research on personality and pain responses in pain-free populations. Nonetheless, it remains important to control for potential covariates such as personality, more specifically neuroticism, in any study of pain and pain sensitivity.

Given this background, the objective was to investigate cross-cultural differences in AEE, and if these differences were associated with differences in pain sensitivity. The broad aim of this study was to seek a better understanding of the range of experiences of pain sensitivity by examining if differences in the emotional processes of AEE exist cross-culturally between Eastern and Western cultural samples, and the extent to which any differences in this emotional processing may influence the subjective experience of pain as measured by the variations in level of pain sensitivity. Thus, the following hypotheses were proposed for investigation: (1) the levels of AEE will be higher on average within the sample representing an Eastern culture than the sample representing a Western culture; (2) levels of pain sensitivity will be higher on average in the sample representing the Eastern culture; (3) stronger adherence to Asian cultural values will be positively associated with higher levels of pain sensitivity, thus the sample representing

an Eastern culture will show a stronger relationship in this than the sample representing the Western culture; (4) stronger adherence to Asian cultural values will be positively associated with higher levels of AEE, thus the sample representing an Eastern culture will show a stronger relationship in this than the sample representing the Western culture; and (5) higher levels of AEE will be associated to higher levels of pain sensitivity in both samples, with the sample representing Eastern culture having a stronger relationship than the sample representing a Western culture thereby reflecting cultural group differences.

CHAPTER II

Method

Participants

Healthy university students, without any major physical ailments/impairments or mental disorders, were invited to participate in this study. As this study aimed to do a cross-cultural comparison, there were two culturally different samples: (1) 28 participants between the ages of 21 and 25, from Singapore (21 being the age of majority in Singapore), served as a sample representing Eastern culture; and (2) 43 participants between the ages of 18 and 25 (18 being the age of majority in Texas), from Sam Houston State University in Huntsville, Texas, served as a sample representing Western culture. Pertinent to the research question, other inclusion criteria included participants having spent most of their childhood living in their respective nations or in nations that aligned with the Eastern/Western culture distinction, or participants who self-identified with local cultural heritages. Thus international students or recent foreign migrants were excluded from the samples. Firstly, selecting university students was intended to increase the general comparability between the Eastern and Western participants in terms of education and reading level, which can influence responses on the measures used in this study that are in the English language. Secondly, selecting healthy participants was to facilitate filtering out possible confounding variables such as comorbid emotional/psychological (e.g., depression, anxiety) and other medical/physical symptoms that can influence the pain experience (Courbalay et al., 2015; de Zwaan et al., 1996; Kadimpati et al., 2015; Lumley et al., 2011; Payne et al., 2013).

Design

This study utilized a between-subjects design, focused on a cross-cultural comparison of the samples representing Eastern and Western culture. Participants were invited to complete questionnaires at their own time in one sitting via an online platform. Recruitment remained open until as many responses were collected as possible within the duration of one and a half years.

Measures

Demographic questionnaire. Participants first responded to a general demographic questionnaire that collected basic information such as age, current level of education, nationality, place of birth, places lived, ethnicity, biological sex, and any known physical or mental health afflictions. This information was used to filter the data collected and ensured that participants met the inclusion criteria.

Patient Health Questionnaire – Somatic, Anxiety, and Depressive Symptom Scales (PHQ-SADS). The Patient Health Questionnaire was originally developed by Spitzer, Kroenke, and Williams (1999) as a self-administered measure to screen for symptoms of five common concerns in primary care settings: depression, anxiety, somatoform, alcohol, and eating disorders. It has been repeatedly established as an efficient method for screening and monitoring, with the somatoform, anxiety, and depression modules being the most utilized (Kroenke, Spitzer, Williams, & Lowe, 2010); thus, the PHQ-SADS consists of 15, 7, and 9 items respectively. In a review by Kroenke et al. (2010), the three modules in the PHQ-SADS were found to have internal consistency coefficients of .80 to .92 across studies, and via receiver operating characteristic analyses were also found to have area under curve of .76 to .95. Each

module demonstrated good criterion validity, across several studies, to corresponding disorders with sensitivity and specificity values ranging from .66 to .89 and .71 to .94 respectively. The measure is available in over 60 languages, including Mandarin Chinese and Korean, and has been shown to be well-validated for symptom detection on a global level (Kroenke et al., 2010; Pfizer, 2010). The PHQ-SADS was used to ensure participants had met the inclusion criteria by filtering out those who exhibited clinically significant levels of psychological symptoms of depression, anxiety, and/or somatic complaints regardless of whether they have received any definite diagnoses. According to Kroenke et al. (2010), scores of 0 to 4 on each of the PHQ-SADS modules represents minimal levels of symptoms endorsed, and scores of 5 to 9, 10 to 14, and more than 15 reflect mild, moderate, and severe levels respectively. In addition, the authors cite a global rating 5, 10, and 15 points as reflecting increasing levels of symptom severity for the PHQ-SADS, with 10 points representing symptoms or conditions that may be of clinical significance. As recommended by the authors, this study used a cutoff of 9 points and below on each module as part of the inclusion criteria to retain only healthy participants with minimal levels of symptoms.

Big Five Inventory (BFI). The BFI was developed by John, Donahue, and Kentle (1991) with the aim to assess for the prototypical five factors of personality. The goal was to create a measure that allowed for a more efficient method to assess for core factors without the need to investigate further differentiation of the factor facets (Benet-Martinez & John, 1998; John, Naumann, & Soto, 2008), which is sufficient for purposes of this study to assess the core trait of Neuroticism. The measure consists of 44 items, 8 of which pertain to neuroticism, and all of which are short phrases that achieve the goal

of brevity while also avoiding common issues of ambiguous or multiple meanings pertaining to single word definitions. The authors maintained that this approach ultimately results in higher interrater agreement on scores (John, Naumann, & Soto, 2008). The BFI phrases were derived from the trait adjectives that define the Big Five, and final items were selected using factor analyses in large samples of junior college and university students (John, Naumann, & Soto, 2008). This measure has been validated in studies as described in Benet-Martinez and John (1998) and John, Naumann, and Soto (2008), and was shown to have high internal consistencies on all five factors with reliability coefficients across studies of .86 to .88 for Extraversion, .79 for Agreeableness, .82 for Conscientiousness, .84 to .87 for Neuroticism, and .81 to .83 for Openness, as well as an overall mean reliability coefficient of .83. The BFI demonstrated divergent validity among the five factors with low discriminant correlations of absolute values averaging .20 overall (the highest being .31). The BFI also demonstrated substantial convergent validity to a longer measure of the Big Five, the NEO-FFI, with convergent validity correlations of .83 for Extraversion, .98 for Agreeableness, .95 for Conscientiousness, .93 for Neuroticism, and .90 for Openness, after controlling for acquiescence factors in participants' responding. The overall mean for convergent validity of the BFI to the NEO-FFI was .93. Finally, the BFI shows cross-cultural utility with its availability in various language translations.

Asian Values Scale – Revised (AVS-R). To assess identification with Asian cultural values – pertinent to the research question – participants also completed the AVS-R. The AVS-R was used to distinguish the samples based on high or low adherence to Asian cultural values, and the information used in the analyses of cultural identity

influences/differences with regard to levels on AEE and pain sensitivity. The questionnaire has a total of 25 items. Each item is rated on a 4-point Likert scale, with higher scores denoting stronger agreement to Asian values. The authors of the questionnaire recommended using the entire scale score to collectively assess cultural values adherence due to its unidimensional model.

Kim and Hong (2004) developed and provided psychometric properties for the AVS-R. Based on the Rasch model, the AVS-R reflects a person separation (akin to Cronbach's alpha) reliability of .86, and an item separation reliability of .99, both of which reflect the measure's overall reliability to be in good range (above .80). The AVS-R demonstrated concurrent validity with a correlation of .93 with the original version of the scale in which Kim et al. (1999) found the original AVS to have coefficient alphas of .81 and .82 across different studies, and a two-week test-retest reliability coefficient of .83. Evidence of concurrent validity for the original version also included confirmatory factor analyses with the Individualism-Collectivism Scale developed by Triandis (1995), reflected in a Goodness-of-Fit Index of .973, Comparative Fit Index of .972, and Normed Fit Index of .961, thus, overall demonstrating a good fit. The unidimensionality of the AVS-R was also supported by infit and outfit mean square (MNSQ) values as delineated by the Rasch model. In addition, the authors strived to maintain divergent validity in the development of its items by comparing responses from first-generation Asian Americans and European Americans. Although the measure has not been validated with the intended Eastern sample from Singapore, the development of this measure might allow for adaptation and generalization. The AVS-R development sample involved participants aged 18 to 38, with Asian ancestry from India, China, and more specifically Southeast

Asian countries including Cambodia, Laos, Philippines, Thailand, and Vietnam.

Singaporeans not only share common ancestry from India and China, but Singapore is also a Southeast Asian nation, surrounded by the aforementioned countries. As such, the cultural values reflected in the AVS-R likely mirror those identified by Singaporeans, and the instrument is likely to be reasonably valid for use.

Ambivalence over Emotional Expression Questionnaire (AEQ). Participants responded to the AEQ as developed by King and Emmons (1990) to assess their levels of AEE. There are a total of 28 items in the AEQ. Each item is rated on a 5-point Likert scale, with higher scores denoting higher ambivalence levels (King & Emmons, 1990; Lee, 2013). Items on the AEQ consist of two conflicting thoughts (e.g., I feel angry and want to express it, but I do not), and participants are instructed to view each item by its overall meaning (e.g., endorsing both the desire to express an emotion and the behavior of not doing so) when rating how much the item applies to them. As such, participants should give a high rating to an item only if both conflicting thoughts are endorsed by the individual. In addition, there are no negatively worded items because of concerns that wording may affect accurate and reliable responding, particularly with items on the AEQ that already endorse confusing or complex ideas. In terms of psychometric properties, King and Emmons (1990) have shown the AEQ to have an internal consistency coefficient of .89 and a mean inter-item correlation of .23 with the minimum being .02 and the maximum being .64. They also showed the AEQ to have a 6-week test-retest reliability coefficient of .78. In addition, they performed an exploratory factor analysis which yielded two factors on the AEQ, namely, ambivalence over the expression of positive emotions and ambivalence over the expression of negative emotions. However,

with further confirmatory factor analysis, the authors concluded that because the two clusters were so highly correlated ($r = .71$) the AEQ assessed AEE best as a single general construct. Furthermore, Lee (2013) showed that the AEQ also performed well as a single general construct with an alpha reliability coefficient of .90 and a one-factor structure with a sample of participants from Singapore.

Pain Sensitivity Questionnaire (PSQ). Pain sensitivity in this study was assessed with the PSQ as developed and validated by Ruscheweyh et al. (2009). The PSQ consists of 17 items that represent situations in which pain may be experienced in daily life. Participants rated each item on a 0 to 10 scale, with higher scores denoting higher anticipated pain in each situation. When compared against actual assessments of comprehensive laboratory pain experiments – involving a range of modalities from heat, cold, pressure, and pinprick – the PSQ demonstrated criterion validity with a high significant correlation to pain intensity ratings ($r = .56, p < 0.001$). Although the PSQ assesses pain sensitivity best as one factor, represented by a PSQ-total score for all 14 painful items on the questionnaire, it was also shown to have a valid two factor model reflecting two components of differentiating levels of pain. These 2 components are represented by scores named the PSQ-moderate and PSQ-minor, with each component accounting for 7 specific items on the questionnaire. The PSQ has been shown to have a Cronbach's alpha of .92 for PSQ-total, .91 for PSQ-moderate, and .81 for PSQ-minor, and a test-retest intra-class correlation coefficient of .83 for PSQ-total, .79 for PSQ-moderate, and .86 for PSQ-minor, over an interval of one to three weeks. The PSQ also showed convergent validity with a correlation of .45 with the Pain Catastrophizing Scale (PCS), and divergent validity with correlations of .24, .15, and .19 with measures of

depression, trait anxiety, and state anxiety. While the English version of the PSQ (Sellers, Ruscheweyh, Kelley, Ness, & Vetter, 2013) has not yet been validated specifically with healthy samples from an Eastern/Asian population or from Singapore, the constructs assessed by the PSQ have, however, been validated with a Korean clinical population.

Kim et al. (2013) did a translation and cross-cultural adaptation of the PSQ. It was established that the adaptation revealed the same factors of PSQ-moderate and PSQ-minor, and mirrored patterns similar to the original versions. The Korean PSQ showed a Cronbach's alpha of .926, .869, and .877 for the PSQ-total, PSQ-minor, and PSQ-moderate respectively. Item-total correlations ranged from .581 to .779 for the PSQ-total, and there were significant correlations with the PCS at .377 for PSQ-total, .365 for PSQ-minor, and .362 for PSQ-moderate, similar to the original English version of the PSQ. The Korean PSQ also showed test-retest intra-class correlations with an interval of 4 weeks to be .782 for PSQ-total, .752 for PSQ-minor, and .793 for PSQ-moderate. As such, the authors concluded that the values were similar to the originally developed PSQ and thus validated in the Korean sample. This Korean translation and adaptation of the PSQ suggests that the PSQ is generalizable for use with an Asian population.

Procedures

Eastern sample. The invitation to participate in the study was advertised and distributed in Singapore via online platforms. Participants were recruited via word-of-mouth, social networks, internet forums, and online media platforms such as Facebook appealing to people within these social networks to participate in the study. The measures were uploaded onto SurveyMonkey, and the link shared within the invitation.

Participants were instructed to access the online platform to submit their responses.

Participants also had to complete the measures in one sitting, which took about 10 to 30 minutes. The order of the questionnaires was: (1) demographic questionnaire, (2) PHQ-SADS, (3) BFI, (4) AVS-R, (5) AEQ, and (6) PSQ.

Western sample. Details about the study were advertised within Sam Houston State University and welcomed eligible students to participate. These participants were also directed to complete the measures in one sitting, lasting approximately 10 to 30 minutes; and the order of questionnaires was the same.

CHAPTER III

Results

Survey response profiles for both samples were first collected and stored via SurveyMonkey, after which only completed survey response profiles were collated. Each profile was reviewed according to the inclusion and exclusion criteria and discerned for final inclusion in the analyses. Some reasons for exclusion were based on demographic responses (e.g., self-identifying as an international person in that country), and self-reports of previous or presenting health conditions which may confound the associations of interest in this study (e.g., scoliosis, post-surgical pain conditions, or complaints of being symptomatic). Other reasons were based on cutoff scores of 10 and above on the PHQ-SADS, which is considered as endorsing moderate-to-severe levels of symptom burden on depression, anxiety, and somatization; all of which could again contribute to confounds. A final reason was failing the face-validity check questions on the PSQ, responding with high ratings on non-painful items (i.e., responding with “very painful” on the item “when showering with lukewarm water”).

Sample 1 participants representing an Eastern culture (volunteers from Singapore)

A total of 69 completed survey response profiles were collected online, of which 28 profiles were viable for use with data analyses based on aforementioned inclusion criteria. The respondents in this sample were on average 22.07 years old (age range between 21 and 25 years), and largely female in biological sex (78.6%). All were born in Singapore, except 2 participants, (1 born in Indonesia, 1 born in Hong Kong), who had spent much, if not all, of their childhood being raised (at least 6 out of 12 years of pre-adolescent period) in Singapore. There were 2 participants who expressed having some

childhood experiences growing up in another country or Southeast Asian country (i.e., 1 participant having spent 2 years in Indonesia and 3 years in Australia, and another having spent 2 years in Hong Kong) before eventually settling down in Singapore from age 7 and age 3. Nonetheless, all participants culturally self-identified as being of Chinese, Malay, or Indian heritage even when given the option of declaring otherwise.

Table 1

Means and Standard Deviations for Sample 1 on the PHQ-SADS and BFI

	Age	PHQ-S Score	PHQ-A Score	PHQ-D Score	BFI- Neuroticism Score
Mean	22.07	4.54	3.00	3.54	2.99
Std. Deviation	1.12	2.03	2.45	2.53	0.55
Skewness	0.70	-0.20	0.73	0.51	0.25
Kurtosis	-0.13	0.06	-0.43	-0.79	0.00

Note. $n = 28$

The scores on the dependent measures for this sample appeared to be normally distributed, and so homogeneity of variance was assumed. The means and standard deviations for the AVS-R, AEQ, and all 3 components of the PSQ can be found below in Table 2. Prior to between sample comparisons, preliminary analyses were done to check for confounding variables of concern (i.e., biological sex and age) that might have been associated with the responses on the dependent measures. While age was not significantly associated, biological sex was significantly associated with scores on the AVS-R in this sample. Particularly, females ($M = 55.86$, $SD = 4.78$) scored significantly lower than males ($M = 62.17$, $SD = 3.37$) on the AVS-R, $t(26) = -3.01$, $p < .01$ (two-

tailed), $d = 1.18$. Thus, biological sex was controlled for as a covariate in the later analyses.

Table 2

Means and Standard Deviations for Sample 1 on Dependent Measures

	AVS-R Score	AEQ Score	PSQ-TOTAL Score	PSQ-MOD Score	PSQ-MIN Score
Mean	2.29	3.11	3.20	4.67	2.97
Std. Deviation	0.207	0.70	1.08	1.57	1.24
Skewness	0.05	-0.59	0.06	-0.54	0.82
Kurtosis	-0.60	1.14	-0.01	-0.06	0.19

Note. $n = 28$

Sample 2 participants representing a Western culture (Sam Houston State University students from Texas, United States)

A total of 181 completed survey response profiles were collected online, of which 43 profiles were viable for use based on the aforementioned inclusion criteria. The respondents in this sample were on average 20.28 years old (age ranged between 18 and 25 years), and also largely female in biological sex (81.4%). All participants were born in the United States, and most had spent much, if not all, of their childhood being raised (at least 8 out of 12 years of pre-adolescent period) in the United States. There were 2 participants who expressed having some childhood experiences growing up in another country on the European or South American continent (i.e., 6 years in Europe, 2 years in Columbia respectively). Regardless, all participants culturally self-identified themselves as being of North American heritage, even when given the open option of declaring otherwise.

Table 3

Means and Standard Deviations for Sample 2 on the PHQ-SADS and BFI

	Age	PHQ-S Score	PHQ-A Score	PHQ-D Score	BFI- Neuroticism Score
Mean	20.28	4.65	2.53	2.65	2.58
Std. Deviation	1.98	2.76	2.03	2.64	.76
Skewness	0.69	-0.17	0.51	0.80	0.02
Kurtosis	-0.21	-0.94	-0.77	-0.47	-0.85

Note. $n = 43$.

The scores on the dependent measures for this sample appeared to be normally distributed, and so homogeneity of variance was assumed. The means and standard deviations for the AVS-R, AEQ, and all 3 components of the PSQ can be found below in Table 4. Once again, prior to between sample comparisons, preliminary analyses were done to check for confounding variables of concern (i.e., biological sex and age) that might have been associated with the responses on the dependent measures. For this sample, neither age nor biological sex appeared to be significantly associated with scores of the dependent measures. Nonetheless, due to the findings from Sample 1, biological sex was also controlled for as a covariate in the later analyses for this sample.

Table 4

Means and Standard Deviations for Sample 2 on Dependent Measures

	AVS-R Score	AEQ Score	PSQ-TOTAL Score	PSQ-MOD Score	PSQ-MIN Score
Mean	2.45	2.63	2.86	4.49	2.33
Std. Deviation	0.26	.73	1.18	1.92	1.25
Skewness	-1.03	-.28	.289	.34	1.04
Kurtosis	2.50	-.44	-.64	-.80	1.11

Note. $n = 43$.

Between-group comparisons and hypotheses outcomes

Prior to analyzing the dependent variables across samples, Neuroticism was analyzed as part of a confound of concern across samples. It was found that Sample 1 ($M = 2.99$, $SD = 0.54$) scored significantly higher on Neuroticism than Sample 2 ($M = 2.58$, $SD = 0.75$), $t(82) = 2.61$, $p = .01$, $d = 0.63$. Neuroticism therefore was included, in addition to biological sex, as a covariate for later analyses of between group comparisons.

Between group analyses began with univariate analysis of variance and was used to test between-subject effects of Sample 1 and Sample 2, for all dependent variable measures; controlling for biological sex and Neuroticism as covariates. Firstly, results indicated that Sample 1 ($M = 2.29$, $SD = 0.21$) scored significantly lower than Sample 2 ($M = 2.45$, $SD = 0.26$) on the AVS-R, $F(1, 67) = 5.77$, $p = .02$, $\eta_p^2 = 0.08$; showing that Sample 2 identified with an Asian values system significantly more than Sample 1 did. Secondly, Sample 1 ($M = 3.11$, $SD = 0.70$) scored significantly higher than Sample 2 ($M = 2.63$, $SD = 0.73$) on the AEQ, $F(1, 67) = 2.98$, $p = .09$, $\eta_p^2 = 0.4$. This indicated that hypothesis 1 – predicting that levels of AEE to be higher on average within the sample representing an Eastern culture than the sample representing the Western culture – was

supported with this data. Thirdly, although not statistically significant, Sample 1 consistently scored higher than Sample 2 on all three components of the PSQ (see Table 5 below). This indicated that while there was not enough evidence in support of hypothesis 2 – levels of pain sensitivity were higher on average in the sample representing Eastern culture – there appeared to be a pattern congruent to the initial prediction when comparing the responses of both samples.

Table 5

Univariate Analysis of Variance of Between-Subject Effects on Components of the PSQ

Components	Means and Standard Deviations	<i>F</i>	<i>p</i> -value	η_p^2
PSQ Total Score	Sample 1 (<i>M</i> = 3.20, <i>SD</i> = 1.08)	<i>F</i> (1, 67) = 0.56	.45	0.01
	Sample 2 (<i>M</i> = 2.86, <i>SD</i> = 1.18)			
PSQ Moderate Score	Sample 1 (<i>M</i> = 4.67, <i>SD</i> = 1.57)	<i>F</i> (1, 67) = 0.125	.73	< 0.01
	Sample 2 (<i>M</i> = 4.49, <i>SD</i> = 1.92)			
PSQ Minor Score	Sample 1 (<i>M</i> = 2.97, <i>SD</i> = 1.24)	<i>F</i> (1, 67) = 1.66	.20	0.02
	Sample 2 (<i>M</i> = 2.33, <i>SD</i> = 1.25)			

Following that, linear regression analysis was used to investigate the relations between each dependent variable, within each sample before cross-sample associations could be compared (see Table 6, Table 7, Table 8 below for Sample 1, and Table 9, Table 10, Table 11 for Sample 2). Overall, there were no statistically significant associations within each sample on the dependent variables, and so no significant different relations could be set up to compare or concluded across samples. As such, the data failed to support Hypotheses 3, 4, and 5 in either sample (i.e., stronger adherence to Asian cultural values will be positively associated with higher levels of pain sensitivity, stronger adherence to Asian cultural values will be positively associated with higher

levels of AEE, and higher levels of AEE will be associated with higher levels of pain sensitivity, respectively).

Table 6

Regression between AVS-R Scores and Component Scores of PSQ Adjusting for Covariates of Biological Sex and Neuroticism Scores in Sample 1

Dependent Variable	<i>t</i>	<i>p</i> -value
PSQ-Total Score	-0.66	.51
PSQ-Moderate Score	-0.61	.55
PSQ-Minor Score	-0.60	.55

Note. n = 28

Table 7

Regression Between AVS-R Scores and AEQ Scores Adjusting for Covariates of Biological Sex and Neuroticism in Sample 1

Dependent Variable	<i>t</i>	<i>p</i> -value
AEQ Total Score	1.04	.31

Note. n = 28

Table 8

Regression Between AEQ Scores and Component Scores of PSQ Adjusting for Covariates of Biological Sex and Neuroticism Scores in Sample 1

Dependent Variable	<i>t</i>	<i>p</i> -value
PSQ-Total Score	-0.36	.72
PSQ-Moderate Score	-0.93	.36
PSQ-Minor Score	0.34	.73

Note. n = 28

Table 9

Regression Between AVS-R Scores and Component Scores of PSQ Adjusting for Covariates of Biological Sex and Neuroticism in Sample 2

Dependent Variable	<i>t</i>	<i>p</i> -value
PSQ-Total Score	0.72	.47
PSQ-Moderate Score	0.76	.45
PSQ-Minor Score	0.26	.80

Note. *n* = 43

Table 10

Regression Between AVS-R Scores and AEQ Scores Adjusting for Covariates of Biological Sex and Neuroticism in Sample 2

Dependent Variable	<i>t</i>	<i>p</i> -value
AEQ Total Score	0.58	.57

Note. *n* = 43

Table 11

Regression Between AEQ Scores and Component Scores of PSQ Adjusting for Covariates of Biological Sex and Neuroticism in Sample 2

Dependent Variable	<i>t</i>	<i>p</i> -value
PSQ-Total Score	0.38	.71
PSQ-Moderate Score	0.49	.63
PSQ-Minor Score	0.42	.67

Note. *n* = 43

CHAPTER IV

Discussion

Overall, the study showed mixed findings based on the results of the data collected from the two samples, supporting only one out of the five original hypotheses. Specifically, only Hypothesis 1 – predicting the levels of AEE to be higher in the sample representing Eastern culture than the sample representing Western culture – was supported to a medium effect size. Given the existing research about differences within emotional processing systems, preferences for emotional expressions, and the variation in values systems between diverse cultures that can be generally distinguished as hailing from the East and the West (Chen et al., 2005; Davidhizar & Giger, 2004; Edwards et al., 2001; Hong et al., 2005; Kim et al., 1999; Kim & Hong, 2004; Kim & Omizo, 2005; Lee, 2013, 2009; Markus & Kitayama, 2010; Rahim-Williams et al., 2012; Sue & Sue, 2012; Yoon et al., 2010; Zou et al., 2008), this finding aligns with patterns in research literature in regards the concept of ambivalence. On the other hand, while the remaining hypotheses were neither statistically supported, nor significantly conclusive, there appeared to be observable patterns worthy of further investigation and discussion.

First, the current data did not support Hypothesis 2 – predicting pain sensitivity to be higher on average in the sample representing Eastern culture than the sample representing Western culture. There was not enough evidence to confidently conclude that pain sensitivity differed significantly between the two samples in this study. However, while none of the differences proved to be statistically significant, the analyses did show Sample 1 to have consistently scored higher than Sample 2 across all components of this measure (see Table 5). Thus, there seemed to be a pattern of interest

congruent with findings from previous research literature about cultural group differences in the experiences of pain and pain sensitivity (Davidhizar & Giger, 2004; Edwards et al., 2001; Kim et al., 2004; Kim et al., 2013; Lu et al., 2013; Nielsen et al., 2009; Nielsen et al., 2008; Rahim-Williams et al., 2012); particularly with the idea that samples identifying as Asian or groups with a stronger ethnic cultural identity as a collective tend to score higher on pain experiences and sensitivity. Perhaps this finding might have found better support with larger sample sizes, further raising some questions about the samples used for this study.

In addition to the samples being small and with a disproportionately large female count, attempts were made during the profile reviewing process to ensure that potentially confounding variables would be minimized in both samples. As such, strict inclusion/exclusion criteria were used to filter and eliminate response profiles that presented these confounding elements (i.e., individuals who endorsed existing ailments that might elevate/alter their pain sensitivity response profile in a clinically significant manner). Both samples were also deliberately curated for outlier variables and/or significant influences, that were then statistically adjusted/accounted for prior to the between-group analyses. The overall strictness of this approach may have resulted in more than normal highly selective samples that restricted exploration of the phenomena under study. Also, findings might be different if carefully selected clinical conditions were included in the aim or emphasis for a cross-cultural study.

Moving on, Hypotheses 3 and 4 attempted to predict possible associations between the dependent variables of levels of AEE and adherence to Asian cultural values, and levels of pain sensitivity and adherence to Asian cultural values respectively. The notion of

cross sample comparisons (in attempt to investigate cross-cultural differences) was entirely dependent on the expectation that the sample representing Eastern culture would score higher on Asian values with the AVS-R, congruent to how the scale was developed. In other words, that Sample 1 representing an Eastern/Asian culture would score higher than Sample 2. This is an idea supported by some research showing that Singapore is generally considered Asian in its cultural systems and perspectives even though Western influences are present in today's globalized world (Lee, 2013, 2009). However, this was not the case with the current data set (see Table 2 and Table 4). Rather, the data showed that Sample 2, representing Western culture, obtained statistically significantly higher scores than Sample 1. Due to the violation of this expectation, the differences in the scores of the AVS-R between samples, in and of itself, became an area of interest for further exploration.

With further exploration, Sample 2 was discovered to endorse a ratio of participants not normally representative of the ratio in the census of the general population. Specifically, the number of participants who self-identified as Black or of African American heritage (28%) and who self-identified to be of Hispanic heritage (19%) accounted for larger percentage of the sample; and analyses showed that participants who self-identified with these ethnic cultural identities indeed were scoring higher than participants self-identifying as White or European Americans of the dominant culture on the AVS-R. This pattern reflects findings from existing research literature and theories that posit ethnic cultural identities, such as African American and Hispanic communities, within the United States differ from the dominant culture and align more with culturally collectivistic values (Kim et al., 1999; Rahim-Williams et al., 2012; Sue

& Sue, 2012; Yoon et al., 2010). Keeping in mind that the AVS-R was developed to specifically distinguish Eastern from Western values based on a history of European American literature, this imbalance of distribution of representation within the sample – in addition to already small sample size with both samples – may have contributed to the overall higher or elevated endorsement of values reflected in the AVS-R within Sample 2 over Sample 1.

Moreover, individuals can also vary on the spectrum of ethnic cultural values endorsement even if they are of the same ethnic cultural background due to, for example, varying individualized experiences of the introduction or adoption of ideas contrary to the traditional ethnic culture. Particularly for individuals hailing from Eastern cultures, Chen et al. (2005) and Lee (2013, 2009) discussed the cultural effects of globalization, culture exchange, and westernization/modernization of Eastern societies; including Singapore even if it is considered to be largely Asian. This might, for example, help to explain the lowered AVS-R scores that were observed with Sample 1. Some of the participants in Sample 1 were discovered to have had some history of exposure to overseas educational training or exchanges, specifically at schools in Europe or the United States. This was not specifically considered in the inclusion/exclusion criteria because when university students were selected as samples, the language and reading levels were emphasized as the focus of concern. Furthermore, another interesting exploratory observation was the differences in AVS-R scores between males and females. Data for this study showed that in Sample 1, males scored higher than females to the point of statistical significance resulting in the decision to include biological sex as a covariate in the later analyses. This pattern, however, was not reflected in Sample 2 despite having a similar biological

sex ratio/distribution. One can only speculate what this means for the adherence of cultural values and gender differences, or whether the AVR-S assessed Asian cultural values per se as opposed to just aspects of collectivistic values endorsed by communities both within and outside of what is considered Asian; perhaps as adherence to cultural values overall have changed over time given the effects of cultural movements and feminism in more recent years.

Returning to Hypotheses 3 and 4, analyses showed the evidence to be insufficient to demonstrate any significant association between the variables of interest, thus failing to support either hypothesis. Nonetheless, some patterns of interest were observed in the data. Firstly, Sample 1 and Sample 2 displayed completely opposite directions of associations for Hypothesis 3. Specifically, Sample 2 displayed positive association (i.e., higher scores on AVS-R were associated with higher scores on the PSQ) congruent to the initial prediction, while Sample 1 displayed the opposite negative association (i.e., higher scores on AVS-R were associated with lower scores on the PSQ). Secondly, both samples displayed a similar direction of association for the variables congruent to the initial prediction of Hypothesis 4 (i.e., higher scores on AVS-R were associated with higher scores on the AEQ).

Several explanations may account for these observations. Once again, the lack of support for significance might be due to the limited sample size; perhaps the associations can be better verified with a larger sample size. It might also be possible that an entirely different or additionally weighted cultural notion may be more relevant in describing the directions of associations in AEE and pain sensitivity. One aspect that comes to mind is that of stoicism in regard to individual expression operating in Sample 1. Research has

shown Eastern cultures to regard emotional expressiveness as a personal weakness, and stoicism or emotional restraint as being better valued, which is counter or contrary to Western values (Chen et al., 2005; Kim et al., 1999; Lee, 2013; Sue & Sue, 2012). This could be a facet to consider in the observed pattern of differences between samples, or perhaps there is more to the relationship between cultural values and levels of AEE..

Another possible consideration might be sample distribution again, in that culturally specific participant subgroups (i.e., African American, Hispanic, and European American heritage) within Sample 2 may be displaying patterns in this data consistent with previous studies; or responded differently on the measures in relation to each other. Participants who self-identified as being of Hispanic heritage scored higher than the other two subgroups on the AVS-R, and participants who self-identified as being of African American heritage scored higher on the AEQ compared to the other two cultural subgroups. Moreover, participants self-identifying as of African American heritage scored consistently higher on all three components of the PSQ, followed by participants of Hispanic heritage, compared to other subgroups. This pattern is consistent with previous studies claiming that a stronger ethnic cultural identification, particularly African American and Hispanic in the United States, may endorse values more akin to collectivistic Asian culture (Sue & Sue, 2012) and were associated with greater pain sensitivity (Rahim-Williams et al., 2012).

Lastly, for Hypothesis 5, there remains insufficient evidence to support the prediction that higher levels of AEE to be positively associated with higher levels of pain sensitivity. This hypothesis attempted to investigate between the two samples, if these two culturally distinct samples showed different patterns or strengths of association in

said variables. Perhaps as each operated on differential degrees of emotional processing (i.e., AEE) within unique cultural contexts (i.e., adherence to Asian cultural values), they may have demonstrated cultural differences in experiences of pain. However, once again, because of the expectation violation with the AVS-R, analyses were inconclusive. While no significant associations were found in either sample and no meaningful conclusions could be reached, it is interesting to note that the directions of associations differed specific to each sample or each component being assessed (see Table 8 and Table 11); and perhaps a larger, more representative sample could better distill and illustrate the distinctions better, if any.

To summarize, there are a number of potential unknown factors that might have influenced the outcome with several limitations and considerations to be taken into account. To recap, firstly, the use of a highly selective, small sample may have resulted in a restricted range of potential variability in obtained scores. Secondly, the non-normally distributed cultural representation in Sample 2 may also have masked or less accurately represented any associations between the variables compared to a sample more representative of the population from which the sample was drawn. Thirdly, additional conceptual considerations that may be relevant to the hypothesis. Lastly, this study included relatively healthy individuals. There may be a possibility of variation in responses on the variable of pain sensitivity when the assessment is based on healthy samples compared to assessing well-defined clinical samples of patients with pain. Perhaps pain sensitivity may be less evident and/or have less cultural variation when it comes to healthy participants; and/or cultural differences in responses to pain sensitivity may be more likely to be detected in a clinical sample. It might be that persons with pain

conditions exhibit pain sensitivity responses that have already been altered by cultural influences as they navigated their pain experiences over time; something that healthier participants may not have had to do or spent much time doing. Thus, pain sensitivity may evolve based on a given environment and based on personal worldviews derived from various internal processes (e.g., emotional processing of culture-based beliefs in pain coping), but only when it holds a more consistent or significant weight in the pain experience narratives, like that of clinical samples as compared to healthy participants. Therefore, the overall relations among variables of ambivalence over emotional expression and pain sensitivity, in the context of culturally distinct self-identified Eastern versus Western cultural values may be more complex than originally conceptualized; and require refinement of future research directions.

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APPENDIX A

Institutional Review Board Approvals



Institutional Review Board
Office of Research and Sponsored Programs
 903 Bowers Blvd, Huntsville, TX 77341-2448
 Phone: 936.294.4875
 Fax: 936.294.3622
irb@shsu.edu
www.shsu.edu/~rgs_www/irb/

DATE: April 20, 2016

TO: Tammy Lee [Faculty Sponsor: Dr. David Nelson]

FROM: Sam Houston State University (SHSU) IRB

PROJECT TITLE: *Ambivalence over Emotional Expression and Pain Sensitivity: A Cross-Cultural Comparison [T/D]*

PROTOCOL #: 2016-03-26164

SUBMISSION TYPE: INITIAL REVIEW—RESPONSE TO MODIFICATIONS

ACTION: APPROVED

APPROVAL DATE: April 19, 2016

EXPIRATION DATE: **April 19, 2017**

REVIEW TYPE: EXPEDITED

REVIEW CATEGORIES: 7

Thank you for your submission of your **Response to Modifications** for this project. The Sam Houston State University (SHSU) IRB has **APPROVED** your submission. This approval is based on an appropriate risk/benefit ratio and a project design wherein the risks have been minimized. All research must be conducted in accordance with this approved submission.

This submission has received **Expedited** Review based on the applicable federal regulation.

Please remember that informed consent is a process beginning with a description of the project and insurance of participant understanding followed by a signed consent form. Informed consent must continue throughout the project via a dialogue between the researcher and research participant. Federal regulations require each participant receive a copy of the signed consent document.

Please note that any revision to previously approved materials must be approved by this committee prior to initiation. Please use the appropriate revision forms for this procedure which are found on the Application Page to the SHSU IRB website.

All UNANTICIPATED PROBLEMS involving risks to subjects or others and SERIOUS and UNEXPECTED adverse events must be reported promptly to this office. Please use the appropriate reporting forms for this procedure. All Department of Health and Human Services and sponsor reporting requirements should also be followed.

This letter has been electronically signed in accordance with all applicable regulations, and a copy is retained within Sam Houston State University IRB's records



Institutional Review Board
 Office of Research and Sponsored Programs
 2405 Avenue I, Suite E, Huntsville, TX 77341-2448
 Phone: 936.294.4875
 Fax: 936.294.3622
irb@shsu.edu
www.shsu.edu/~rgs_www/irb/

DATE: April 21, 2017

TO: Tammy Lee [Faculty Sponsor: Dr. David Nelson]

FROM: Sam Houston State University (SHSU) IRB

PROJECT TITLE: *Ambivalence over Emotional Expression and Pain Sensitivity: A Cross-Cultural Comparison [T/D]*

PROTOCOL #: 2016-03-26164

SUBMISSION TYPE: CONTINUING REVIEW

ACTION: APPROVED

APPROVAL DATE: April 20, 2017
EXPIRATION DATE: April 20, 2018

REVIEW TYPE: EXPEDITED

REVIEW CATEGORIES: 7

Thank you for your submission of your **Continuing Review** for this project. The Sam Houston State University (SHSU) IRB has **APPROVED** your submission. This approval is based on an appropriate risk/benefit ratio and a project design wherein the risks have been minimized. All research must be conducted in accordance with this approved submission.

This submission has received **Expedited Review** based on the applicable federal regulation.

Please remember that informed consent is a process beginning with a description of the project and insurance of participant understanding followed by a signed consent form. Informed consent must continue throughout the project via a dialogue between the researcher and research participant. Federal regulations require each participant receive a copy of the signed consent document.

Please note that any revision to previously approved materials must be approved by this committee prior to initiation. Please use the appropriate revision forms for this procedure which are found on the Application Page to the SHSU IRB website.

All UNANTICIPATED PROBLEMS involving risks to subjects or others and **SERIOUS** and **UNEXPECTED** adverse events must be reported promptly to this office. Please use the appropriate reporting forms for this procedure. All Department of Health and Human Services and sponsor reporting requirements should also be followed.

All **NON-COMPLIANCE** issues or **COMPLAINTS** regarding this project must be reported promptly to this office.

This letter has been electronically signed in accordance with all applicable regulations, and a copy is retained within Sam Houston State University IRB's records

APPENDIX B

Recruitment Materials



The following verbiage will be used to advertise on media platform to recruit participants from **Singapore**:

"Hello, my name is Tammy Lee and I am a Master's student with Sam Houston State University.

As part of my Thesis research, under the supervision of David V. Nelson, Ph.D., I am looking at how emotional expression and pain sensitivity are related in different cultures, such as in Singapore and the United States. As such, I am seeking the participation of individuals who are between the ages of 21 to 25 to complete an online survey.

The survey consists of demographic (e.g., age, sex, education level) and other personal background information (e.g., health issues), aspects of personality, preferences for dealing with emotion, and typical responses to painful situations. There are minimal anticipated risks in completing this survey. However, because some of the items make references to personal medical/psychological history. Some individuals might experience increased discomfort or distress while responding to the survey. On that note, please be assured that all responses will be collected in a de-identified manner that ensures your responses are recorded anonymously. Please respond to the items as truthfully as possible. Also, should you feel any sort of increased distress or discomfort, please see below for a list of helplines/support platforms in which you can reach out to in order to obtain assistance in coping in Singapore:

Samaritans of Singapore (SOS), 24 hours: 1800-221 4444

– For people in crisis, thinking of suicide or affected by suicide.

Counselling and Care Centre, Mondays to Fridays 9.00am – 4.00pm: 6536 6366

– For those who are facing emotional, psychological, relationship and marital problems

WINGS Counselling Centre, Mondays to Fridays 8.30am – 5.30pm, Saturdays: 9am – 1pm: 6383 5745

– For individuals of all ages with socio-emotional, personal or family related problems

Thank you very much for your participation and I would appreciate it if you would pass the invitation on to others who might also be willing to participate."

APPENDIX C

Permissions for Use of Specific Questionnaires and Measures

2/28/2018

Re: Request for Permission - Asian Values Scale - Revised - Lee, Tammy

Re: Request for Permission - Asian Values Scale - Revised

Bryan Kim, Ph.D. <bryankim@hawaii.edu>

Thu 3/17/2016 4:12 PM

To: Lee, Tammy <tammy.lee@shsu.edu>;

1 attachment

AVSRevisedPacket.doc;

Dear Tammy:

Thank you for your interest in the AVS-R. Attached is the scale and its scoring instructions. You have my permission to use the scale for your thesis but please do not make any changes to the items, as doing so could change the scale's psychometric properties. Good luck with your research!

Bryan

Bryan S. K. Kim, Ph.D.
 Professor of Psychology
 Director of MA Program in Counseling Psychology
 (Specialization: Clinical Mental Health Counseling)
 Department of Psychology
 University of Hawai'i at Hilo
 200 W. Kawili Street
 Hilo, Hawai'i 96720-4091
 Tel: 808-932-7090
 Fax: 808-932-7098
 Email: bryankim@hawaii.edu
<http://www2.hawaii.edu/~bryankim>

Editor, "Asian American Journal of Psychology"
 Associate Editor, "Measurement & Evaluation in Counseling & Development"
 Fellow, American Psychological Association (Divisions 17, 29, & 45)
 Fellow, Asian American Psychological Association
 Fellow, International Academy of Intercultural Research

On 3/17/2016 8:58 AM, ty002@shsu.edu wrote:

Dear Dr. Kim,
 How are you?

My name is Tammy Lee, and I am an international graduate student pursuing an MA in Clinical Psychology at Sam Houston State University in Texas. I am currently working on my Master's thesis, and am writing in hopes to seek your permission to use the Asian Values Scale – Revised as developed by you.

My master's thesis is, in summary, trying to look a cross-cultural comparison, with a sample of Singaporean and American adults, the levels of Ambivalence in Emotional Expression and Pain Sensitivity, and whether the variations are related to differential adherence to cultural values, more specifically Asian Cultural Values. As such, I was wondering if I might be allowed access to the Asian Values Scale – Revised for use with my thesis?

Thank you very much, and hope to hear from you soon Dr. Kim.

Yours sincerely,

<https://mail.shsu.edu/owa/ReadMessage.aspx?itemID=AAM&ADK3M2QzNWRLTEyMzQ@NDRjZS1hZjMzLTkxYjM2M2RnOTUxOABGAA...> 1/2

2/28/2018

RE: Request for Permission - Ambivalence in Emotional Expressi... - Lee, Tammy

RE: Request for Permission - Ambivalence in Emotional Expression Questionnaire

King, Laura A. <kingla@missouri.edu>

Mon 3/21/2016 9:34 AM

To: Lee, Tammy <tammy.lee@shsu.edu>;

Sure the scale I not trademarked or anything—you can use it however you like!!

Cheers,

Laura

Laura A. King, Ph.D.
Curators' Professor of Psychological Sciences
210 McAlester Hall
University of Missouri, Columbia 65201
Phone: (573) 239-7729
FAX: (573) 882-7710

From: tyl002@shsu.edu [mailto:tyl002@shsu.edu]
Sent: Thursday, March 17, 2016 12:50 PM
To: King, Laura A. <kingla@missouri.edu>
Subject: Request for Permission - Ambivalence in Emotional Expression Questionnaire

Dear Professor King,

How are you?

My name is Tammy Lee, and I am an international graduate student pursuing an MA in Clinical Psychology at Sam Houston State University in Texas. I am currently working on my Master's thesis, and am writing in hopes to seek your permission to use the Ambivalence in Emotional Expression Questionnaire as developed by you.

My master's thesis is, in summary, trying to look a cross-cultural comparison, with a sample of Singaporean and American adults, the levels of Ambivalence in Emotional Expression and Pain Sensitivity, and whether the variations are related to differential adherence to cultural values, more specifically Asian Cultural Values. As such, I was wondering if I might be allowed to access the Ambivalence in Emotional Expression Questionnaire for use with my thesis?

Thank you very much, and hope to hear from you soon Professor King.

Yours sincerely,

Tammy Lee

Graduate Student at Sam Houston State University

Email: tammy.lee@shsu.edu

Contact: 936 577 9880

VITA

EDUCATION

M.A. Clinical Psychology, GPA 4.0

Projected graduation: August 2018

Sam Houston State University, Huntsville, Texas

Completed practicum training at:

- *Federal Correctional Institute, Beaumont, Texas*
- *Kingwood Pines Hospital, Kingwood, Texas*

Thesis title: *Ambivalence over Emotional Expression and Pain Sensitivity: A Cross-Cultural Comparison*

ACADEMIC / PROFESSIONAL EXPERIENCE

Head Graduate Assistant

January 2017 – December 2017

Sam Houston State University, Political Science Department, Huntsville, Texas

- Responsible for organizing and coordinating departmental duties
- Research assistant in collecting and organizing research data
- Assisted professors with grading, proctoring, and other administrative duties

Graduate Assistant

January 2016 – December 2016

Sam Houston State University, Political Science Department, Huntsville, Texas

- Research assistant in collecting and organizing research data
- Assisted professors with grading, proctoring, and other administrative duties

PUBLICATION

Thong, I. S. K., Tan, G., **Lee, T. Y. C.**, & Jensen, M. P. (2017). A comparison of pain beliefs and coping strategies and their association with chronic pain adjustment between Singapore and United States. *Pain Medicine*, 18(9), 1668-1678.
doi:10.1093/pm/pnw237

SCHOLARSHIP

College of Humanities & Social Sciences Graduate Student Scholarship

2013 – 2016, 2018

Office of Graduate Studies Scholarship 2018

VOLUNTEER SERVICE

Crisis Text Line Trained Crisis Counselor

July 2016 – Present

- 262 hours to date

American Red Cross Volunteer

September 2017 – Present

- 47 hours to date