

**Influence of Cultural Contexts on Daily Stress Experiences: Perception of Interpersonal vs.  
Non-Interpersonal Situations among European Canadian and Japanese Undergraduate  
Students**

by

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## Abstract

Daily stress experiences are significantly shaped by how people appraise and react to situations. While cultural psychologists suggest that people from different cultures interpret and react to situations differently based on their self-construal (how the self is defined in terms of an individual's self-other relations), few studies have tested how people's self-construal is manifested in daily stress processes. Using a situation sampling method, we examined cultural differences in how European-Canadians and Japanese appraise both interpersonal events, which involve interactions with others, and non-interpersonal events, which do not involve interactions with others (Study 1A). Additionally, we analyzed the descriptions of daily stress events using a text analysis approach (Study 1B). These lead to different levels of self-reported mental and physical distress (Studies 2 and 3). Further, we assessed whether self-construals mediate the association between culture and interpersonal distress (Study 3). The results of these three studies showed that European-Canadians, who perceive themselves as distinct from relationships, rated non-interpersonal events as more stressful and prevalent than interpersonal events, whereas Japanese, who perceive themselves embedded in relationships, rated interpersonal events as equally stressful and prevalent as non-interpersonal events. Further, we found that European-Canadians expressed mental aspects of distress more frequently in their descriptions, whereas Japanese expressed physical and social aspects of distress. This cultural difference in situational appraisal was further manifested in self-reported mental and physical distress. Importantly, stronger interdependent (relative to independent) self-construals explain why people from different cultures experience different levels of interpersonal distress. These results are discussed in terms of how culture shapes daily stress processes.

*Keywords:* Culture, Daily Stress, Self-Construals, Situation Sampling, Situational Appraisal

## Preface

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CHAPTER 1

General Introduction

According to a Canadian community health survey in 2017, twenty percent of the total population aged 12 and over reported that they perceived most days in their life as ‘quite a bit’ or ‘extremely’ stressful. Most people experience stress on a daily basis, and these experiences significantly affect emotional and physical well-being (Bolger, DeLongis, Kessler, & Schilling, 1989; DeLongis, Folkman, & Lazarus, 1988). Stress is defined as people’s perceptions that situations are more than their ability to handle them, and their emotional and physical reactions to such situations (Lazarus & Folkman, 1984). Imagine having an argument with a romantic partner, family member, or friend. If you appraise this situation as a stressful one, you might react to the situation emotionally with feelings of distress, or physically with a racing heartbeat. Accumulative impact of daily stress may lead to clinical conditions such as depression or anxiety (Booij, Snippe, Jeronimus, Wichers, & Wigman, 2018; Kessler, 1997; Mazure, 1998) and physical illnesses such as cardiovascular disease (Leger, Charles, & Almeida, 2018), and even a higher risk of mortality (Chiang, Turiano, Mroczek, & Miller, 2018).

To understand the various health outcomes from stress, Lazarus and Folkman (1984) suggested that situational appraisal, in which people evaluate a situation on how relevant it is to their goals and values, significantly determines how frequently and intensely people experience negative affect in daily life (Bolger et al., 1989; Marco & Suls, 1993). While Lazarus and Folkman (1984) did not consider culture as part of their model, cultural psychologists have suggested that people from different cultures interpret and react to a situation differently based on their culturally-shaped self-construals (Kitayama & Masuda, 1995; Markus & Kitayama, 2010; Varnum, Grossmann, Kitayama, & Nisbett, 2010). Individuals from Western cultures (i.e. European-descent North Americans) tend to perceive themselves as being separate from their environment, and place greater value on recognizing and expressing their mental states, i.e.,

*independent self-construals*. Conversely, individuals from East Asian cultures (i.e. Chinese, Japanese, and Koreans) tend to view themselves as being embedded in relationships with others, and place greater value on maintaining social harmony over expressing themselves, i.e., *interdependent self-construals*.

This self-construal framework plays an important role in understanding cultural influences in people's situational appraisals, which lead to different emotional reactions (Kitayama, Mesquita, & Karasawa, 2006; Mesquita & Leu, 2007). Although prior research has acknowledged the influence of social contexts such as perceived neighborhood environments and cultural differences in these processes of stress (Caspi, Bolger, & Eckenrode, 1987; Hashimoto, Mojaverian, & Kim, 2012), few studies have empirically tested how self-construal is key in explaining the role of cultural contexts in daily stress processes. Since a situation sampling method can directly measure how people from different cultures would react to culturally-dominant stressful situations in which members of each culture find themselves, we adopted this method to examine different patterns of situational appraisal and manifestations of distress among undergraduate student samples in Canada and Japan (Kitayama, Markus, Matsumoto, & Norasakkunkit, 1997; Morling, Kitayama, & Miyamoto, 2002). The term 'distress' is used to describe a sense of discomfort related to symptoms of depression. Additionally, we targeted undergraduate samples because these samples tended to share more similar life goals (achievement and affiliation goals) and demographic characteristics (educated, industrialized, rich, and democratic) compared to community samples with varied demographic characteristics (Erikson, 1982; Henrich, Heine, & Norenzayan, 2010). Such controlled university settings allow the present research to identify cultural differences in daily stress experiences. For our future research, we plan to target middle-aged samples who tend to have multiple role-related stresses,

from being an employee at work to being a spouse and a parent at home, to increase the generalizability of the present research.

### **Culture and Cognitive Processes of Emotions**

Lazarus and Folkman (1984) proposed that cognitive appraisals of situations function as a key mediator between person-environment interactions and health outcomes. Appraisals of situations occur when people assess how strongly a situation pertains to their well-being and health (Folkman & Moskowitz, 2000). Specifically, when a situation threatens people's pursuit of goals and values, people appraise the situation more intensely and experience more mental distress (Lee-Flynn, Pomaki, DeLongis, Biesanz, & Puterman, 2011; Timmermans, Van Mechelen, & Nezlek, 2009). For example, if people perceive that their performance at exams determines their long-term career goals, they appraise taking exams as more stressful, and react to this situation with a greater intensity of distress compared to those who do not perceive exams as important to their career goals.

While Lazarus and Folkman (1984) considered emotions as a result of individuals' internal processes, cultural psychologists have suggested that "emotions are scripts that are socially shared, constructed, and often conventionalized, and they are collectively enacted within a given cultural group" (Kitayama & Masuda, 1995, p. 220). These cultural influences on emotions originate from differing orientations of independent and interdependent self-construals (Markus & Kitayama, 2010; Varnum et al., 2010). Westerners from more independent-oriented cultural contexts tend to disentangle the individual self from their relationships, and place greater value on recognizing and expressing their mental states. In contrast, East Asians from more interdependent-oriented cultural contexts tend to perceive themselves as being embedded in relationships with others, and place greater value on maintaining social harmony. Empirical

findings have supported the influence of culturally-dominant self-construals on cognitive processes of emotions. This include cultural differences in how people appraise situations (Kitayama et al., 2006; Mesquita & Ellsworth, 2001), how people react emotionally to situations (Chentsova-Dutton & Tsai, 2010; Tsai, Chentsova-Dutton, Freire-Bebeau, & Przymus, 2002), and how people describe their emotional experiences (Ryder et al., 2008; Tsai, Simeonova, & Watanabe, 2004).

For example, people in independent-oriented cultural contexts (North America) appraise socially-disengaging situations (such as getting higher scores in the exam than other classmates) more intensely, whereas people in interdependent-oriented cultural contexts (East Asia) appraise socially-engaging situations (such as having good interactions with their friends) more intensely. Based on these distinctive appraisals of situations, they experience correspondingly different emotions. North Americans tend to report experiencing socially-disengaging emotions (pride and frustration) more strongly than socially-engaging emotions (feelings of closeness and guilt), whereas East Asians show the opposite pattern (Kitayama et al., 2006). Further, when expressing emotional experiences, people from different cultures adhere to culturally-dominant scripts; North Americans tend to emphasize their internal states in the experiences (“I feel proud or frustrated”), whereas East Asians tend to highlight their physical states (“I got sick”) and social relations (“I feel close to my friends”; Ryder et al., 2008; Tsai et al., 2004). Taken together, cultural research in the field of emotions has broadened our understanding of how cultural affordances shape cognitive processes of emotion.

### **The Role of Self-Construals in Situation Appraisals and Emotional Reactivity**

With an emphasis on how people’s cognitive processes of emotion are constructed through interaction with their cultural contexts, cultural psychologists suggest using a framework

of self-construals in explaining how people from different cultures appraise and react to situations differently (Kitayama & Masuda, 1995; Mesquita & Ellsworth, 2001). This approach is rooted in a new understanding of the individual self and its relationships with close others. Researchers have found supporting evidence for how different levels of independent (versus interdependent) self-construals across cultures influence people's different appraisal patterns of social contexts and non-social contexts (Masuda et al., 2008; Oishi, Diener, Scollon, & Biswas-Diener, 2004).

For instance, Oishi and his colleagues found that, compared to cultural groups with stronger independent self-construals (European Americans), cultural groups with stronger interdependent self-construals (Japanese and Indian) showed greater variability in mood throughout the day due to their stronger appraisals of social contexts compared to non-social contexts. In this study, participants in three countries were asked to report their experiences of positive emotions (e.g., calm, happy) or negative emotions (e.g., sadness, worry) five times a day. They also stated whether they were alone, with people close to them, or with a stranger at the time of reporting. The results showed that Indian and Japanese participants tended to rate stronger emotions when they were with close others than when they were alone or with a stranger, showing that they tended to appraise their emotions by considering the context. In contrast, European Americans who experienced either positive or negative emotions in one situation also tended to report consistent states of emotions in other situations, showing that their emotions were not affected by the changing context. Thus, cultural modes of self-construals influence the degree to which people attend to and appraise the contexts where emotions arise, leading to correspondingly different emotional reactions.

To explain the underlying mechanism of cultural differences in situational appraisal and emotional reactivity, prior research has suggested whether the activation of culturally-dominant self-construals in given situations leads to different emotional reactivity (Chentsova-Dutton & Tsai, 2010; Tsai et al., 2002; Tsai & Levenson, 1997). For example, when people from independent- or interdependent-oriented cultures think about recent experiences of failure in an exam (activation of their independent self) or of a relationship breakup (activation of their interdependent self) then watch a sad film, Chentsova-Dutton and Tsai (2010) hypothesized that people would show stronger emotional reactions to the film when their culturally-dominant self-construal is activated. To test this hypothesis, they asked European-Americans and Asian-Americans to think about themselves or family members, then induced them to experience positive or negative mood through films and music. The results showed that while both European- and Asian-Americans activated either their independent or interdependent self-construal by thinking about themselves or family members, European Americans who activated their independent self-construals experienced greater emotional reactivity in self-reported emotional experiences, facial behavior, and physiological reactivity during mood induction than Asian-Americans. In contrast, Asian-Americans who activated their interdependent self-construals experienced greater emotional reactivity than European-Americans. These results suggest that social and non-social situations may activate cultural modes of self-construals, which lead to different emotional reactivity across cultures.

Extending prior cross-cultural research on the role of self-construals in emotional processes, a recent study highlighted cultural differences in the perceived frequency of stressful interpersonal events between American and Japanese undergraduates (Hashimoto et al., 2012). They found that Japanese undergraduates tended to report stressful interpersonal events as more



pervasive and experience greater psychological distress, compared to American undergraduates. These cultural differences may be explained by positing a greater tendency of appraising negative social events as threatening to pursuing social goals among East Asians as compared to North Americans (Heine, Lehman, Markus, & Kitayama, 1999; Uchida & Kitayama, 2009). East Asians' threat appraisals of interpersonal issues are associated with their stronger adoption of avoidance coping (Elliot, Chirkov, Kim, & Sheldon, 2001; Li, Adams, Kurtis, & Hamamura, 2015), which results in more frequent symptoms of depression and anxiety (Mak, Law, & Teng, 2011; Norasakkunkit, Kitayama, & Uchida, 2012; Sato, Yuki, & Norasakkunkit, 2014).

### **The Role of Self-Construals in Emotional Expressions**

Beyond intensifying emotional reactivity, cultural modes of self-construal also play a role in how people describe their emotional experiences (Kitayama, Markus, & Kurokawa, 2000; Mesquita & Karasawa, 2002). Cross-cultural literature on psychopathology has extensively documented cultural variations in the distress symptoms that people focus on (Chentsova-Dutton & Tsai, 2009; Kirmayer, 2001; Kirmayer & Ryder, 2016; Marsella, Kaplan, & Suarez, 2002). Specifically, while the mental aspect of distress is often emphasized among North American clinical populations, the somatic aspect of distress symptoms is often emphasized among East Asian clinical populations including Chinese (Parker, Cheah, & Roy, 2001; Ryder et al., 2008), Koreans (Keyes & Ryff, 2003; Pang, 2000), and Japanese (Kirmayer, 1993; Tanaka-Matsumi & Marsella, 1976; Waza, Graham, Zyzanski, & Inoue, 1999). Also, depressed patients in general express more physical symptoms than non-depressed patients (Arnault, Sakamoto, & Moriwaki, 2006).

Although many theories have been proposed to explain these cultural differences in presentations of distress symptoms (Ryder, Ban, & Chentsova-Dutton, 2011), we suggest that

expressions of distress reflect culturally-different conceptions of emotion associated with self-construals. As predicted by the role of self-construals in cultural scripts of emotions, people from Western cultures tend to focus on mental aspects of emotions such as feelings separate from bodily states and social contexts, and place greater value on expressing their emotions. In contrast, people from East Asian cultures tend to focus on mental aspects as well as their relations to bodily states and social contexts, and place greater value on being emotionally reserved for the sake of social harmony (Kitayama & Masuda, 1995; Ots, 1990). To date, only a few studies offer empirical support for the association between the cultural dimension of self-construals and the distinction- versus the integration- view of mental, physical, and interpersonal distress (Kirmayer, 1993; Ryder et al., 2008; Ying, Lee, Tsai, Yeh, & Huang, 2000).

Specifically, prior research documents culturally-specific symptom reporting among Japanese clinical populations. In line with a cultural emphasis on a greater sensitivity to interpersonal relationships compared to other societies, Japanese clinical populations often express physical symptoms to describe a wide range of interpersonal stresses (Kirmayer, 1993; Lock, 1987). For example, targeting cultural variations in expressions of depression between Americans and Japanese, Waza and his colleagues (1999) found that whereas American depressed patients tended to present greater mental symptoms than their Japanese counterparts, Japanese depressed patients tended to express greater physical complaints including abdominal distress, neck and shoulder discomfort, or headaches, compared to American patients.

Similarly, a recent study by Ryder and his colleagues (2008) offered partial support for a cultural difference in symptom-reporting between European-Canadian and Chinese outpatients by using multiple assessment methods (interviews and self-reported symptom questionnaires). They found that while European-Canadian outpatients showed a more consistent tendency of

emphasizing mental symptoms of distress (e.g., feeling depressed or hopeless) across different methods, Chinese outpatients tended to emphasize physical symptoms of distress (e.g., having physical fatigue or pain), particularly in interview settings where they verbally described their experiences of symptoms. Further, cultural variations in symptom-reporting may emerge from the degree to which individuals allocate attention to their emotional states. That is, the focus of mental symptoms among European-Canadian outpatients could be explained by their tendency to pay more attention to their emotional states, whereas the focus of physical symptoms among Chinese outpatients could be explained by their tendency to pay less attention to their emotional states.

Additionally, several researchers, who included non-clinical populations from each culture in their studies, have suggested culturally-different conceptions of emotion in how people use different words to express emotional experiences (Choi, Chentsova-Dutton, & Parrott, 2016; Tanaka-Matsumi & Marsella, 1976; Tsai et al., 2004). For example, Tanaka-Matsumi and Marsella (1976) analyzed word associations to the equivalent English and Japanese words of ‘depression’ and ‘yuutsu’ among undergraduate students in America and Japan. They found that Americans associated predominantly emotional referent terms, such as ‘sad’ and ‘lonely’, to the English word ‘depression’. Conversely, Japanese associated more external referent terms, such as ‘rain’ and ‘cloud’, and somatic referent terms, such as ‘headache’ and ‘fatigue’, to the Japanese word of ‘yuutsu’.

Such cultural differences in emotional expressions have also been shown independently of language use. When both European-Americans and Chinese-Americans were asked to talk about areas of conflict with their romantic partners in English, Chinese-Americans preferred to use somatic terms (e.g., ache, exhaust) and social terms (e.g., friend, mother) more than

European-Americans. Differences in the level of acculturation were also associated with differences in word use, such that less acculturated Chinese-Americans used somatic and social words more frequently than more acculturated Chinese-Americans (Tsai et al., 2004, Study 2). Using the same method of text analysis, a recent study replicated these culturally-distinctive patterns of expressing emotion, this time comparing Americans with Koreans. It demonstrated that Koreans tended to perceive the use of somatic words as more effective in communicating their emotional experiences, while Americans did not show such a tendency (Choi et al., 2016).

These findings suggest that these culturally-distinctive conceptualizations of emotion associated with self-construals may lead people from different cultures to allocate their attention differently, either to internal states (feelings) or external states (physical states and social contexts) of emotion. However, it is still unclear what psychological factors underlie these cultural differences. In our present research, we attempt to explain cultural differences in manifestations of daily distress based on the framework of self-construals.

### **The Present Research**

As aforementioned, many researchers in various fields have acknowledged the critical role of culture in influencing cognitive processes of emotions (Kitayama & Masuda, 1995). However, few studies have investigated potential cultural variations in daily stress experiences and examined the underlying mechanisms of why these cultural differences may take place. In the three studies that follow, we specifically examined cultural differences in how people appraised stressful interpersonal events (involving interactions with others) and non-interpersonal events (not involving interactions with others; Study 1A). Additionally, using a text analysis approach, we analyzed how people from different cultures used different words to describe their daily stress experiences (Study 1B). Further, the patterns of situation appraisals

across cultures resulted in differing manifestations of mental and physical distress (Studies 2 and 3). We further assessed the mediating role of self-construals in explaining these cultural differences (Study 3).

In Study 1A, we collected participants' concrete examples of daily stress as samples of their culturally-dominant situations. Specifically, we asked European-Canadian and Japanese undergraduate students to describe situations in which they experienced stress from interpersonal situations and from non-interpersonal situations. We then asked the participants to rate how stressful each type of situation was. We hypothesized that, consistent with cultural modes of self-construals in appraisals of situations (Hashimoto et al., 2012; Kitayama et al., 2006; Oishi et al., 2004), European-Canadians, who tend to have stronger independent self-construals (a stronger orientation of personal goals than relational ones), would appraise non-interpersonal events (e.g., failing exams) as more stressful than interpersonal ones (e.g., arguments with friends). Conversely, Japanese, who tend to have stronger interdependent self-construals (a stronger orientation towards relational goals than personal ones), would appraise interpersonal events as more stressful than non-interpersonal events (**Hypothesis 1a**). Similarly, this pattern would be consistent in their perceived prevalence of stressful events. That is, European-Canadians would perceive stressful non-interpersonal events as more prevalent than interpersonal ones, whereas Japanese would perceive interpersonal events as more frequent than non-interpersonal events (**Hypothesis 1b**).

In Study 1B, we also analyzed the text of the sampled stressful situations from Study 1A, exploring whether people from different cultures describe their emotional experiences differently. Specifically, we counted the use of emotional, social, and somatic words across cultures. Informed by prior work by Tsai and her colleagues (2004), we expected to find cultural

differences in how people use different words in describing their experiences of distress, such that European-Canadians, who tend to place greater value on expressing mental states and who think of mental states as being independent from physical or social states, would describe emotional states more frequently. Meanwhile, Japanese, who tend to be reserved in their expression of mental states and who think of mental states as being integrated with physical and social states, would use social words and somatic words more frequently (**Hypothesis 1c**).

In Studies 2 and 3, we investigated the extent to which people would manifest mental and physical symptoms of distress elicited by typical cultural situations, which we collected for each culture. Another set of participants from each culture were asked to imagine themselves experiencing a random selection of the situations generated in Study 1A. In each situation, they were asked to report how likely they would experience their distress mentally (e.g., feeling depressed or hopeless) or physically (e.g., feeling physical tension and stiffness in their body). Based on the role of self-construals in emotional reactivity across cultures (Chentsova-Dutton & Tsai, 2010), we hypothesized that European-Canadian participants, who are more independent, would show greater overall symptoms of distress when they imagine themselves encountering stressful non-interpersonal events than interpersonal events. Conversely, since Japanese participants are more interdependent, their symptoms of distress to stressful interpersonal events would be stronger than non-interpersonal ones (**Hypothesis 2a**).

Additionally, consistent with prior research on cultural differences in manifestations of distress symptoms (Kirmayer, 1993; Ryder et al., 2008), we explored whether European-Canadians, who value expressions of mental states, and who view emotions independently from social contexts and bodily states and, would report experiencing more mental symptoms of distress compared to Japanese. Meanwhile, Japanese, who place greater value on being

emotionally reserved for the sake of social harmony, and who view emotions as being intertwined with social contexts and bodily states, were expected to report experiencing more physical symptoms of distress than European-Canadians (**Hypothesis 2b**).

Most importantly, we expected a three-way interaction among culture, type of stressful situation, and manifestation of distress symptoms. Specifically, we hypothesized that the pattern of European-Canadian participants reporting more mental symptoms of distress would be especially greater for non-interpersonal situations compared to interpersonal ones. Japanese participants, on the other hand, were expected to report more physical symptoms of distress for interpersonal situations more strongly than for non-interpersonal situations (**Hypothesis 2c**).

Further, in Study 3, we examined whether self-construals mediated cultural differences in experiences of interpersonal distress and perceived life satisfaction. Specifically, based on a one-dimensional model which assumes that independent and interdependent self-construals are two opposite poles on a single continuum (Singelis, 1994), we hypothesized that stronger interdependent self-construal (relative to independent self-construal) would explain why Japanese participants tend to experience stronger distress from interpersonal events, which influences their lower life satisfaction compared to European Canadian participants (**Hypothesis 3**). Additionally, we categorized the sources of stress described in the situation samples, to better understand how stressful situations differ qualitatively across cultures (see Supplemental table).

To test our hypotheses, we used a situation sampling method (Kitayama et al., 1997; Morling et al., 2002). This method comprises two steps. In the first step, we collected participants' concrete examples of daily stress as samples of culturally-representative situations for each culture. Specifically, we asked European-Canadian and Japanese undergraduate students to describe situations in which they personally experienced stress in their daily lives (Studies 1A

and 1B). In the second step, we attempted to determine the correspondence between the characteristics of situations in each culture and those of psychological processes of each member in the culture. Thus, we asked European-Canadian and Japanese participants to imagine themselves experiencing the stressful situations collected in each culture, and then report how likely they would experience mental and physical symptoms of distress (Studies 2 and 3). This method has the important advantage of not only collecting culturally-specific stressful situations, but also analyzing individual situational appraisals and emotional reactivity to these culturally-specific situations. This contrasts with other context-free symptom questionnaires such as the Center for Epidemiological Studies Depression Scale (Radloff, 1977) and the Perceived Stress Scale (Cohen, Kamarck, & Mermelstein, 1983), which do not consider any information about the stressful situations themselves. Therefore, this quasi-behavioral measure allows us to detect the interaction between cultural contexts and cognitive processes of daily stress.



CHAPTER 2

Cultural Influences in Situational Appraisals

Cultural contexts shape people's values and goals, which can be associated with either independent or interdependent self-construals. This dissertation describes studies on the role of these culturally-dominant self-construals—-independent self-construals being prevalent in North America and interdependent self-construals being prevalent in East Asia—on the cognitive processes that give rise to daily stress (situation appraisals and emotional reactivity). These cognitive processes function as key antecedents of different health outcomes. Therefore, in Study 1A, we examined how people from independent- versus interdependent-oriented cultures appraise different stressful situations in daily life.

While people's daily stressful events range from non-interpersonal events (e.g., impending deadlines at school or work) to interpersonal events (e.g., arguments with their significant others, friends, or coworkers), their appraisals of these events differ depending on their culturally-dominant self-construals. Specifically, North Americans, who have stronger independent self-construals, would show a bias towards appraisal of non-interpersonal events than interpersonal ones, whereas East Asians, with stronger interdependent self-construals, would show a bias towards appraisal of interpersonal events than non-interpersonal ones.

We collected a similar number of each of two types of stressful situations from members of each culture, and examined whether participants from different cultures would evaluate these situations differently in terms of perceived stress intensity level and the frequency of such situations. This served to test our specific prediction that European-Canadians would rate a higher level of perceived intensity and frequency for stressful non-interpersonal events compared to interpersonal ones, whereas Japanese would rate a higher level of intensity and frequency for interpersonal events relative to non-interpersonal ones.

## Method

### *Participants*

We recruited a total of 104 participants from two universities: 53 European-Canadian undergraduate students (39 females, 14 males;  $M_{age} = 19.34$  years,  $SD = 1.97$ ; range = 18-28) from the psychology subject pool at the University of Alberta in Canada, and 51 Japanese undergraduates (27 females, 24 males;  $M_{age} = 20.12$ ,  $SD = 1.12$ ; range = 18-23) at Kobe University in Japan. We excluded one Japanese participant from the analyses since the participant did not follow the instructions. Using screening questions, we only recruited Canadian samples whose ethnic background was either European descent (e.g., French, German, Italian) or Euro-North American descent (including Euro-Canadian) and whose native language was English, and Japanese samples whose ethnic background was Japanese descent and whose native language was Japanese. The Canadian participants received a course credit for their participation, and the Japanese participants received 500 yen (worth approximately CAD\$5) for their participation. Instructions in all tasks were presented in the participants' native languages (i.e., English for the European-Canadians, and Japanese for the Japanese). We determined our sample size based on an estimate of a medium effect size,  $f = .25$ . We required a sample size of approximately 80 participants for a study powered at 80% using G\*Power 3 (Faul, Erdfelder, Buchner, & Lang, 2009).

### *Measures and Procedure*

To collect situation samples from each cultural group, we asked participants to recall and describe two different situations in which they had personally experienced stress in daily life: (1) an interpersonal situation (that involves interactions with other people) and (2) a non-interpersonal situation (that does not involve interactions with other people and is related to their

personal events and experiences). After writing down each situation, they were asked to rate two items on two 9-point scales (e.g., 1 = not at all/never, 9 = very much/always). The first question was about the perceived intensity of stress they experienced in the situation they wrote (“How stressful was the situation you described above?”). In addition, they were asked to rate the perceived frequency of each type of stressful situation (“In general, how often do you experience situations in which you are stressed out in an interpersonal/non-interpersonal context?”). These instructions and questions were translated and back-translated by a team of bilingual Japanese-English researchers to ensure equivalence (Brislin, 1970).

Finally, they provided demographic information, such as gender and age.

## Results

**Gender and age effects.** Consistent with prior research (Matud, 2004), we found significant gender differences for the ratings of situation intensity, such that females ( $M = 7.18$ ,  $SD = .97$ ) tended to appraise their situations as more stressful compared to males ( $M = 6.74$ ,  $SD = 1.18$ ),  $F(1, 99) = 4.13$ ,  $p = .045$ ,  $\eta_p^2 = .040$ . However, there was no interaction between gender and culture,  $F(1, 99) < 1$ ,  $p = .904$ ,  $\eta_p^2 = .000$ . Also, we did not find gender differences,  $F(1, 99) < 1$ ,  $p = .769$ ,  $\eta_p^2 = .001$ , or interaction involving gender and culture in the ratings of situation frequency,  $F(1, 99) < 1$ ,  $p = .793$ ,  $\eta_p^2 = .001$ . Additionally, we did not find age differences in the ratings of situation intensity,  $F(7, 93) = 1.13$ ,  $p = .352$ ,  $\eta_p^2 = .078$ , and in the ratings of situation frequency,  $F(7, 93) < 1$ ,  $p = .600$ ,  $\eta_p^2 = .056$ . Therefore, we did not consider gender and age effects in the following analyses.

**Cultural differences in perceived stress intensity of situations.** A 2 (Culture: European-Canadians vs. Japanese; between-Ss)  $\times$  2 (Situation Type: Interpersonal vs. Non-interpersonal; within-Ss) mixed factorial ANOVA yielded a main effect of Situation Type,

$F(1,101) = 5.69, p = .019, \eta_p^2 = .053$ . There was no significant main effect of Culture,  $F(1,101) = .02, p = .894, \eta_p^2 = .000$ . Importantly, a two-way interaction between Culture and Situation Type approached significance,  $F(1, 101) = 3.75, p = .055, \eta_p^2 = .036$ , indicating a marginally-significant difference in the ratings of stress intensity for different types of situations between European-Canadian and Japanese participants.

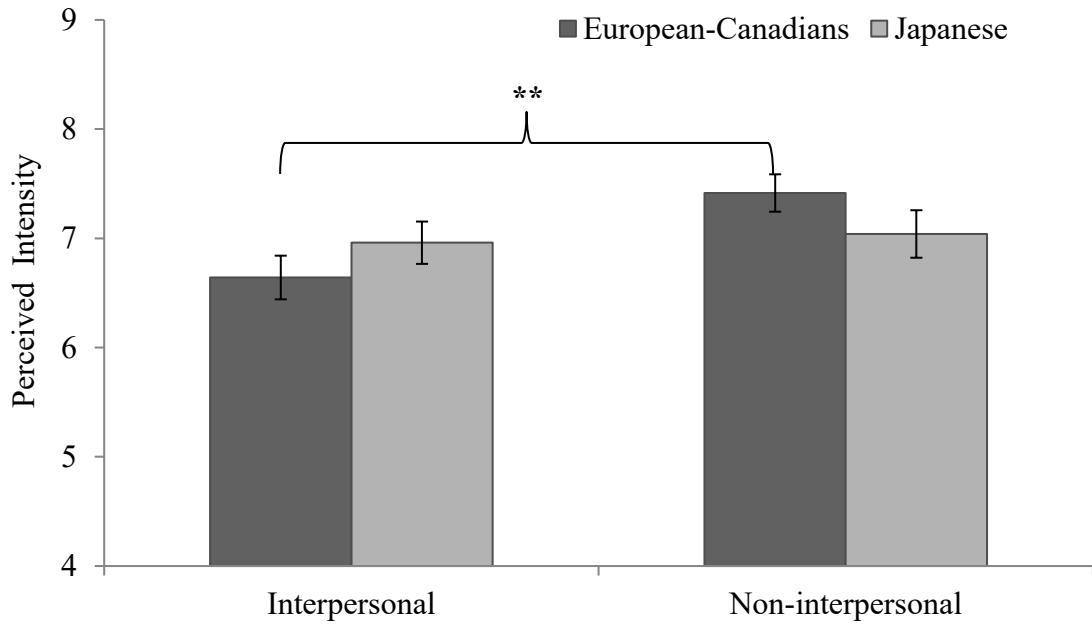
To understand this interaction effect, we performed separate *t*-tests for each culture. We partially supported our predictions, such that the perceived stress intensity of non-interpersonal events ( $M = 7.42, SD = 1.25$ ) was greater than that of interpersonal events ( $M = 6.64, SD = 1.46$ ) among European Canadian participants,  $t(52) = 2.97, p = .005, d = .58$ , whereas the perceived stress level of interpersonal situations ( $M = 6.96, SD = 1.37$ ) and non-interpersonal situations ( $M = 7.04, SD = 1.54$ ) did not differ among Japanese participants,  $t(49) = .33, p = .744, d = .05$  (see Figure 1).

**Cultural differences in perceived frequency of situations.** We also ran additional analyses to assess cultural influences on the perceived frequency of each type of situation. A 2 (Culture: European-Canadians vs. Japanese; between-Ss)  $\times$  2 (Situation Type: Interpersonal vs. Non-interpersonal; within-Ss) mixed factorial ANOVA yielded no main effect of Situation Type,  $F(1,101) = 1.31, p = .255, \eta_p^2 = .013$ , nor Culture,  $F < 1, p = .681, \eta_p^2 = .002$ . Most importantly, a two-way interaction between Culture and Situation Type was significant,  $F(1, 101) = 13.15, p < .001, \eta_p^2 = .115$ .

To probe the nature of the interaction, we further performed separate *t*-tests for each culture. Similar to the results of stress intensity ratings across cultures, we found that European-Canadian participants tended to perceive stressful non-interpersonal situations ( $M = 6.00, SD = 1.52$ ) as more prevalent than interpersonal ones ( $M = 5.00, SD = 1.63$ ),  $t(52) = 3.39, p = .001, d$

= .63, whereas Japanese participants perceive stressful interpersonal situations ( $M = 5.66$ ,  $SD = 1.73$ ) as slightly more prevalent than non-interpersonal situations ( $M = 5.14$ ,  $SD = 1.62$ ),  $t(49) = 1.75$ ,  $p = .086$ ,  $d = .31$  (see Figure 2).

In sum, these results demonstrate the influence of culturally-dominant self-construals in situational appraisals: European-Canadian participants, who view themselves as existing independently from their relationships with others, appraised non-interpersonal events as more stressful and prevalent than interpersonal events. Conversely, Japanese participants, who view themselves as being embedded in relationships with others, appraised interpersonal and non-interpersonal events as equally stressful, and interpersonal events as marginally more frequent than non-interpersonal situations.



*Figure 1.* Cultural differences in the self-reported stress intensity of each situation type.

Standard errors are represented in the figure by the error bars attached to each column.

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ (two-tailed).

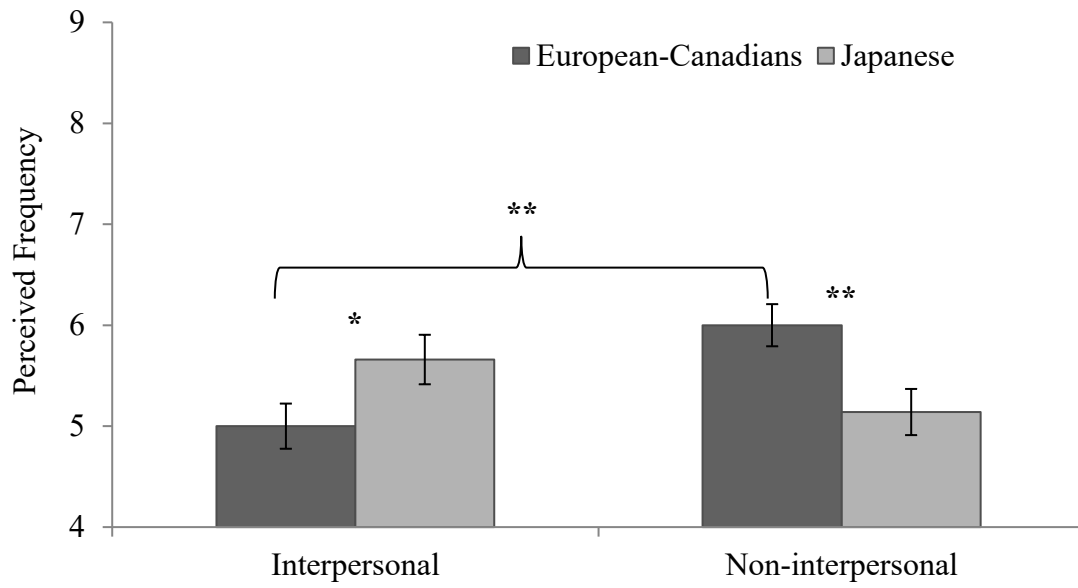


Figure 2. Cultural differences in perceived frequency of each situation type.

Standard errors are represented in the figure by the error bars attached to each column.

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ (two-tailed).



### Discussion

The results from Study 1A demonstrated cultural differences in appraisals of interpersonal and non-interpersonal situations. Importantly, we partially supported **Hypotheses 1a and 1b**, showing that Euro-Canadians tended to appraise non-interpersonal situations as more stressful and prevalent than interpersonal ones. In contrast, Japanese tended to appraise stressful interpersonal and non-interpersonal situations as equally stressful, and appraise interpersonal situations as marginally more prevalent than non-interpersonal ones. Consistent with culturally dominant modes of self-construals, we can interpret these results as implying that Westerners, who perceive themselves as separate from their social relationships, tend to show greater appraisals of stressful non-interpersonal events compared to interpersonal events, whereas East Asians, who perceive themselves in relation with their social relationships, show relatively similar appraisals of interpersonal and non-interpersonal events.

Yet, the results were not in line with our prediction that Japanese would appraise interpersonal situations more intensely than non-interpersonal events. Instead, we found that Japanese appraised both contexts more equally. First, these patterns of situation appraisals may emerge from culturally dominant attention styles, such that Westerners devote their attention to the individual self rather than the context, whereas East Asians allocate their attention more equally to the individual self and the context (Masuda, Russell, Li, & Lee, 2019). An alternative explanation is that since we asked participants to freely recall two instances of their past daily stress experiences, under this instruction, our samples of stressful situations had a varied range of intensity (mildly, moderately, and intensely) and duration (short-term and long-term). That is, we did not specifically ask them to recall their experiences where they had been experiencing stress. This led some participants to think of situations in which they were no longer experiencing stress

and to reduce their appraisals of such situations. Therefore, in the following studies (Studies 2 and 3), we selected situations that participants rated as moderately or intensely stressful and instructed participants to put themselves in each situation as if they were currently experiencing it.

CHAPTER 3

Text Analysis of Situation Descriptions

While Study 1A revealed the appraisal patterns of interpersonal versus non-interpersonal situations based on participants' intensity and frequency ratings, it is possible that participants' written descriptions of daily stress experiences can also reveal how people from different cultures use culturally-dominant scripts of emotions. Based on the role of self-construals in shaping differing conceptions of emotion across cultures, researchers have suggested that people with independent self-construals (North Americans) tend to perceive mental states as being distinct from physical states and social contexts, and place greater value on expressing their emotions. Meanwhile, people with interdependent self-construals (East Asians) tend to perceive mental states as being intertwined with physical states and social contexts, and place greater value on being emotionally reserved. Therefore, in Study 1B, we further analyzed the text of 160 situations, collected from Study 1A and used for Studies 2 and 3, to explore whether the use of words in the described situations reveals cultural differences in how people express their experiences of daily stress.

### **Data Analyses and Results**

We employed an objective method of measuring words in language called Pennebaker's Linguistic Inquiry and Word Count (LIWC; Pennebaker, Booth, Boyd, & Francis, 2015). LIWC is a computerized text analysis program that categorizes and quantifies word use. LIWC counts the frequency of words in a given category, including standard language categories (e.g., articles, propositions) and psychological processes (e.g., emotion, cognitive, sensory, social). All word counts are shown as a percentage of the total number of words, thus controlling for the length of the writing sample. To assess the role of self-construals in shaping the distinction, versus the integration view of interpersonal, mental, and physical distress, we specifically focused on counting the frequency of (1) emotional words (e.g., angry, mad, hurt), (2) social words (e.g.,

talk, friend, mother), and (3) somatic words which were further classified under sensory and perceptual processes (e.g., heard, listen, sound) and physical states and functions (e.g., sleep, tiresome). Following prior cross-cultural research on expressions of distress based on differing conceptions of emotion (Choi et al., 2016; Ots, 1990; Ryder et al., 2008; Tsai et al., 2004), we expected to find cultural differences in the use of words, such that European-Canadians, who perceive internal states as being independent from external sensations, would use emotional words more frequently, whereas Japanese, who perceive internal states as being intertwined with external sensations, would use social and somatic words more frequently.

**Emotional Words.** An analysis of variance (ANOVA) was conducted to measure the effect of Respondent Culture (European Canadians vs. Japanese) on the counts of emotional words in each written description (shown as percentage of total words). The results showed that European-Canadian participants ( $M = 6.48, SD = 2.86$ ) used emotional words more frequently compared to Japanese participants ( $M = 5.63, SD = 2.58$ ),  $F(1, 158) = 3.93, p = .049, \eta_p^2 = .024$ .

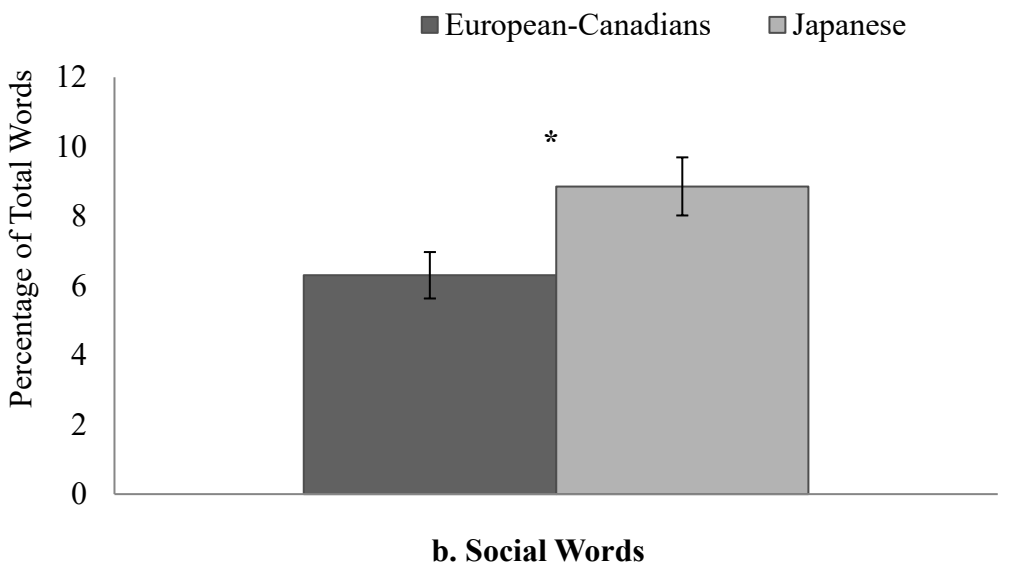
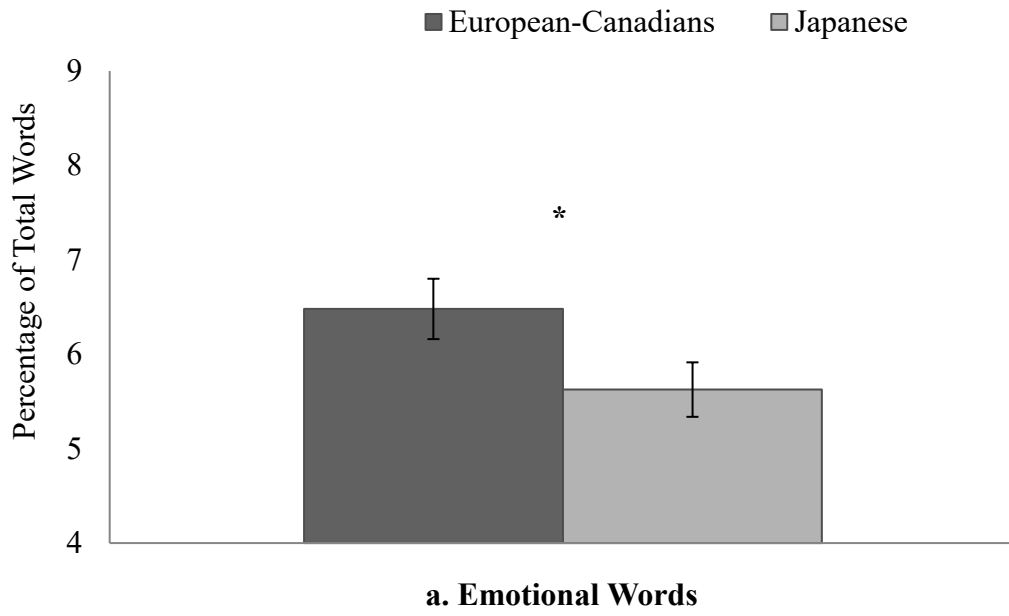
Additional analyses revealed that there were no cultural differences in the use of positive emotional words (e.g., happy, good),  $t(158) < 1, p = .504, d = .11$ , and of negative emotional words (e.g., hate, worthless),  $t(158) = 1.47, p = .144, d = .23$ . These results support our prediction that European-Canadians tend to use emotional words more frequently in describing their experiences of distress compared to Japanese (see Figure 3a).

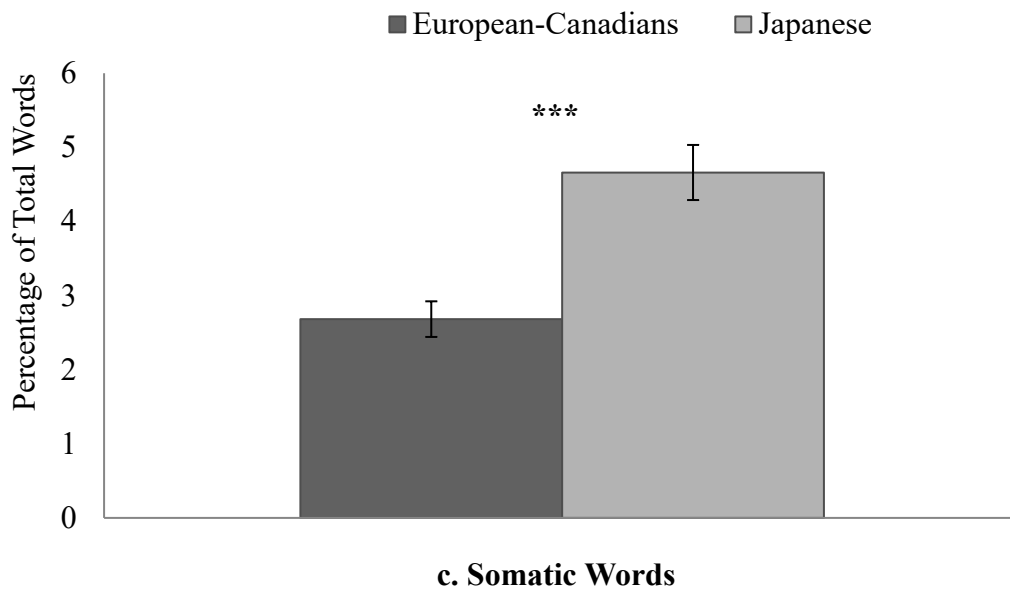
**Social Words.** As shown in Figure 3b, an analysis of variance (ANOVA) was conducted to measure the effect of Respondent Culture (European- Canadians vs. Japanese) on the counts of social words, such as references to close relationships including friends and family, in each written description (shown as percentage of total words). The results revealed that Japanese ( $M =$

8.86,  $SD = 7.48$ ) used social words more frequently compared to European Canadians ( $M = 6.30$ ,  $SD = 5.98$ ),  $F(1, 158) = 5.71$ ,  $p = .018$ ,  $\eta_p^2 = .035$ .

Additional analyses revealed that while there were no cultural differences in the number of references to family,  $t(158) = 1.16$ ,  $p = .247$ ,  $d = .18$ , Japanese participants ( $M = .97$ ,  $SD = 2.22$ ) referred to friends more frequently in their descriptions compared to European-Canadian participants ( $M = .33$ ,  $SD = .74$ ),  $t(158) = 2.41$ ,  $p = .017$ ,  $d = .38$ . In fact, prior research has suggested a greater sensitivity to friendship among people with interdependent self-construals (Cross, Bacon, & Morris, 2000; Morry, Kito, Mann, & Hill, 2013). Our results, then, provide further evidence for this: Japanese, being higher in interdependent self-construals, talk about their close relationships more frequently in their expressions of distress compared to European-Canadians.

**Somatic Words.** An analysis of variance (ANOVA) was conducted to measure the effect of Respondent Culture (European Canadians vs. Japanese) on the counts of somatic words in each written description (shown as percentage of total words). The results revealed the main effect of Respondent Culture,  $F(1, 158) = 19.99$ ,  $p < .001$ ,  $\eta_p^2 = .112$ , which showed that Japanese ( $M = 4.66$ ,  $SD = 3.32$ ) used somatic words more frequently compared to European-Canadians ( $M = 2.68$ ,  $SD = 2.15$ ). Consistent with prior cross-cultural research on the focus of distress symptoms (Ryder et al., 2008; Tsai et al., 2004), we found that Japanese participants tended to use somatic words to express their experiences of distress more often than European-Canadian participants (see Figure 3c).





*Figure 3.* Use of emotional, social, and somatic words by each cultural group for their descriptions of daily stress. Standard errors are represented in the figure by the error bars attached to each column.  $*p < .05$ ;  $**p < .01$ ;  $***p < .001$  (two-tailed).



### Discussion

Overall, the findings from our text analysis supported **Hypothesis 1c** regarding cultural differences in emotional expressions, consistent with prior work by Tsai and her colleagues (2004). When European-Canadians and Japanese are asked to describe daily stress experiences, European-Canadian participants, who tend to view mental states as being distinct from physical states and social contexts, use emotional words (e.g., worry) more frequently compared to Japanese participants. In contrast, Japanese participants, who tend to view mental states as being intertwined with physical states and social contexts, use somatic words (e.g., exhaust) and social words (e.g., friends) more frequently than European-Canadians. Additionally, Choi and her colleagues (2016) suggested the adaptive function of such communication styles, demonstrating that the more frequent use of somatic words among East Asians predicted greater positive (empathetic) responses from close others. In other words, somatic expressions of distress facilitate social support from close others.

Why, then, would people from different cultures be more likely to show culturally distinctive emotional expressions in their descriptions than self-reported ratings? We speculate that narrative construction may take place before we judge our emotions, and influence how we do so. According to Bruner (1990), the construction of narratives represents people's act of activating culturally-shared meaning systems. Therefore, it is possible that a culturally-different modes of emotion can be better reflected in descriptions compared to emotion judgments. Recent studies gave credence to this possibility by demonstrating that cultural differences in emotion judgments are mediated by people's narrative construction (Masuda et al., 2019; Senzaki, Masuda, & Ishii, 2014). Therefore, future research should examine whether people's descriptive styles of daily stress predict their symptom reporting of mental and physical distress.

CHAPTER 4

Cultural Influences in Manifestations of Distress Symptoms

Results from Studies 1A and 1B demonstrated cultural differences in appraisals of interpersonal and non-interpersonal situations and in word use for these situation descriptions. Using the samples of culturally-dominant situations across cultures, Study 2 was designed to measure how members from each culture show different emotional reactivity to culturally-constructed interpersonal and non-interpersonal contexts that activate one's culturally-dominant self-construals to a different extent. Based on the role of self-construals in emotional reactivity across cultures, we hypothesized that North Americans, being from more independent-oriented cultural contexts, would show stronger emotional reactions to non-interpersonal situations, whereas East Asians, being from more interdependent-oriented cultural contexts, would react emotionally to interpersonal situations more strongly than non-interpersonal situations.

To measure people's emotional reactivity, we asked people from different cultures to report the levels of their mental and physical symptoms of distress, depending on the type of situation. Consistent with prior research by Chentsova-Dutton and Tsai (2010), we expected that European-Canadians who were activated with independent self-construals would report greater mental and physical symptoms of distress in stressful non-interpersonal situations than interpersonal ones, whereas Japanese who were activated with interdependent self-construals would report distress symptoms for interpersonal situations more intensely than for non-interpersonal situations. Since prior researchers have suggested that presentations of distress are culturally-distinctive (greater emphasis on mental states of distress among North Americans and physical states among East Asians; e.g., Kirmayer, 1993; Ryder et al., 2008), we also explored whether self-reported ratings of mental versus physical symptoms would differ across cultures.

## Method

### *Participants*

We recruited a total of 126 individuals from two universities: 64 European-Canadian undergraduate students (53 females, 11 males;  $M_{age} = 19.13$ ,  $SD = 1.58$ ; range = 17 to 25) from the psychology subject pool at the University of Alberta in Canada, and 62 Japanese undergraduates (41 females, 21 males;  $M_{age} = 19.03$ ,  $SD = .79$ ; range = 18 to 20) at Kobe University in Japan participated in our study. Using screening questions, we only recruited Canadian samples whose ethnic background was either European descent (e.g., French, German, Italian) or Euro-North American descent (including Euro-Canadian) and whose native language was English, and Japanese samples whose ethnic background was Japanese descent and whose native language was Japanese. The Canadian participants received a course credit, and the Japanese participants received 500 yen for their participation. Instructions in all tasks were presented in participants' native languages (i.e., English for the European-Canadians and Japanese for the Japanese). We calculated our target sample size based on the expected medium effect size,  $f = .25$ , requiring a sample size of approximately 80 participants for a study powered at 80%. Power analyses were conducted using G\*Power 3 (Faul et al., 2009).

### *Measures and Procedure*

Out of a total of 206 interpersonal and non-interpersonal situations generated in Study 1, we selected 160 situations by excluding about 20 situations from each cultural group that received low ratings of stress intensity (less than the median = 7) from the participants, and that contained descriptions of multiple episodes. There were 40 from each of the four situation types derived from each cell of the 2 (Situation Culture)  $\times$  2 (Situation Type) design of Study 1.

Further, (a) we modified information from situations that was given in culturally-specific terms into general terms that could be applied for both cultures (e.g., replacing *Biological Science Building* with *the building*); (b) we deleted any phrases that implied a resolution of stressful situations (e.g., *Once the situation is over then you feel relief and the pressure is off*)<sup>1</sup>; (c) we confirmed that each situation contained only one episode; and (d) we modified information from situations so that the main protagonist in each episode could be of either gender (e.g., *he/she*). Other than these changes, the original situational descriptions were kept intact.

The 80 Japanese situations were translated into English, and the 80 Canadian situations were translated into Japanese. Following the back-translation method (Brislin, 1970), one of the Japanese-English bilinguals who had lived in both cultures for substantial periods of time first translated both the Japanese and Canadian situations into English and Japanese, and then another Japanese-English bilingual back-translated the situations to ensure that each one sounded natural in the other language. Any discrepancies between the original and the translated version were resolved through discussion among three bilingual investigators.

We presented these situations to both European-Canadian and Japanese participants in a questionnaire format. To reduce the burden on the participants, we separated the sample of 160 situations into two versions of the questionnaire, in which each version contained 80 situations (20 from each of the four possible types of situations). In each questionnaire, the 80 situations were presented in a randomized order to participants. Each situation was followed by two questions: one about the likelihood of experiencing mental symptoms of distress, and the other about the likelihood of experiencing physical symptoms of distress, both on a 9-point scale (1 =

not at all, 9 = very much). Specifically, the participants were asked to rate the two questions based on the definitions of mental and physical symptoms as provided below:

**Mental symptoms:** When people are stressed in a given situation, they may focus on mental states which include feelings. For example, sometimes people feel hopeless, depressed, disappointed, or bitter. People may also feel afraid, sad, hostile, or aggressive. In order to avoid such distress, people may feel mentally numb, or not feel anything. Furthermore, people may suffer from excessive worrying, including worrying about what others think of them.

**Physical symptoms:** When people are stressed in a given situation, they may focus on physical states. For example, sometimes people experience physical tension and stiffness in their body or shoulders. People may experience physiological responses such as dizziness, heart pounding, or sweating. People may also experience physical fatigue such as feeling weary and sleepy, or aches and pains in their stomach. Furthermore, people may suffer from sleeplessness, loss of appetite, itchiness, rashes, or a decrease in their ability to think as if they are “hazy” or “foggy.”

Finally, participants provided demographic information, such as gender and age.

## **Results**

We analyzed the rating data in two ways. First, we considered each participant as the unit of analysis. Means were computed across situations that differed in relevant within-subject variables, including situation culture (Canada-made versus Japan-made), symptom type (mental

versus physical), and situation type (interpersonal versus non-interpersonal). The between-subject variables were respondent culture (European-Canadian versus Japanese participants) and version (first or second set).

**Version, gender, and age effects.** There was no significant difference between versions in the analyses,  $F(1, 122) = 2.60, p = .110, \eta_p^2 = .021$ , and no significant interaction with respondent culture,  $F(1, 122) < 1, p = .622, \eta_p^2 = .002$ . Also, consistent with prior research which addressed gender differences in stress reactivity (Dedovic, Wadiwalla, Engert, & Pruessner, 2009), we found that females ( $M = 5.40, SD = .98$ ) tended to report slightly greater distress symptoms compared to males ( $M = 5.15, SD = 1.14$ ),  $F(1,122) = 3.88, p = .051, \eta_p^2 = .031$ , but there was no significant interaction between gender and respondent culture,  $F(1,122) = 1.77, p = .186, \eta_p^2 = .014$ . Further, there were no age differences in distress symptoms,  $F(8,114) = 1.12, p = .353, \eta_p^2 = .073$ , or interaction between age and respondent culture,  $F(2, 114) < 1, p = .791, \eta_p^2 = .004$ . Therefore, we did not include version, gender, or age effects in the further analyses reported below.

**Degree of mental and physical distress reporting depending on situations.** We analyzed the kind of distress reporting prevalent in each culture. A 2 (Respondent Culture: European-Canadian vs. Japanese; between-Ss)  $\times$  2 (Situation Type: Interpersonal vs. Non-interpersonal; within-Ss)  $\times$  2 (Symptom Type: Mental vs. Physical; within-Ss) ANOVA had three main effects: 1) Respondent Culture,  $F(1, 124) = 5.49, p = .021, \eta_p^2 = .042$ , which showed that Japanese ( $M = 5.55, SD = .89$ ) rated greater overall distress scores compared to European-Canadians ( $M = 5.13, SD = 1.11$ ); 2) Situation Type,  $F(1, 124) = 55.06, p < .001, \eta_p^2 = .307$ , which revealed that both cultural groups reported greater distress reporting for non-interpersonal situations ( $M = 5.55, SD = 1.07$ ) than interpersonal situations ( $M = 5.13, SD = 1.12$ ); and 3)

Symptom Type,  $F(1, 124) = 474.36, p < .001, \eta_p^2 = .793$ , which showed that both cultural groups reported greater mental symptoms of distress ( $M = 6.30, SD = .98$ ) compared to physical symptoms ( $M = 4.37, SD = 1.29$ ). There were significant two-way interactions between Respondent Culture and Situation Type,  $F(1, 124) = 75.96, p < .001, \eta_p^2 = .380$ , between Respondent Culture and Symptom Type,  $F(1, 124) = 4.52, p = .036, \eta_p^2 = .035$ , and between Situation Type and Symptom Type,  $F(1, 124) = 53.83, p < .001, \eta_p^2 = .303$ . More importantly, the three-way interaction among Respondent Culture, Symptom Type, and Situation Type approached significance,  $F(1, 124) = 3.90, p = .051, \eta_p^2 = .030$ .

To probe the three-way interaction, we analyzed mental and physical ratings separately, in the context of stressful interpersonal and non-interpersonal situations. First, mental symptom ratings in the two types of situations are presented in the left side of Figure 4. The two-way interaction involving Situation Type and Respondent Culture proved significant for the ratings of mental symptoms,  $F(1, 124) = 74.80, p < .001, \eta_p^2 = .376$ . As we predicted, European-Canadians reported greater mental symptoms of distress for non-interpersonal situations ( $M = 6.39, SD = 1.07$ ) than interpersonal ones ( $M = 5.62, SD = 1.18$ ),  $t(63) = 7.68, p < .001, d = .69$ , whereas Japanese reported greater mental symptoms for interpersonal situations ( $M = 6.76, SD = .80$ ) than non-interpersonal ones ( $M = 6.47, SD = .88$ ),  $t(61) = 4.18, p < .001, d = .34$ .

These results suggest that European-Canadian participants, who are more independent, tend to experience more intensified mental distress in response to non-interpersonal situations than interpersonal ones. Conversely, Japanese, who are more interdependent, tend to show more intensified mental distress in interpersonal situations than non-interpersonal ones. This may show that European-Canadians tend to show mental symptoms of distress (e.g., feeling hopeless and



sad) in situations where their personal goals are threatened, whereas Japanese tend to present mental symptoms in situations where their social goals are threatened.

Physical symptom ratings in the two types of situations are presented in the right side of Figure 4. The two-way interaction involving Situation Type and Respondent Culture was significant for the ratings of physical symptoms,  $F(1, 124) = 55.55, p < .001, \eta_p^2 = .309$ . While both cultural groups showed greater physical symptoms for non-interpersonal situations than interpersonal situations, European-Canadians showed significantly greater physical symptoms of distress for non-interpersonal situations ( $M = 4.76, SD = 1.47$ ) than interpersonal ones ( $M = 3.75, SD = 1.34$ ),  $t(63) = 10.88, p < .001, d = .72$ . Conversely, Japanese reported marginally greater physical symptoms for non-interpersonal situations ( $M = 4.56, SD = 1.28$ ) than interpersonal ones ( $M = 4.42, SD = 1.20$ ),  $t(61) = 1.99, p = .051, d = .11$ . These results suggest that in general, both European-Canadians and Japanese tend to experience greater physical distress from non-interpersonal situations than interpersonal ones.

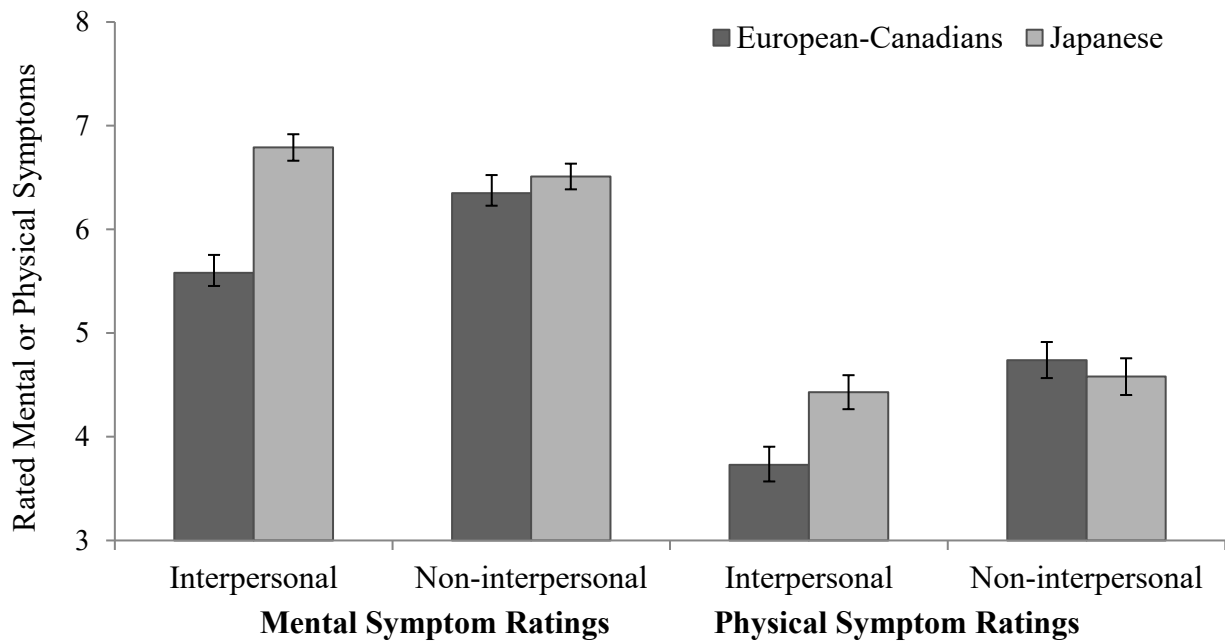
**Influence of cultural context on distress reporting.** Effects of cultural context on participants' ratings of distress were analyzed. A 2 (Respondent Culture: European-Canadian vs. Japanese; between-Ss)  $\times$  2 (Situation Culture: Canada-made vs. Japan-made; within-Ss)  $\times$  2 (Situation Type: Interpersonal vs. Non-interpersonal; within-Ss) ANOVA had three main effects: 1) Respondent Culture,  $F(1, 124) = 5.49, p = .021, \eta_p^2 = .042$ , which showed that Japanese ( $M = 5.55, SD = .89$ ) rated higher overall distress scores compared to European-Canadians ( $M = 5.13, SD = 1.11$ ); 2) Situation Culture,  $F(1, 124) = 222.73, p < .001, \eta_p^2 = .642$ , which revealed that both cultural groups reported higher overall distress scores for Canada-made situations ( $M = 5.62, SD = 1.03$ ) compared to Japan-made situations ( $M = 5.05, SD = 1.09$ ); and 3) Situation Type,  $F(1, 124) = 55.06, p < .001, \eta_p^2 = .307$ , which showed that both cultural groups reported

higher overall distress scores for non-interpersonal situations ( $M = 5.55$ ,  $SD = 1.07$ ) than interpersonal situations ( $M = 5.13$ ,  $SD = 1.12$ ). There were significant two-way interactions between Respondent Culture and Situation Culture,  $F(1, 124) = 90.26$ ,  $p < .001$ ,  $\eta_p^2 = .421$ , and between Respondent Culture and Situation Type,  $F(1, 124) = 75.96$ ,  $p < .001$ ,  $\eta_p^2 = .380$ , but not significant interaction between Situation Culture and Situation Type,  $F(1, 124) < 1$ ,  $p = .950$ ,  $\eta_p^2 = .000$ . More importantly, the three-way interaction among Respondent Culture, Situation Culture, and Situation Type was significant,  $F(1, 124) = 25.28$ ,  $p < .001$ ,  $\eta_p^2 = .169$ .

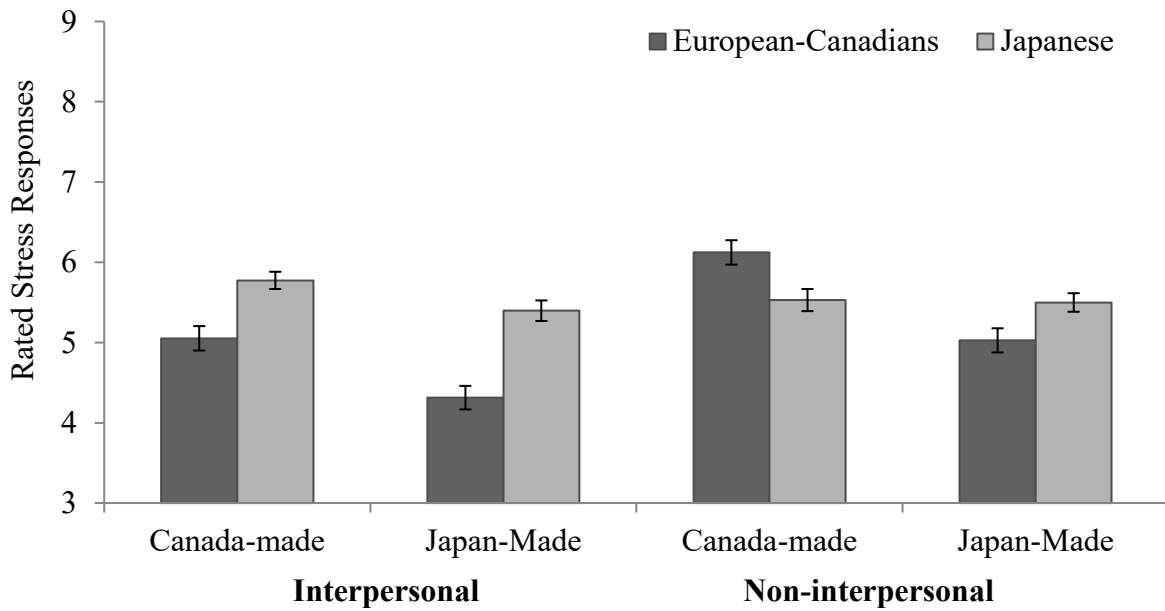
To understand this three-way interaction, we analyzed interpersonal and non-interpersonal stress ratings separately. First, interpersonal stress ratings in the two types of cultural context are presented in the left side of Figure 5. The two-way interaction involving Situation Culture and Respondent Culture was significant for the ratings of interpersonal stress,  $F(1, 124) = 12.26$ ,  $p = .001$ ,  $\eta_p^2 = .090$ . European-Canadians showed greater ratings of distress to Canadian interpersonal situations ( $M = 5.05$ ,  $SD = 1.22$ ) than Japanese interpersonal situations ( $M = 4.31$ ,  $SD = 1.17$ ),  $t(63) = 10.30$ ,  $p < .001$ ,  $d = .62$ . Similarly, Japanese also showed a higher level of distress ratings to Canadian interpersonal situations ( $M = 5.77$ ,  $SD = .85$ ) than to Japanese interpersonal situations ( $M = 5.40$ ,  $SD = 1.01$ ),  $t(61) = 5.08$ ,  $p < .001$ ,  $d = .41$ . These results indicate that both cultural groups react more strongly to Canadian interpersonal contexts, which illustrate interpersonal conflict (explicit conflict and quarreling), compared to Japanese interpersonal contexts, which describe interpersonal friction (potential conflict with others; e.g., Hashimoto et al., 2012).

Additionally, non-interpersonal stress ratings in the two types of cultural contexts are presented in the right side of Figure 5. The two-way interaction involving Situation Culture and Respondent Culture was significant for the ratings of non-interpersonal stress,  $F(1, 124) =$

109.15,  $p < .001$ ,  $\eta_p^2 = .468$ . Specifically, European-Canadians showed greater ratings of distress to Canadian non-interpersonal contexts ( $M = 6.12$ ,  $SD = 1.22$ ) than Japanese non-interpersonal contexts ( $M = 5.03$ ,  $SD = 1.20$ ),  $t(63) = 16.34$ ,  $p < .001$ ,  $d = .91$ , whereas Japanese reported similar distress ratings to both Canadian non-interpersonal contexts ( $M = 5.53$ ,  $SD = 1.08$ ) and Japanese ones ( $M = 5.50$ ,  $SD = .91$ ),  $t(61) < 1$ ,  $p = .699$ ,  $d = .03$ . These results suggest that European-Canadians tend to show greater stress responses to their culturally-specific non-interpersonal situations, whereas Japanese tend to show similar stress responses to both Canadian and Japanese non-interpersonal situations.



*Figure 4.* Degree of mental and physical distress reporting depending on situation types across cultures. Standard errors are represented in the figure by the error bars attached to each column.



*Figure 5.* Influence of cultural contexts on people's reporting of distress. Standard errors are represented in the figure by the error bars attached to each column.

### Discussion

Study 2 partially supported **Hypothesis 2a**. Consistent with the role of self-construals in emotional reactivity (Chentsova-Dutton & Tsai, 2010), European-Canadians tended to experience greater mental and physical distress in non-interpersonal events than interpersonal ones, whereas Japanese tended to experience greater mental distress in interpersonal events than in non-interpersonal ones. These results may come from cultural differences in goal orientations, where European-Canadians are frequently exposed to non-interpersonal situations which encourage them to pursue personal goals such as personal accomplishment, and Japanese are frequently exposed to interpersonal situations which encourage them to pursue social goals such as harmony-seeking (Heine et al., 1999; Uchida & Kitayama, 2009). Therefore, when people perceive that the pursuit of culturally-dominant goals are threatened in a situation, they appraise the situation as stressful and experience distress accordingly.

Although previous research showed cultural differences in mental versus physical symptom of distress (Ryder et al., 2008), we failed to confirm **Hypothesis 2b**, which posited a greater focus on mental symptoms among European-Canadians versus physical symptoms among Japanese. In fact, our data showed that both cultural groups reported greater mental symptoms of distress than physical symptoms. Specifically, Japanese reported greater mental symptoms of distress compared to European-Canadians, and there was no cultural difference in the level of physical symptoms. In line with prior research that East Asians show greater mood variability due to their sensitivity to differing contexts (Oishi et al., 2004), greater rating of mental distress among Japanese may come from their greater sensitivity to negative social situations compared to European-Canadians.

CHAPTER 5

The Role of Self-Construals in Manifestations of Distress Symptoms

In Study 2, we provided participants with a detailed definition of mental and physical symptoms and asked them to contemplate the likelihood of each symptom in the situations. The results demonstrated cultural differences in presentations of distress symptoms, depending on the types of stressful situations. The aim of Study 3 was to replicate the findings from Study 2 using a much-simplified definition of symptoms (“mentally stressed out” versus “physically tired”), so that participants would report the focus of their distress more spontaneously. We predicted that we would replicate the results from Study 2 with this more-spontaneous symptom reporting.

Further, we assessed whether cultural differences in manifestations of distress from interpersonal situations could be explained by interdependent (vs. independent) self-construal scores. Specifically, we expected that compared to European-Canadians, Japanese would experience greater distress symptoms from interpersonal situations, due to their interdependent self-construals being stronger than independent self-construals. Additionally, extending prior research which suggested that a lower level of life satisfaction among East Asians compared to North Americans was related to their different self-construals (Diener, Diener, & Diener, 1995), we aimed to elucidate how interdependent self-construal serves as an important mediator in explaining cultural differences in interpersonal stress experiences and perceived life satisfaction.

## **Method**

### *Participants and Procedure*

Eighty-nine European-Canadian undergraduate students (57 females, 32 males;  $M_{age} = 19.25$ ,  $SD = 2.21$ ; range = 17 to 29) were recruited from the psychology subject pool at the University of Alberta in Canada. The Canadian participants received a course credit for their participation. We also recruited 84 Japanese undergraduate students (41 females, 43 males;  $M_{age} = 19.47$ ,  $SD = 1.40$ ; range = 18 to 23) at Kobe University in Japan, and the Japanese participants



received 500 yen for their participation. Using screening questions, we only recruited Canadian samples whose ethnic background was either European descent (e.g., French, German, Italian) or Euro-North American descent (including Euro-Canadian) and whose native language was English, and Japanese samples whose ethnic background was Japanese descent and whose native language was Japanese. Instructions in all tasks were presented in the participants' native languages (i.e., English for the European-Canadians and Japanese for the Japanese). Power analyses were conducted using Monte Carlo Power Analyses (Schoemann, Boulton, & Short, 2017). Parameters were set to a sample size of 170, with 1,000 replications, and 20,000 Monte Carlo draws per replication, by specifying the medium effect size of correlation coefficients among variables,  $r = .30$ . While we had 80% power to detect the indirect effect from culture to interpersonal stress responses, we averaged 60 % power to detect the indirect effects from culture to life satisfaction (Cohen, 1988).

In comparison with the instructions in Study 2, we simplified our instructions so that participants spontaneously responded to the provided 80 scenarios from version 1 of Study 2. In each scenario, participants were asked to rate two questions related to mental and physical symptom reporting on a 9-point scale (1: not at all, 9: very much). The two questions were, “When you imagine yourself in the situation, (1) how likely would you be *mentally stressed out*? and (2) how likely would you be *physically tired*?”. We also counterbalanced the presentation of these questions to rule out order effects.

Participants were then asked to complete Kim and his colleagues' (2003) 23-item Self-Constraint Scale (European-Canadians:  $\alpha = .73$ ; Japanese:  $\alpha = .81$ ) and Diener and colleagues' (1985) 5-item Satisfaction with Life Scale (SWLS; Diener, Emmons, Larsen, & Griffin, 1985; Euro-Canadians:  $\alpha = .85$ ; Japanese:  $\alpha = .85$ ) on a 7-point scale from 1 (*strongly disagree*) to 7

(*strongly agree*). The Self-Construal Scale is comprised of independent self-construal (13 items; e.g., “I prefer to be self-reliant rather than dependent on others”) and interdependent self-construal (10 items; e.g., “It is important to consult close friends and get their ideas before making decisions”). Following the recommended procedure (Singelis, 1994), we subtracted the mean score of independent self-construal from that of interdependent self-construal, to obtain a summary index of interdependent self-construal (see also Na & Kitayama, 2011). Higher scores signify higher interdependent self-construal relative to independent self-construal. An example of an item from SWLS is, “I am satisfied with my life”, with higher scores representing higher perceived life satisfaction.

Finally, participants provided demographic information, such as gender and age.

## Results

We used the same analytic procedures as Study 2, analyzing the rating data in two ways. First, we treated each participant as the unit of analysis. Means were computed across situations that differed in relevant within-subject variables, including situation culture (Canada-made versus Japan-made), symptom type (mental versus physical), and situation type (interpersonal versus non-interpersonal). The between-subject variables were respondent culture (European-Canadian versus Japanese) and order (mental first versus physical first).

**Gender, order, and age effects.** Consistent with previous research (Dedovic et al., 2009), females ( $M = 5.60$ ,  $SD = 1.12$ ) showed greater stress reactions compared to males ( $M = 5.21$ ,  $SD = 1.21$ ),  $F(1, 169) = 7.16$ ,  $p = .008$ ,  $\eta_p^2 = .041$ , but there was no significant interaction with respondent culture,  $F(1, 169) = 1.66$ ,  $p = .199$ ,  $\eta_p^2 = .010$ . Also, there were no order,  $F(1, 169) < 1$ ,  $p = .878$ ,  $\eta_p^2 = .000$ , or interaction effects between respondent culture and order,  $F(1, 169) < 1$ ,  $p = .828$ ,  $\eta_p^2 = .000$ . Additionally, there were age differences in stress reactions, such

that older participants tended to experience greater symptoms of distress,  $F(11, 155) = 2.13, p = .021, \eta_p^2 = .131$ , but there was no significant interaction between respondent culture and age,  $F(4, 155) = 1.72, p = .148, \eta_p^2 = .043$ . Therefore, we did not include gender, order, or age effects in the further analyses reported below.

**Degree of mental and physical distress reporting depending on situations.** We analyzed the presentations of distress that were sustained by the social practices prevalent in each culture. A 2 (Respondent Culture: European-Canadian vs. Japanese; between-Ss)  $\times$  2 (Situation Type: Interpersonal vs. Non-interpersonal; within-Ss)  $\times$  2 (Symptom Type: Mental vs. Physical; within-Ss) ANOVA had three main effects: 1) Respondent Culture,  $F(1, 171) = 10.33, p = .002, \eta_p^2 = .057$ , which showed that Japanese ( $M = 5.71, SD = 1.13$ ) rated greater overall distress scores compared to European-Canadians ( $M = 5.17, SD = 1.15$ ); 2) Symptom Type,  $F(1, 171) = 402.78, p < .001, \eta_p^2 = .702$ , which revealed that both cultural groups reported greater mental symptoms of distress ( $M = 6.31, SD = 1.18$ ) compared to physical symptoms ( $M = 4.55, SD = 1.46$ ); and 3) Situation Type,  $F(1, 171) = 148.38, p < .001, \eta_p^2 = .465$ , which showed that both cultural groups reported greater distress scores from non-interpersonal situations ( $M = 5.72, SD = 1.22$ ) compared to interpersonal situations ( $M = 5.13, SD = 1.25$ ). There were significant two-way interactions between Respondent Culture and Situation Type,  $F(1, 171) = 84.55, p < .001, \eta_p^2 = .331$ , and between Situation Type and Symptom Type,  $F(1, 171) = 164.28, p < .001, \eta_p^2 = .490$ , but there was no interaction between Respondent Culture and Symptom Type,  $F(1, 171) < 1, p = .940, \eta_p^2 = .000$ . More importantly, the three-way interaction among Respondent Culture, Symptom Type, and Situation Type was significant,  $F(1, 171) = 11.74, p = .001, \eta_p^2 = .064$ .

To interpret the significant three-way interaction, we analyzed mental and physical ratings separately. First, mental symptom ratings in the two types of situations are presented in the left side of Figure 6. The two-way interaction involving Situation Type and Respondent Culture proved significant for the ratings of mental symptoms,  $F(1, 171) = 106.85, p < .001, \eta_p^2 = .385$ . To illustrate, European-Canadians reported greater mental symptoms of distress for non-interpersonal events ( $M = 6.42, SD = 1.20$ ) than interpersonal ones ( $M = 5.67, SD = 1.35$ ),  $t(88) = 10.78, p < .001, d = .59$ , whereas Japanese reported greater mental symptoms for interpersonal events ( $M = 6.77, SD = .96$ ) than non-interpersonal ones ( $M = 6.46, SD = 1.16$ ),  $t(83) = 4.08, p < .001, d = .29$ . Consistent with the results from Study 2, these results demonstrate cultural differences in the level of mental distress, depending on the type of situation.

Additionally, physical symptom ratings in the two types of situations are presented in the right side of Figure 6. We found the two-way interaction involving Situation Type and Respondent Culture was significant for the ratings of physical symptoms,  $F(1, 171) = 34.35, p < .001, \eta_p^2 = .167$ . Consistent with Study 2, both cultural groups rated greater physical symptoms for non-interpersonal situations than interpersonal situations: European-Canadians showed significantly higher ratings for non-interpersonal situations ( $M = 4.90, SD = 1.50$ ) compared to interpersonal ones ( $M = 3.63, SD = 1.40$ ),  $t(88) = 13.80, p < .001, d = .88$ . Similarly, Japanese also showed higher ratings for non-interpersonal situations ( $M = 5.11, SD = 1.49$ ) than interpersonal ones ( $M = 4.52, SD = 1.51$ ),  $t(83) = 8.52, p < .001, d = .39$ . Notably, although both cultural groups tend to experience a similar level of physical symptoms in situations where other people are not involved, we found cultural variations in the degree of physical symptoms of distress experienced in situations where other people are involved.

**Influence of cultural contexts on distress reporting.** Effects of cultural contexts on participants' ratings of distress were analyzed. A 2 (Respondent Culture: European-Canadian vs. Japanese; between-Ss)  $\times$  2 (Situation Culture: Canada-made vs. Japan-made; within-Ss)  $\times$  2 (Situation Type: Interpersonal vs. Non-interpersonal; within-Ss) ANOVA had three main effects: 1) Respondent Culture,  $F(1, 171) = 10.33, p = .002, \eta_p^2 = .057$ , which showed that Japanese participants ( $M = 5.71, SD = 1.13$ ) rated higher overall distress scores compared to European Canadian participants ( $M = 5.17, SD = 1.15$ ); 2) Situation Culture,  $F(1, 171) = 93.63, p < .001, \eta_p^2 = .354$ , which indicated that both cultural groups reported higher overall distress scores for Canada-made situations ( $M = 5.59, SD = 1.17$ ) compared to Japan-made situations ( $M = 5.27, SD = 1.26$ ); and 3) Situation Type,  $F(1, 171) = 148.38, p < .001, \eta_p^2 = .465$ , which revealed that both cultural groups reported higher overall distress scores for non-interpersonal situations ( $M = 5.72, SD = 1.22$ ) than interpersonal situations ( $M = 5.13, SD = 1.25$ ). There were significant two-way interactions between Respondent Culture and Situation Culture,  $F(1, 171) = 181.09, p < .001, \eta_p^2 = .514$ , between Respondent Culture and Situation Type,  $F(1, 171) = 84.55, p < .001, \eta_p^2 = .331$ , and between Situation Culture and Situation Type,  $F(1, 171) = 17.85, p < .001, \eta_p^2 = .095$ . More importantly, the three-way interaction among Respondent Culture, Situation Culture, and Situation Type was significant,  $F(1, 171) = 85.93, p < .001, \eta_p^2 = .334$ .

To understand the three-way interaction, we analyzed interpersonal and non-interpersonal stress ratings separately. First, interpersonal stress ratings in the two types of cultural context are presented in the left side of Figure 7. The simple interaction involving Situation Culture and Respondent Culture was significant for the ratings of interpersonal stress,  $F(1, 171) = 30.11, p < .001, \eta_p^2 = .150$ . In particular, European-Canadians showed greater ratings of distress to Canadian interpersonal contexts ( $M = 4.85, SD = 1.21$ ) than Japanese interpersonal contexts ( $M =$

4.44,  $SD = 1.28$ ),  $t(88) = 7.35$ ,  $p < .001$ ,  $d = .33$ . Conversely, Japanese showed similar high levels of distress ratings to both Canadian ( $M = 5.65$ ,  $SD = 1.11$ ) and Japanese interpersonal contexts ( $M = 5.64$ ,  $SD = 1.09$ ),  $t(83) < 1$ ,  $p = .961$ ,  $d = .00$ . These results suggest that European-Canadians showed greater stress reactions to their culturally-specific interpersonal situations, whereas Japanese showed similar stress reactions to interpersonal situations regardless of cultural context.

Additionally, non-interpersonal stress ratings in the two types of cultural contexts are presented in the right side of Figure 7. The simple interaction involving Situation Culture and Respondent Culture was significant for the ratings of non-interpersonal stress,  $F(1, 171) = 232.01$ ,  $p < .001$ ,  $\eta_p^2 = .576$ . That is, European-Canadians showed greater ratings of distress to Canadian non-interpersonal contexts ( $M = 6.20$ ,  $SD = 1.32$ ) than Japanese non-interpersonal contexts ( $M = 5.13$ ,  $SD = 1.22$ ),  $t(88) = 16.44$ ,  $p < .001$ ,  $d = .84$ , whereas Japanese reported greater ratings of distress to Japanese non-interpersonal contexts ( $M = 5.91$ ,  $SD = 1.17$ ) than Canadian non-interpersonal contexts ( $M = 5.66$ ,  $SD = 1.29$ ),  $t(83) = 4.36$ ,  $p < .001$ ,  $d = .20$ . These results suggest that both cultural groups showed greater stress responses to non-interpersonal situations which often occur in their cultural context.

**The mediating role of self-construals.** Following the procedure developed by Preacher and Hayes (2008), with 5,000 bootstrapping resamples, we conducted a serial-mediation analysis to test whether interdependent self-construal and interpersonal stress responses mediate the influence of culture on perceived life satisfaction (European-Canadians = 0, Japanese = 1). These mediation analyses were conducted with Mplus 7.11 (Muthén & Muthén, 1998–2012). Since non-interpersonal stress responses did not show cultural differences [ $M_{\text{European-Canadians}} = 5.66$  versus  $M_{\text{Japanese}} = 5.79$ ;  $t(171) < 1$ ,  $p = .506$ ,  $d = .10$ ], we did not conduct these mediation

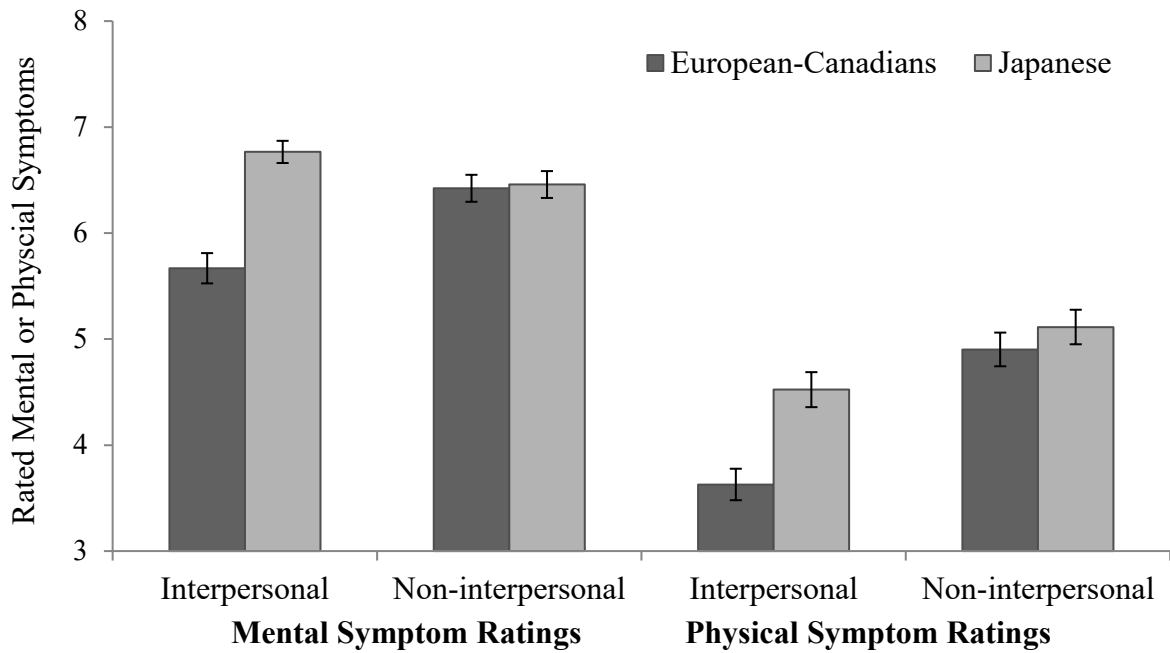
analyses on non-interpersonal stress responses. Instead, we focused on cultural differences in the degree to which people experience interpersonal stress [ $M_{\text{European-Canadians}} = 4.65$  versus  $M_{\text{Japanese}} = 5.64$ ;  $t(171) = 5.68, p < .001, d = .87$ ].

Results of path coefficients showed that Japanese participants tended to experience higher levels of interpersonal stress,  $b = .32, SE = .09, 95\% CI = [.23, .58], p < .001$ , and report lower life satisfaction,  $b = -.27, SE = .10, 95\% CI = [-.56, -.15], p = .001$ , compared to European-Canadian participants. Consistent with the cultural framework of self-construal (Markus & Kitayama, 2010; Varnum et al., 2010), Japanese had higher interdependent self-construal compared to European-Canadians,  $b = .33, SE = .07, 95\% CI = [.19, .48], p < .001$ . Further, higher interdependent self-construal predicted both higher levels of interpersonal stress responses,  $b = .26, SE = .08, 95\% CI = [.15, .48], p < .001$ , and lower levels of life satisfaction,  $b = -.15, SE = .09, 95\% CI = [-.38, -.01], p = .035$ . However, the path between interpersonal stress response and life satisfaction was marginally significant,  $b = -.15, SE = .08, 95\% CI = [-.31, .02], p = .060$ .

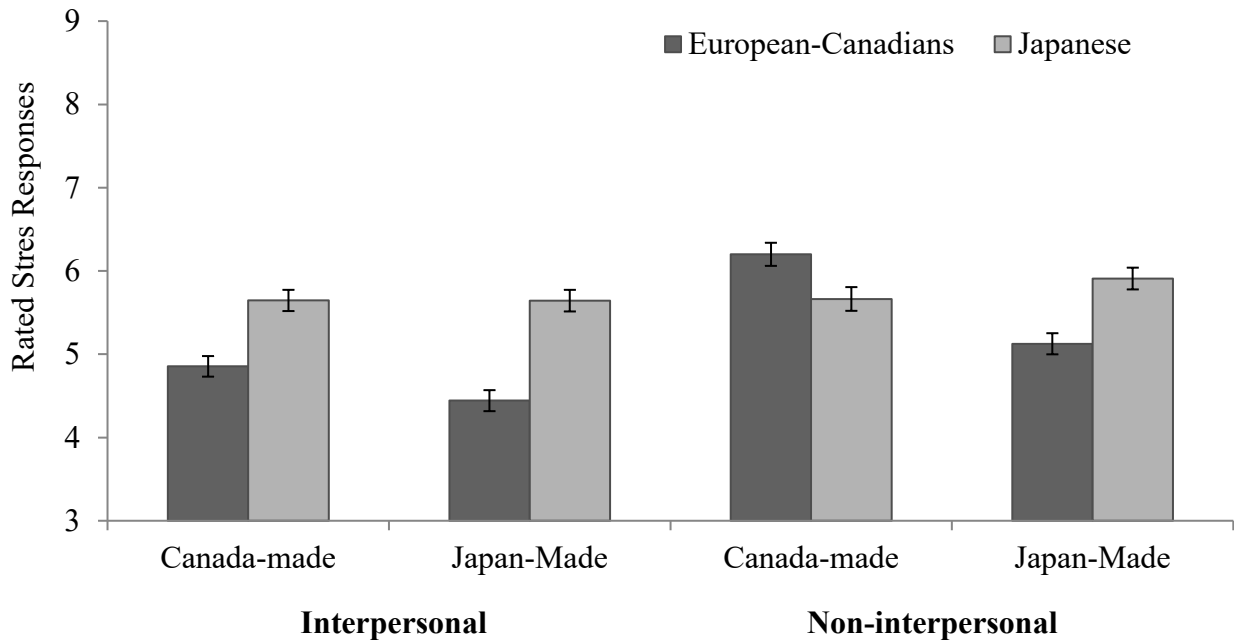
As shown in Table 1, we found one significant indirect effect from culture to interpersonal stress responses via interdependent self-construal, indirect effect = .08, 95% CI [.03, .13],  $p < .001$ . This indirect effect indicates that being Japanese was associated with a .08-*SD* increase in interpersonal stress responses via a higher level of interdependent self-construal than European-Canadians. Consistent with Diener et al. (1995), the indirect effect from culture to life satisfaction via interpersonal self-construal was close to significance, indirect effect = -.05, 95% CI [-.10, .00],  $p = .071$ , showing that being Japanese was associated with .05-*SD* decrease in life satisfaction via a higher level of interdependent self-construal (based on the standardized coefficients; see Figure 8). Although the indirect effect from culture to life satisfaction via

interdependent self-construal and interpersonal stress responses did not reach significance, indirect effect =  $-.01$ , 95% CI  $[-.03, .00]$ ,  $p = .105$ , the results of path coefficients suggest that compared to European-Canadians, Japanese with higher interdependent self-construal are more likely to experience more intense distress from interpersonal issues, which may influence their lower perceived life satisfaction.





*Figure 6.* Degree of mental and physical distress reporting depending on situation types across cultures. Standard errors are represented in the figure by the error bars attached to each column.



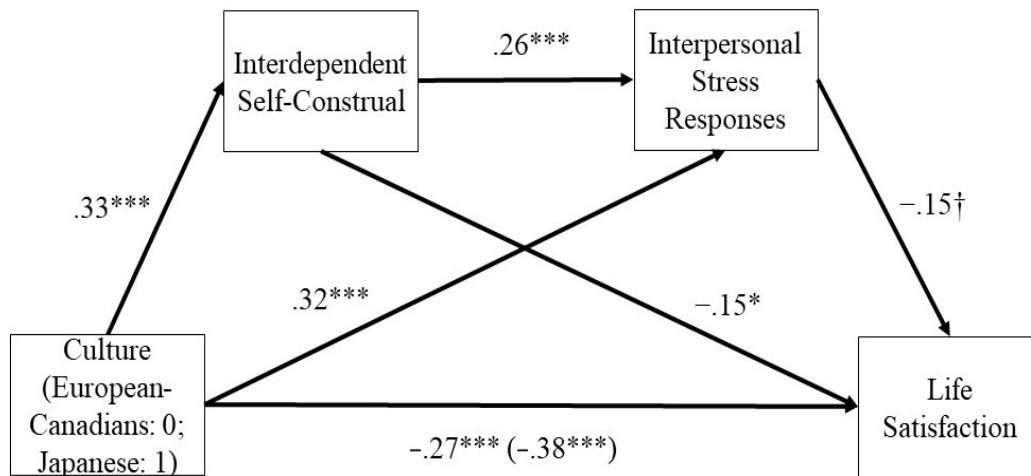
*Figure 7.* Influence of cultural contexts on people's reporting of distress. Standard errors are represented in the figure by the error bars attached to each column.

Table 1

*Indirect Associations between Culture and Life Satisfaction with Interdependent Self-Construal and Interpersonal Stress Responses as Mediators: 5000 Bootstrap Estimates and 95% Confidence Intervals ( $N_{\text{total}} = 171$ ).*

Predictor	Mediator	Outcome	$\beta$	C.I.
<b>Japanese (vs. European-Canadians) →</b>	Higher (Lower) interdependent self-construal → Higher (Lower) interpersonal stress responses →	Lower (Higher) SWB	-.01	[-.03, .00]
<b>Japanese (vs. European-Canadians) →</b>	Higher (Lower) interdependent self-construal	Lower (Higher) SWB	-.05 <sup>†</sup>	[-.10, .00]
<b>Japanese (vs. European-Canadians) →</b>	Higher (Lower) interpersonal stress responses	Lower (Higher) SWB	-.05	[-.11, .01]
<b>Japanese (vs. European-Canadians) →</b>	Higher (Lower) interdependent self-construal	Higher interpersonal stress responses	.08 <sup>**</sup>	[.03, .13]

*Note.* Standardized  $\beta$  estimates shown. C.I. = 95% bias-corrected confidence interval; SWB = subjective well-being. <sup>†</sup> $p = .07$ ; \* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ (two-tailed).



*Figure 8.* Interdependent self-construal and interpersonal stress responses mediate the association between being Japanese (vs. European-Canadians) and lower (vs. higher) life satisfaction. All presented effects are standardized regression coefficients. Direct effect is shown in parentheses.  $^\dagger p = .06$ ;  $*p < .05$ ;  $** p < .01$ ;  $***p < .001$  (two-tailed).

## Discussion

Study 3 replicated the patterns of distress reporting across cultures as shown in Study 2. The results demonstrated that European-Canadians tended to report greater mental and physical distress from non-interpersonal events than interpersonal ones, whereas Japanese tended to experience greater mental distress from interpersonal events than non-interpersonal ones (**Hypothesis 2a**). However, we failed to identify the expected patterns of mental versus physical symptoms of distress across cultures (**Hypothesis 2b**). Importantly, we identified a three-way interaction among culture, situation type, and symptom type (**Hypothesis 2c**). To explain this three-way interaction, we showed that Japanese reported stronger mental distress from interpersonal events, whereas European-Canadians reported stronger mental distress from non-interpersonal events. While both cultural groups showed greater physical distress from non-interpersonal events compared to interpersonal ones, Japanese reported higher levels of physical distress from interpersonal events compared to European-Canadians. Specifically, we identified cultural differences in the degree to which people experience overall distress from interpersonal issues. Importantly, levels of interdependent (relative to independent) self-construals partially mediated these cultural differences of interpersonal stress responses (**Hypothesis 3**). These findings were consistent with prior research that showed that interdependent self-construal could function as a risk factor in mental health by increasing emotional reactivity to negative social events (Mak et al., 2011; Norasakkunkit et al., 2012; Sato et al., 2014).

Despite extant evidence that daily stress experiences reduce one's sense of well-being over time (Dalton & Hammen, 2018), we could not find a significant path from interpersonal stress experiences to life satisfaction ( $p = .060$ ). Since our data was cross-sectional, our analysis was unable to confirm the temporal precedence of the predictor over the mediating variables.

Also, it is possible that moderators such as coping styles may influence this association (Hamarat et al., 2001; Mahmoud, Staten, Hall, & Lennie, 2012). Mahmoud et al. conducted a study on the moderating role of coping styles in health outcomes such as stress, depression, and life satisfaction, demonstrating that people with adaptive coping styles could maintain positive mental health. Future research should incorporate people's coping styles as a moderating factor in explaining the association between interpersonal stress and health outcomes.

CHAPTER 6

General Discussion

Cultural psychologists have widely documented the role of self-construals in many aspects of emotional experiences and expressions (Kitayama & Masuda, 1995; Mesquita & Leu, 2007). Although a growing literature in psychopathology has acknowledged the influence of culture in depressive symptom presentation (Chentsova-Dutton & Tsai, 2009; Kirmayer, 2001; Kirmayer & Ryder, 2016; Marsella et al., 2002; Ryder et al., 2008), it is still unclear what psychological factors underlie people's experiences and expressions of distress across cultures. While cultural differences in depressive symptom presentation may be intertwined with different levels of social stigma regarding mental disorders (Ryder, Bean, & Dion, 2000), and different patterns of help-seeking behavior (Cheung, 1984), the present research sheds light on the role of self-construals in explaining how people from different cultural backgrounds perceive and express distress in everyday discourses.

This dissertation examines the role of cultural meaning systems (independent versus interdependent self-construals) on daily stress experiences. As suggested by Kitayama and Masuda (1995), culture plays a critical role in shaping people's perception of daily stressful situations and in constructing their daily experiences of stress. Using diverse methods such as a situation sampling method and a text analysis, the present research supports the role of culture in the daily stress processes that determine how people perceive stressful situations, and how people experience distress in response to different types of situations.

Three empirical studies revealed four major findings. In Study 1A, culture was involved in the cognitive process of situational appraisal. Based on the cultural framework of self-construal, we explained how culture influences the way people appraise everyday stressors in terms of perceived intensity and frequency. Specifically, we demonstrated that European-Canadians, who perceive themselves independent from relationships with others, tended to show



more intense appraisal of non-interpersonal stressors relative to interpersonal ones, whereas Japanese, who perceive themselves embedded in relationships, tended to appraise interpersonal and non-interpersonal stressors more equally. While a recent study by Hashimoto and his colleagues (2012) highlighted a greater perceived frequency of interpersonal stress experiences among Japanese compared to European-Canadians, the present research further illuminates how people from different cultures process different types of stressful situations, which influences cultural differences in the perceived frequency of interpersonal and non-interpersonal stress experiences.

In Study 1B, our text analyses showed cultural differences in how people describe emotional experiences, replicating prior research by Choi et al. (2016) and Tsai et al. (2004). Although we could not find cultural differences in the degree to which people emphasize mental versus physical symptoms of distress in the self-reported ratings of Studies 2 and 3, the text analyses of situation descriptions revealed that European-Canadians tend to describe their emotions as being independent from social contexts and somatic states by focusing more on their internal states, whereas Japanese tend to describe their emotions as being intertwined with social contexts and somatic states. In fact, Ryder et al. (2008) also found more distinctive cultural differences in the expressions of distress in participants' verbal descriptions (such as in interviews), compared to self-reported ratings on a symptom questionnaire. These findings offer clues as to how cultural discourses (narrative constructions) reflect differing cognitive processes of emotion across cultures (Bruner, 1990; Senzaki et al., 2014; Vygotsky, 1978)

These differences in culturally-representative situations further affect the extent to which people experience mental and physical distress. Consistent with the patterns of situational appraisal across cultures, Studies 2 and 3 showed that European-Canadians tend to experience

mental and physical symptoms of distress from non-interpersonal events rather than interpersonal ones, whereas Japanese tend to experience greater mental distress from interpersonal events than non-interpersonal ones. While prior research has highlighted the influence of culture on the relative emphasis on mental versus physical symptoms of distress (Chentsova-Dutton & Tsai, 2009; Kirmayer, 2001; Kirmayer & Ryder, 2016; Marsella et al., 2002; Ryder et al., 2008), our findings suggest how the interaction between a person and their immediate situation can be key in explaining cultural differences in manifestations of distress.

Furthermore, our mediation analyses in Study 3 showed that the relationship between culture and experiences of distress from interpersonal situations is partially mediated by interdependent self-construal. In other words, among Japanese, higher interdependent self-construal compared to European-Canadians could explain greater experiences of distress from interpersonal situations. While prior research has addressed how higher levels of independent self-construal and self-esteem contribute to higher life satisfaction among North Americans compared to East Asians (e.g., Koreans and Japanese; Diener et al., 1995), researchers have not fully examined why East Asians tend to report lower life satisfaction. The present research provides an explanation for the underlying psychological factors of negative health outcomes among individuals or cultural groups with higher interdependent self-construal (i.e., East Asians).

### **Implications**

According to the Statistics Canada data (2016), Canada is becoming one of the most multicultural societies in the world with twenty percent of the total population being immigrants. Accordingly, the health of Canada's immigrant population is of major concern to health scholars, practitioners, and policymakers. However, prior research on mental health has addressed the

issue of de-emphasizing culturally-specific values and communication styles of Asian immigrants in Western-based counselling and psychotherapy (Kuo & Gingrich, 2005; Yeh & Hwang, 2000). For examples, European-Canadian counselors may diagnose and treat Asian immigrants based on their culturally-dominant values of independence and direct communication of emotions. In this process, Asian immigrants may form negative impressions that a host culture does not accept their cultural values, and may feel reluctant to seek help in the future. To prevent this happening more cross-cultural research in health is required to broaden our cultural understanding, and this has critical implications for how to provide better health services to culturally-diverse individuals.

Specifically, this dissertation examined the role of culture, i.e., independent and interdependent self-construals, in people's daily stress experiences. Our findings suggest that people with higher interdependent self-construals (such as Asian populations) are more likely to perceive stressors from differing contexts, which lead to experiencing greater stress responses. These findings support prior cross-cultural research in health that interdependent self-construals influence motivational, cognitive, and emotional tendencies which predict lower subjective well-being (Suh, 2007).

However, prior cross-cultural research and the present findings should be interpreted with caution. First, we do not advocate that interdependent self-construals always lead to negative health outcomes. As Uchida and Kitayama (2009) stated, people with interdependent self-construals also experience happiness in the context of their relationships with others. More importantly, although cultural research is often criticized for increasing stereotyping of cultural groups, the main aim of cultural research is to acknowledge cultural differences in psychological

processes and to explain the underlying mechanisms of those cultural differences so that such knowledge can be used to facilitate smooth inter-cultural communication.

### **Limitations**

The present research has several limitations. First, since we only sampled two cultural groups (European Canadians and Japanese), we have generalization issues. To understand the nuances of self-construal in cognitive processes of stress, future research should include other cultural groups—for example, Latinos, who are as high in interdependent self-construal as, but put more value on expressing their emotions, compared to East Asians (Mesquita & Leu, 2007); and Japanese immigrants and international students, whose self-construal falls in between European-Canadians and Japanese, and who have also experienced acculturative stress (Oh, Koeske, & Sales, 2002; Tsai et al., 2004). Also, despite the evidence of age differences in cognitive processes of stress (Aldwin, Sutton, Chiara, & Spiro, 1996) and symptom presentation of distress (Sun et al., 2018), our samples consist only of undergraduate students. Therefore, future research should assess whether our findings can be generalizable to other cultural and age groups.

Additionally, our findings were based on self-reported responses. Although self-reported mental and physical health represents help-seeking behavior (Doherty & Kartalova-O'Doherty, 2010) and, in the long term, predicts mortality (McGee, Liao, Cao, & Cooper, 1999), we identified significantly lower ratings of physical symptoms compared to mental symptoms regardless of culture, e.g.,  $M_{\text{physical}} = 4.37$  versus  $M_{\text{mental}} = 6.31$  in Studies 2 and 3. It is possible that subjective markers of health could potentially differ from objective measures of health, such as biological markers of cortisol and inflammation (Pennebaker, 1982; Watson & Pennebaker,

1989). Therefore, future studies should extend the present research on physical symptoms of distress by using objective measures of health.

Further, as shown in the results on the influence of cultural contexts on distress symptom reporting (Studies 2 and 3), Japanese participants tend to be attuned to both their own cultural contexts (Japanese situations) and different cultural contexts (Canadian situations) to a similar degree, whereas European-Canadian participants are more attuned to their own cultural contexts. Since participants were instructed to put themselves in another person's perspective in a given situation, it is possible that these results may be moderated by cultural differences in perspective taking (Cohen, Hoshino-Browne, & Leung, 2007; Wu & Keysar, 2007). For example, Wu and Keysar found that cultural patterns of interdependence orientation lead to individual differences in perspective-taking. Their results showed that Chinese, who come from interdependence-oriented cultural contexts, are better at perspective taking than Americans, who come from independence-oriented cultural contexts. Although a situation sampling method has important merits for testing the interactions among culture, situation, and individual variables, future cultural research should examine a possible moderating factor of perspective-taking, by including first-person ("I") vs. third-person ("a person") perspective-taking instructions in their reporting of distress symptoms.

### **Future Directions on Culture and Coping**

While the present research has highlighted cultural differences in situational appraisals and their impact on stress responses, it is important to examine how coping processes moderate cultural influence in situation appraisals and stress responses. Coping is defined as how people put cognitive and behavioral effort towards managing situational demands (Lazarus & Folkman, 1984). The choice of coping strategy depends on two factors: (1) how people appraise situations, and (2) how people perceive their ability to cope with the situations. Although coping responses

may be classified in many ways (Moos & Schaefer, 1993), researchers generally categorize our behavioral tendencies in three ways, depending on levels of perceived control (Bandura, 1997). For example, when people perceive themselves as having a high degree of control over a situation, they may put effort toward directly changing the situation (problem-focused coping). Otherwise, they may focus on regulating the feelings of distress elicited from the situation (emotion-focused coping), or avoiding thinking about the situation altogether (avoidance coping; Folkman et al., 1986). Ultimately, successful coping with stressful situations helps mitigate detrimental health outcomes (Denson, Spanovic, & Miller, 2009; Folkman, Lazarus, Gruen, & DeLongis, 1986).

Since, as shown in the present research, culturally-dominant self-construals influence how people appraise situations, these cultural differences in situation appraisals may influence how people cope with situations. In fact, prior research has suggested cultural differences in the use of coping strategies, which reflect self-construals (Lam & Zane, 2004; Morling et al., 2002; Morling & Evered, 2006). After appraising situations as stressful, European-Americans, having strong independent self-construals, tend to use problem-focused coping strategies as an attempt to change their situations. In contrast, East Asians, having strong interdependent self-construals, tend to adopt emotion-focused coping strategies to accommodate themselves to situational demands.

Integrating the findings from the present research, it is possible that North Americans, who perceive non-interpersonal situations as more stressful than interpersonal ones, would be more used to problem-focused coping strategies. In contrast, East Asians, who perceive interpersonal situations as more stressful than non-interpersonal situations, would be more used to emotion-focused coping strategies. Although the use of emotion-focused coping has been

shown to be culturally adaptive among East Asians by increasing a sense of closeness with others (Morling et al., 2002; Uchida & Kitayama, 2009), prior research has also suggested that East Asians often use avoidance coping, which may lead to relationship problems and negative health outcomes (Elliot et al., 2001; Elliot, Gable, & Mapes, 2006; Lee, Lou, Johnson, & Park, 2018). It is still unclear which coping strategies East Asians would use initially, and whether they would end up using avoidance coping after their resources are depleted. Therefore, future research should consider both situational characteristics and temporal changes in the use of coping strategies across cultures.

The present research may offer a potentially important application. By broadening the clinical as well as the non-clinical population, our cross-cultural studies on daily stress can help in the development of culturally-specific programs for the prevention of mental disorders and physical illnesses. For example, a recent study suggested that mindfulness-based stress reduction could alleviate distress among clinical and non-clinical populations (Grossman, Niemann, Schmidt, & Walach, 2004; Goldin & Gross, 2010). One critical component of mindfulness is self-compassion—“being open to and being moved by one’s own suffering, experiencing feelings of caring and kindness towards oneself, taking an understanding, nonjudgmental attitude toward one’s inadequacies and failures, and recognizing that one’s own experience is part of the common human experience” (Neff, 2003, p. 224). Because interdependent East Asian societies reinforce self-criticism, which works against self-compassion (Heine et al., 2001; Kitayama et al., 1997; Neff, Pisitsungkagarn, & Hsieh, 2008), future research should examine whether compassionate mind training can help alleviate interpersonal stress among people with interdependent self-construals (Gilbert & Irons, 2005; Gilbert & Proctor, 2006).

### **Future Direction on Targeting Different Age Groups**

Although the present research has only targeted undergraduate students, future research should consider different age groups, as there are distinctive differences in their sources of stress and in coping strategies. Depending on an individual's stage in life, risk factors in mental and physical health outcomes may be different. Thus, researchers should examine cultural influences in experiences and presentations of distress among different age cohorts.

Extending the present research, our future research plans to target a middle-aged population (approximately ages 45 to 65). There are several reasons for targeting this age group. First, a middle-aged population encounters multiple role-related sources of stress, including family obligations, caretaking for children or elderly parents, and work responsibilities, compared to a university-aged population. This population could be categorized as a high-risk population for chronic stress, because they often encounter situations where their roles are conflicting (being a good caregiver vs. being a successful employee), and because these situations are often perceived as out of their control. More importantly, stress experiences among middle-aged groups influence the functioning of families. For example, the way members of this group interact as caregivers with their children may cause a ripple effect, since a caregiver's stress can affect other family members' well-being and health (Mackler et al., 2015).

Additionally, compared to a university-aged population, a middle-aged population tends to use different coping strategies which are adaptive for different types of stressful situations. For example, while the use of problem-focused coping may be adaptive in non-interpersonal situations (performance on exams) in an undergraduate population, the use of emotion-focused coping may be more adaptive in non-interpersonal situations (health and financial stress) in a middle-aged population. Prior research has shown that regardless of culture, older adults tend to



have stronger interdependent self-construals, which endorse stronger communal values and less agentic values, compared to younger adults (Fung et al., 2016). It is possible that older adults across cultures may show less cultural variation in situation appraisals and coping strategies. Likewise, the source of stress and the mode of coping could differ among people in different life stages. Therefore, it will be worth examining how people in different cultures perceive and cope with their life tasks differently as they age.

Lastly, by targeting the middle-aged population, we may observe cultural changes in cognitive processes of emotion. Specifically, cultural change in self-construals (increase in independent self-construals over time) has been discussed in the United States (Greenfield, 2013) and in Japan (Hamamura, 2012). While younger generations have become more independent across cultures, older generations may endorse more traditional cultural values—stronger interdependent self-construals among East Asians, and stronger independent self-construals among North Americans. On the other hand, East Asians may be becoming less traditional. Sun et al. (2018) conducted a cross-temporal analysis on the presentations of distress symptoms among Chinese and Canadian outpatients. They found that Chinese outpatients have become less likely to emphasize physical states of distress over time and instead, have shown more cultural similarity of emphasizing mental states over time. Future research should assess changes in the association between manifestations of distress symptoms and self-construals over generations.

### **Conclusion**

Applying the cultural framework of self-construals in explaining the role of cultural contexts in daily stress processes, the current study has documented how culturally-shaped self-construal may play a role in situation appraisals, which influence different manifestations of

mental and physical distress. Our findings highlight the importance of considering the interactions between cultural contexts and individuals in cognitive processes of daily stress.

## Endnotes

<sup>1</sup> We identified cultural differences in how often participants included a statement describing a resolution to the situation. We found that only European-Canadians tended to report stressful situations that have already been resolved (20.75 % of Canadian interpersonal situations; 24.53% of Canadian non-interpersonal situations). A chi-square test was performed and the relationship between culture and this tendency was significant,  $\chi^2(1, N = 206) = 25.63, p < .001$ . This tendency may be interpreted as a higher self-enhancing tendency among European-Canadians compared to Japanese (Heine et al., 1999).

Supplemental Table 1

*Respondents' High-ranked Sources of Stress across Cultures*

Sources of <i>interpersonal stress</i> of <b>European Canadian</b> undergraduates	Percentage (%)
Responsibility in school or work	30%
Family problems	17.5%
Disagreement with peers	17.5%
Talk in front of class	10%
Performance on interview	7.5%
Forming new relationships	7.5%
Living adjustments (such as roommate issues)	5%
Conflicts with boss or co-workers	5%
Sources of <i>non-interpersonal stress</i> of <b>European Canadian</b> undergraduates	Percentage (%)
Performance on exams	65%
Concern for future	7.5%
Lack of personal ability	7.5%
Late for school	5%
Technical issue (i.e., computer, car)	5%
Health issue	5%
Being lost	2.5%
Workload in school	2.5%
Sources of <i>interpersonal Stress</i> of <b>Japanese</b> undergraduates	Percentage (%)
Concern for a friend's behavior	25%
Sense of social isolation	20%

Potential conflict with others in school or work	20%
Social responsibility in school or work	17.5%
Disagreement with friends	10%
Family problems	5%
Frustration from not meeting others' expectations	2.5%
<hr/>	
Sources of <i>non-interpersonal stress</i> of <b>Japanese</b> undergraduates	Percentage (%)
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Academic performance	25%
Transportation problems	17.5%
Lack of personal ability	12.5%
Social responsibility	7.5%
Health issue	7.5%
Financial concern	5%
Concern for future	5%
Noise in neighborhood	5%
Technical problems	5%
Late for class	5%
Disappointment from the situation	2.5%
Workload in school	2.5%
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