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SELF-COMPASSION AND DEPRESSION ACROSS CULTURE: COMPARISONS OF
EMERGING ADULTS IN CHINA AND THE UNITED STATES

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Bachelor of Arts in Psychology

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May 2017

Submitted in partial fulfilment of requirements for the degree

MASTER OF ARTS IN PSYCHOLOGY

at

CLEVELAND STATE UNIVERSITY

May 2019

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ACKNOWLEDGMENTS

I would first like to thank my thesis advisor Dr. Ilya Yaroslavsky for your guidance and valuable comments on this thesis. He constantly steered me in the right direction and helped me in all the time of research and writing of this thesis.

I would also like to thank rest of my thesis committee members Dr. Elizabeth Gony, and Dr. Christopher France for their encouragement, insightful comments, and hard questions.

I was fortunate to have met inspiring and invested mentors who influenced me to follow them into a grad school. Thank you, Dr. Laura Stull, and Dr. Wayne Priest. My sincere thanks also goes to Dr. Ryan Mekota for offering me the practicum opportunity and leading me working on exciting neuropsychological cases.

I must express my very profound gratitude to my parents, Jongho Lee and Hyunhee Koh, and to my brother, Samuel Lee for their unfailing support and continuous encouragement. I thank my grandparents, future parents-in-law, Benjamin Kronk, Ji In Chang, Scott Bang, Joy Kang, Suhyun Cho, Alice Kim, Jeewon Oh, Andrea Lee, Daniel Jang, John Bae, Juhee Park, David Kim, Arishna Agarwal, Logan Eskew, Sarah Ghose, Haesook Won, Theo Baart, Andrew Koh.

Finally, I thank the Euncheon Scholarship Foundation team for their support.

SELF-COMPASSION AND DEPRESSION ACROSS CULTURE: COMPARISONS
OF EMERGING ADULTS IN CHINA AND THE UNITED STATES

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ABSTRACT

Major Depressive Disorder (MDD) is one of the most common mood disorders and affects over 300 million individuals across the world in a given year. MDD is marked by sadness, loss of pleasure or interest, feelings of guilt or low self-worth, disturbed sleep or appetite, fatigue or loss of energy, and poor concentration that leads to functional impairment, which can potentially have a debilitating impact on individual's educational, occupational, social and psychological areas of life. Not only is depression highly prevalent in the U.S., but it is also a global concern, including countries such as China. Estimates of lifetime prevalence rates range from 32.6 to 35.1 million in the US and 54 to 100 million in China, respectively. A growing literature shows that self-compassion is a strong protective factor for depression. Self-compassion is a process of mindfully accepting oneself by reducing self-criticism and examining one's experiences from a broader perspective. The values behind self-compassion are rooted in Asian cultural teachings. A small but growing body of work suggests that self-compassion outcomes may differ across non-Western and Western cultures. However, the effect of cultural background on the relationship between self-compassion and depression remains unknown; therefore, more research is needed to be done in cross cultural domains. The current proposed project further seeks to understand the role of self-compassion in depression among both American and Chinese populations. This study also aims to

understand whether cultural components moderate the relationship between self-compassion and depression.

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CHAPTER I

BACKGROUND

Depression

Major Depressive Disorder (MDD) is a commonly occurring, episodic mood disorder that is characterized by symptoms such as sadness, loss of pleasure or interest, feeling guilt or low self-worth, disturbed sleep or appetite, fatigue or loss of energy, and poor concentration that leads to functional impairment (American Psychiatric Association (APA), 2013). The World Health Organization estimated over 300 million individuals are affected by the disorder, which is equivalent to a 4.4% prevalence for the global population. This rate has risen by 18% between 2005 and 2015 (WHO, 2015). In the United States, MDD affects 6.7% individuals in a given year (National Institute of Mental Health (NIMH), 2016), and about 25.66% within their lifetime (Wittayanukorn, Qian, & Hansen, 2014). In other developed countries, such as China, depression evidences an estimated 2% 12-month prevalence, which while lower than that of US, affects 37.8 million more people given China's population size (WHO, 2017).

It is important to note that the prevalence of MDD is compounded by its high rate of recurrence. Indeed, while 20% to 30% recover within a six month period, 50% experience a recurrence within their lifetime (Burcusa & Iacono, 2008). The relatively high prevalence rate of MDD and recurrence is problematic because depression levies

notable burdens on individuals and society at large (Joorman et al., 2008; Schneider & Verdeli, 2014; WHO, 2017). For example, depressed individuals experience more interpersonal difficulties than their peers, as evidenced by their reporting higher levels of interpersonal distress and more severe problems in intimate relationships (Lam, Schuck, Smith, Farmers, & Checkly, 2002). Indeed, using experience sampling methods, Nezlek and his colleagues found that clinically depressed individuals reported their day-to-day interactions with family and friends to be less enjoyable and less intimate compared to non-depressed individuals (Nezlek, Hampton & Shean, 2000). These findings mirror those of others that link depression to briefer social relationships that are contentious (Gotlib & Lee, 1989). Interpersonal difficulties associated with depression are evident also in their marital context, as evidenced by high divorce rates among depressed individuals (Rechman et al., 2008). Furthermore, children of depressed parents are at higher risk for psychopathology. For example, Weissman and his colleagues showed that the risk for major depression was approximately three times higher in high-risk offspring (2016).

With respect to the societal burden, the World Health Organization notes depression as the leading cause of disability across the world (WHO, 2017). In the US, depression costs society around \$210.5 billion per year when untreated, which is a 21.5% increase from 2005 (Greenberg, Fournier, Sistsky, Pike, & Kessler, 2015). These financial burdens are due to medical expenses such as psychiatric inpatient or outpatient services and medication, as well as reduced productivity costs. According to Greenberg, costs associated with MDD are linked to reduced illness-related productivity while at work (presenteeism), as well as to missed work days (absenteeism). Both sources of

societal burden have risen 21.5% and 8.3%, respectively, between 2005 and 2010, and range between from \$86.2 billion to \$102 billion in the US (Greenberg et al., 2015). Similar concerns were recently pronounced in China along with their growing awareness of mental health. In China, it was estimated that depression costs about \$62.64 billion USD per year due to absenteeism, medical expenses, as well as funeral expenses caused by high suicide rate (Hu, He, Zhang & Chen, 2007). The Chinese suicide rate is estimated at 30.3 per 100,000 according to Murray and Lopez (1996). As a result, the rate of full-time employment for individuals with MDD is much lower than the rate for those without MDD.

Depression among Emerging Adulthood

Though depression can occur at any age, its onset is particularly problematic for those in the transition from adolescence into young adulthood. This period, termed emerging adulthood, occurs between the ages of 18 to 25 years and is a time when youths become independent from the family but have not yet fully entered into the societal responsibility (Arnett, 2000). This developmental phase is a time of exploring personal identity, building a worldview, exploring romantic partnerships, pursuing higher education, and career goals.

In the United States and China, emerging adulthood is a time during which many youths pursue higher education. In the US, the rate of seeking post-secondary education among young adults has increased steeply since 1990 from 14% to 60% (National Center for Education Statistics, 2016), and by almost 50% in China (National Bureau of Statistics of China, 2009). At the same time, there is increasing evidence that the transition to a college environment is marked by an increased risk for depression, as

evidenced by the high volume of students seeking treatment from counseling centers (American College Health Association, 2013). In the US, nearly 40% of college students report functional impairment that arises from depression-related symptoms (National College Health Assessment, 2017). These figures are akin to those observed in China, as evidenced by recent meta-analytic findings that show 23.8% of Chinese college students experience depression-related functional impairment (Lei, Xiao, Liu & Li, 2016). As untreated MDD usually last between 6 and 18 months (Berry, 2004), its occurrence during college years has notable adverse implications for academic performance and career development. The consequences of depression have long been associated with academic impairment (Heiligenstein, Guenther, Hsu & Herman, 1996; Hysenbegasi, Hass, & Rowland, 2005). Indeed, depressed students are twice as likely to discontinue their education as their non-depressed peers (Eisenberg, Golberstein, & Hunt, 2009). Further, depression is attributed to increased risk of self-injury, drug abuse, suicide attempts and completion among college students in US and China (Mackenzie et al., 2011; Kisch, Leino, & Silverman, 2005; Zhang, Jiang, Jia, & Wiczorek, 2002), making the disorder the third leading cause of death for those during emerging adulthood years (Center for Disease Control and Prevention, 2004).

While the risk for depression is multiply determined, those who pursue college education are exposed to many risk factors that are known to predict depression occurrence. For example, college students are exposed to a number of stressors, including those related to balancing academic demands, interpersonal relationships, and economic burdens (Ross, Neibling & Heckert, 2008). Further, transition itself away from home to college add on to such life stressors as they are away from already established support

system (Dyson & Renk, 2006). Though unpleasant, distress that arises from exposure to such stressors does not presage depression risk. Rather, growing evidence suggests that it is the response to distressing emotions that increases vulnerability for depressive disorders (Joormann & Gotlib, 2010; Teasdale, 1988). Therefore, identifying modifiable ways that students respond to stressors may provide a novel target for prevention and intervention efforts.

Self-Compassion

Self-compassion has received increasing attention as a putative mechanism for depression risk. Self-compassion reflects channeling compassion inwards, with compassion referring to taking an empathetic stance towards suffering and desiring to alleviate pain with a non-judgmental and kind attitude (Neff, 2012). In practice, self-compassion involves mindfully accepting oneself by reducing self-criticism and examining one's experience from a broader perspective (Neff, Hseih, & Dejithirat, 2005). In other words, those who are self-compassionate treat themselves with kindness, understanding, and gentle care when they are exposed to negative life stressors (Neff, 2013a). Neff proposed that self-compassion has six dimensions: self-kindness, self-judgment, common humanity, isolation, mindfulness, and over-identification (Neff, 2003a). *Self-kindness* entails accepting oneself with kindness and sympathy rather than with frustration and self-criticism. *Common humanity* is being able to acknowledge suffering and failure as a part of a shared human experience rather than isolated self alone. *Mindfulness* involves accepting one's thoughts and feelings as opposed to over-identification or avoidance.

Neff (2003a & b) proposed that the Self-Compassion Scale (SCS) has a six-factor structure, which contains three positive (self-kindness, common humanity, and mindfulness) and three negative components (self-judgment, isolation, and over-identification). A series of confirmatory factor analyses were employed to evaluate the model fit. These results showed an 'adequate fit' of a six-factor correlated model with NNFI (Non-Normed Fit Index) = 0.90, CFI (Comparative Fit Index) = 0.91 (Neff, 2003a & b). Additionally, a higher-order model was also proposed with NNFI = 0.88, and CFI = 0.90 as evidence to support the usage of a total score of the self-compassion scale.

More studies have replicated the factor structure of SCS, which resulted in mixed findings. For example, William et al. (2014) replicated the original publication's six-factor correlated model among the community, mediator, and clinical samples with recurrent depression. This study concluded that the six-factor correlated model best fit the data compared to the one-factor model, and a higher order model across samples, and showed adequate model fit for the community sample. Although the majority of studies supported the original publication's six-factor correlated model (Chen, Yan, & Zhou, 2011), there are some studies did not yield the same factor solution (Costa et al., 2015; Lopez et al., 2015). Costa et al. (2015) found that the two-factor model included correlated errors showed the best fit when compared with a six-factor uncorrelated model, a higher order model, a two-factor uncorrelated model with positive and negative items separated. It is important to note that the authors' approach to examine the uncorrelated model was different from the original approach (Neff, 2003a). Additionally, Lopez et al. (2015) conducted EFA among Dutch community sample and found that the SCS is bi-dimensional due to all the positive items loaded on one factor and all the negative items

loaded on the second factor. Although Chen (2011) found a higher order factor among Chinese student, there is a lack of studies replicating factor structure models. Therefore, alternative factor structures were proposed such as a single-factor model (an overall SCS), two-factor model (SCS positive items, and SCS negative items), and bi-factor model (individual SCS items load on a general self-compassion factor and the group factor consist of the six subscale factors). Furthermore, recent studies (Cleare, Gumley, Cleare & Connor, 2018; Neff, 2016; Neff, Whittakar, & Karl, 2017) investigated more into a bi-factorial model in the SCS. Indeed, Neff (2016) suggested that the higher-order structure may not fully comprehend the concept of self-compassion. Theoretically, self-compassion is manifest directly in how individual respond to suffering, therefore, Neff (2016) argues that the bi-factor model is more accurate ways.

A corpus of conceptual and empirical evidence suggests that self-compassion serves as an emotion regulation response that downregulates negative emotions (Diefrich et al., 2014). Self-compassion entails being mindfully aware of one's situation or emotion, which leads to approaching problems with kindness and further acknowledging that it is a part of shared human experience, instead of ruminating or avoiding the problem. Presented these reasons, self-compassion can notably be a crucial aspect of emotional coping when facing psychological distress (Neff, 2003). While self-compassion may suggest one is self-centered and self-interested, Neff (2003) suggested that individuals are usually harsher and unkind to oneself. Showing compassion to oneself does not entail superiority over others or self-centeredness, rather self-compassion promotes empathy and less judgment toward others.

The Role of Self-Compassion in Depression

There is now considerable evidence showing that self-compassion may be a protective factor against depression (Neff, 2004; Neff, Kirpatrick, & Rude, 2007). For example, college students who were induced into negative mood states and then asked to write about a negative event evidenced the largest mood improvement when they wrote about the event in a self-compassionate way as compared to one of emotional expression (Oudou & Brinker, 2014). These findings are consistent with meta-analysis results that show a strong inverse relationship ($r = -.54$) between self-compassion and affective disorder symptoms (MacBeth & Gumley, 2012). Specifically, high levels of self-compassion were associated with lower levels of anxiety and depression symptoms (MacBeth & Gumley, 2012). Further, findings link self-compassion to lower stress levels and greater levels of hedonic affects (MacBeth & Gumley, 2012) and to higher levels of life satisfaction (Neff, Rude, & Kirkpatrick, 2007).

A small body of work shows the prospective salubrious effects of self-compassion with respect to stress and depression symptoms. In a series of studies, Leary and colleagues investigated how self-compassionate people process unpleasant life events. They ask undergraduate students to report on negative events in their daily lives, responded to hypothetical scenarios, and reflected on negative personal experiences. These series of studies found that self-compassion has been shown to attenuate reaction to negative events in daily life, which in turn, moderates negative emotions (Leary, Tate, Adams, Allen, & Hancock, 2007). Others have also shown that self-compassion reduces the development of depression symptoms. In his longitudinal study, Ress (2011) measured depression symptoms across a five-month period in a large sample of college students. His results showed that baseline self-compassion level significantly predicted

reduction or minimal increase in depression symptoms over the follow-up period. Others have also shown protective effects of self-compassion for developing depression symptoms over time, and its prospective association with hedonic affects (Shapira & Mongrain, 2010).

A few studies were done among Chinese samples to examine the role of self-compassion. Yang and her colleagues examined the role of self-compassion and life satisfaction among over 300 Chinese adults. The results show that during the times of distress, self-compassion acts as an emotion regulation process, which increases positive emotions related to psychological well-being and life satisfaction and reduces negative emotion such as depression (Yang, Zhang, & Kou, 2016). Another study was done on the different roles of three self-compassion components and depression among Chinese in Hong Kong. This study found that all three positive components in self-compassion (self-kindness, common humanity, and mindfulness) significantly and negatively correlated with depression. More specifically, all three negative components (self-judgment, isolation, and over-identification) significantly moderated the relationship between self-criticism and depression. This study noted that future research should examine its cross-cultural generalizability (Wong & Mak, 2013).

Culture and Self-compassion

While self-compassion has only recently received attention in Western literature, its philosophical underpinnings can be traced to Buddhism (Neff, 2003a). Buddhist teachings propose that suffering is a part of human experience, and emphasize finding a balance in life. This is attained through mindful awareness, wherein one takes a distant

and objective perspective on their experience, and responding with loving and kindness towards themselves and others. Self-compassion strongly draws on these ideas.

In China, lifestyles and worldviews are heavily influenced by Confucianism, Taoism, and Buddhism (Zhang, 2003), with Buddhism, in particular, shaping the experience and response to the adversity of many Chinese individuals (Jones, 1999). Buddhism is the oldest religion in China and has profoundly influenced Chinese traditions, teachings, and values since the Han dynasty in 67 AD (Jones, 1999). Therefore, it is not surprising that elements of Buddhist teaching are evident among secular segments of the Chinese culture, and that self-compassion may be expected to be higher for those of this cultural background. Empirical evidence supports this among Chinese and related cultural groups. For example, in a study that compared levels of self-compassion across the United States, Thailand, and Taiwan, Neff found higher levels of self-compassion in Thailand, which shares cultural values for Buddhist teaching with China, relative to the US and Taiwan that do not have cultural origins in Buddhist philosophy (Neff et al., 2008). Others have also shown greater levels of self-compassion in the form of self-kindness and common humanity among Chinese relative to US college students (Birkett, 2014).

Given the close alignment between China's cultural values and self-compassion, it is feasible that being less compassionate towards oneself has more negative consequences among those of Chinese relative to those of Western backgrounds. Indeed, there is evidence that deviating from one's cultural norms is associated with negative outcomes (e.g., Heinrichs et al., 2006). According to social identity theory, people internalize the social norm with significant personal values to certain social groups,

which means that they construct their world to assimilate into the group (Abrams, 2015). Furthermore, in collectivistic cultures, such as Asian culture, the self is commonly defined in relation to the group with the emphasis on interdependence and harmonious relationships with others (Lam, Tsang, Chan, & Corrigan, 2006). As such, the importance of the group norms for the individual is increased, would likely results in higher risk for individuals deviating from the norms (Hsu et al., 2008). However, no study of this author's knowledge has examined whether the effect of self-compassion differ across cultures, as most cross-cultural studies examine differences in levels of the construct.

Culture, Depression, and Self-compassion

While depression is a cross-cultural phenomenon, much of the literature examining the risk factors for depression have focused on Western populations. To date, there are limited cross-cultural studies that examine the relationship between self-compassion and depression among Chinese and American samples. In the United States, the number of international students is growing annually, with the majority originating from China (statistics, 2018). As adjusting to college in a new culture is particularly challenging, many international students face emotional difficulties that exceed those of their US peers (Nelson, 2013). With an increasing number of international students each year and increasing trends in counseling center utilization, it is essential to understand the cultural context for depression risk factors among such diverse student communities in order to provide effective treatment.

CHAPTER II

THE CURRENT STUDY

The current investigation aims to test whether the relationship between self-compassion and depression differs among Chinese and US college students who reside in their respective countries. While prior studies have examined the relationship between self-compassion and depression in each culture, as well as cross-cultural differences in levels of self-compassion, this is the first study to test whether culture moderates the relationship between self-compassion and depression. Given that self-compassion is aligned with Chinese cultural values, I hypothesize that 1) self-compassion will predict lower levels of depression in both groups, 2) culture will moderate the relationship between self-compassion and depression, and low levels of self-compassion will incrementally predict higher depression symptoms among Chinese students relative to US students. As a preliminary hypothesis testing, the current study also tested the psychometric properties of the SCS using a one-factor, six-factor, high-order, and two-factor model in both US and Chinese samples in order to establish the measurement invariance. Based on the reviewed literature, I hypothesized that the six-factor correlated model will demonstrate the best fit across samples.

CHAPTER III

METHODS

Participants

Two different samples of college students were recruited in China and the United States. Chinese participants studied at a university located in Central China and US participants studied at a university located in the Midwest. US sample consisted of 422 participants, 324 (77%) were female. The mean age of this sample was 22.15 years ($SD = 5.46$). US participants received preliminary study information via SONA Research Management System, which fulfilled a requirement in introductory psychology courses. Chinese sample included a total of 213 participants, 169 (79%) were female. Their mean age was 21.18 years ($SD = 1.98$). Chinese participants learned about the study from their course instructors, and point reduction was waived for not attending one class.

Procedure

Both American and Chinese participants completed the survey online using the web-based survey software Qualtrics. All participants finished the questionnaire (demographic questions, Center for Epidemiology for Studies Depression Scale (CES-D), Self-Compassion Scale (SCS); Chinese participants completed a Chinese-translation of the demographic questions, CES-D, and SCS). All the measures were already translated and validated in Chinese population (Chen, Yan, & Zhou, 2011; Yang, Jia, Qin, 2015).

This study was approved by the Ethics Committee of the Chinese University's Academy of Sciences and the US Institutional Review Board.

Measures

Demographic Information. The demographic questionnaire utilized for this study included five items pertaining to participants' age, gender, major, education (years in school), race and ethnicity.

Depression. Center for Epidemiology Studies Depression (CES-D) is a 20-item scale assessing depressive symptomatology in the general population (Radloff, 1977). The scale responses range from 0 = "Rarely or none of the time (less than 1 day)" to 3 = "Most of all of the time (5-7days)". Sample items include: "I was bothered by things that usually don't bother me" (normal scoring) and "I felt hopeful about the future" (reverse-scored). The CES-D items scores are summed to calculate the total score, where higher scores indicate higher levels of depressive symptoms. The CES-D scale is reasonably valid and reliable (Cosco, Prina, Stubbs, & Wu, 2017; Radloff, 1977), with $\alpha = .91$ for the US and $\alpha = .81$ for the Chinese samples, respectively.

Self-compassion. Self-Compassion Scale (SCS) consists of 26 items measuring self-compassion in terms of six subscales: self-kindness, self-judgment, common humanity, isolation, and mindfulness, and over-identification (Neff, 2003a). The scale responses range from 1 = "Almost never" to 5 = "Almost always". Self-kindness and self-judgment contain 5 items, and the rest of the four subscales contains 4 items based on 5 points Likert-type scale. Sample items included, "I try to be loving towards myself when I'm feeling emotional pain" (self-kindness) and "I'm disapproving and judgmental about my own flaws and inadequacies" (self-judgment). An established method of

scoring this scale is to sum the total subscale domains of interest. Further, this measure has been deemed both reliable and valid (Neff, 2003a). The SCS total score and its subscales evidenced good internal consistency in the US and Chinese samples (US $\alpha = .73$, self-kindness showed $\alpha = .81$, self-judgement $\alpha = .78$, common humanity $\alpha = .73$, isolation $\alpha = .74$, mindfulness $\alpha = .77$, and over-identification $\alpha = .75$; China $\alpha = .85$, Self-kindness $\alpha = .79$, self-judgement $\alpha = .76$, common humanity $\alpha = .71$, isolation $\alpha = .86$, mindfulness $\alpha = .77$, and over-identification $\alpha = .81$).

General Methods of Analysis

All statistical analyses were completed utilizing IBM SPSS Version 25 software. Preliminary data screening was done to identify careless responses, which can bias the results of the research. Univariate and multivariate statistics were calculated to describe the sample (demographic information such as age, gender, and race) and to assess skewness, kurtosis, and outliers in the data. Missing data was deleted list-wise. Hypothesis tests were conducted utilizing the SPSS Amos version 25, wherein multiple group measurement models were fit to test the first hypothesis and structural models to test the second hypothesis.

Data Screening. There is evidence that online surveys can be approached in a careless, lack of effort, or random fashion, which can bias the results of the research (DeSimone, Harms, & DeSimone, 2015). DeSimone and his colleagues suggested utilizing response time and long string responses to identify responses without sufficient effort in order to increase the rigor of analyses and more accurate study results. Response time is a technique based on the assumption that there is a minimum time requirement for respondents to answer items with sufficient effort. Although the response time would

vary depending on the participants, researchers should screen those who finish a survey in a very quick manner. For example, it is “unlikely for participants to respond to survey items faster than the rate of 2s per item” (Huang, Curran, Keeney, Paposki, & DeShon, 2012, p. 106). In present research, built-in timers were used to measure the amount of time spent on a survey, as well as an individual page of questions. Long string responses were identified when the same option in the answer choices is being selected repeatedly. This technique was based on the assumption that too many consecutive identical responses suggest a lack of effort. According to Huang and colleagues (2012), 6 to 14 careless long string responses can reflect a lack of participant effort, depending on the number of questions in a survey. Meade and Craig (2012) used an Excel macro to compute the long string responses index. In the present study, a short Visual Basic for Applications program in Microsoft Excel was utilized to screen for 6 or more careless long string responses for each survey page (Meade & Craig, 2012).

Preliminary data analysis. Screening for careless responses using long string technique resulted in the removal of 13% (53 people) of the US sample, and 41% (152 people) of the Chinese sample, with China participants overrepresented among invalid responders relative to those in the US sample, $\chi^2(1, N = 770) = 78.56, p < .001$. Across both samples, there was no significant gender or age difference among the careless responders, US *gender*, $\chi^2 = 2.01, p = .16$; China *gender*, $\chi^2 = 2.31, p = .13$; US *age*, $t(398) = -.95, p = .34$; China *age*, $t(337) = -.93, p = .91$.

Participants who were retained for primary analyses included 350 US (78% female, $M_{age} = 22.29, SD = 5.78$) and 215 Chinese students (77% female; $M_{age} = 21.11, SD = 1.71$). Among 350 US participants, 29% (106) were identified as Caucasian/White

(non-Hispanic), and 23% (85) were Hispanic/Latino(a), 15% (56) were African-American (black), 12% (41) were Southeast Asian, 7% (27) were identified as multiracial, 6% (21) were South Asian/East Indian, 3% (12) were Middle Eastern, and 2% (7) were Native Hawaiian, 1% (4) were others. Among the many ethnic groups in China, 90% are Han (Zhang et al., 2010).

Preliminary Analyses of Power/Effect Size. In order to determine the sample size for the present study, general guidelines of observation to parameter ratio estimates are used. In some studies, the rules of thumb with respect to observations to the parameter of a 10:1 ratio has demonstrated its adequacy. The number of parameters in the structural model is 21 per cultural group (6-factor loadings, 7 intercepts, 1 regression weight, 7 residual variances). This would lead to the required sample of $N = 210$ per group using the 10:1 ratio. According to G Power *sensitivity* analysis at $\alpha = .05$ and $\text{power} = .80$, with $N = 210$ would be able to detect small effect sizes ($f^2 = .02-.04$) for the relationship between self-compassion and depression within each group, and differences in this effect across groups. The required sample size was met in both cultural groups (US $n = 350$, China $n = 215$).

Univariate & Multivariate Normality. As a preliminary step, SPSS macro was utilized to test univariate and multivariate normality (DeCarlo, 1997). The values between -2 to 2 are considered as acceptable to support normal univariate distribution (George & Mallery, 2010). The result showed a significant departure from normality for both US and Chinese samples. For US test of skew, 5 out of 26 items had a range of skewness from $z = -2.09$ to -3.71 with the p -value ranging from $p < .001$ to $.037$. For US test of kurtosis revealed 25 out of 26 items had a range of D'Agostino & Pearson K

square = 6.32 to 45.49 with the p-value ranging from $p < .001$ to .04. There was a significant multivariate normality, small's test = 59.81, $p < .001$, and Mardia's test = 880.70, $p < .001$. For Chinese test of skew, 18 out of 26 items had a range of skewness from $z = -4.76$ to 2.89 with the p-value ranging from $p < .001$ to .04. For Chinese test of kurtosis revealed 24 out of 26 items had a range of D'Agostino & Pearson K square = 6.59 to 30.25 with the p-value ranging from $p < .001$ to .04. There was a significant departure from multivariate normality, small's test = 131.26, $p < .001$, and Mardia's test = 823.93, $p < .001$. Data did not yield the multinormality, indicating skewness and kurtosis in both US and Chinese data. This is the prerequisite for maximum likelihood (ML). However, even with small samples, ML is robust to departures from multivariate normality (Olsson, Foss, Troye, & Howell, 2000).

Preliminary Analysis of Multicollinearity. The correlations among latent factors were utilized to assess for multicollinearity. For both US and Chinese samples, several strong correlations emerged among several latent variables (US $r_s = .80 - .89$; Chinese $r_s = .75 - .96$, *see* Figure 1), which suggest strong likely of multicollinearity (Johnson & Wichern, 1992).

CHAPTER IV

RESULTS

Descriptive Analyses

Descriptive statistics, including means, standard deviations for both U.S. and Chinese samples on age, gender, self-compassion, and depression are reported in Table 1. A total of 350 US participants (78% female, $M_{age} = 22.29$, $SD = 5.78$) and 215 Chinese participants (77% female; $M_{age} = 21.11$, $SD = 1.71$). Prior to all analyses, alpha was set at .05, and missing values were removed list-wised. Across two cultures, SCS was significantly different, $t(563) = 15.54$, $p < .001$, but CES-D was not $t(563) = 1.42$, $p = .16$.

Measurement Invariance

Self-compassion scale was tested for the measurement invariance across US and Chinese samples. Factor structure in both US and Chinese samples were examined before testing measurement invariance. In this study, four different models were used to examine the factor structure of the self-compassion scale (SCS) in each sample. Specifically, confirmatory factor analyses were conducted to examine a one-factor, six-factor, high-order, and two-factor models. After determining the best fitting model is the same across both US and Chinese samples, metric invariance was tested by constraining the factor loadings to be the same across both the US and China. Then, Scalar invariance was tested to whether or not the intercepts are equal across two groups by constraining at

the intercept level. Residual invariance was tested in order to examine the latent mean comparison (Lei & Wu, 2007; Meredith & Teresi, 2006).

First, confirmatory factor analyses were examined separately for the US and Chinese samples in order to test for configural invariance (*see* Table 3). Of aforementioned models, six-factor model was the best fitting for both US ($\chi^2 = 654.63$, RMSEA = .05, CFI = .91) and Chinese data ($\chi^2 = 664.13$, RMSEA = .08, CFI = .79). However, the six-factor model did not yield a satisfactory result in the Chinese model. Examination of the modification indices indicated that item 16 (“When I see aspects of myself that I don’t like, I get down on myself”) loaded on the multiple factors (mindfulness, common humanity, and self-kindness). After removing item 16, six-factor model without item 16 was the best fitting model for both US ($\chi^2 = 617.54$, RMSEA = .05, CFI = .90) and Chinese data ($\chi^2 = 582.26$, RMSEA = .08, CFI = .81) (*see* Table 2). Therefore, this model was used to test the metric invariance. When examined multi-group measurement model, the factor structured served as the basis of testing configural invariance showed adequate fit ($\chi^2 = 1200.5$, $df = 520$, $\chi^2/df = 2.31$ RMSEA = .048, CFI = .87).

Then, metric invariance was examined by restricting the factor loadings to be equal across two cultural groups. The results of the metric invariance model ($\chi^2 = 1235.25$, $df = 539$, $\chi^2/df = 2.29$ RMSEA = .047, CFI = .87) was vary by the subscales. Model fit significantly decreased relative to the configural model suggesting that not all factors are invariant. Therefore, each factor in metric invariance was progressively tested to see which factors are not significantly reduced in model fit.

As shown in Table 4, self-kindness, isolation, mindfulness, and over-identification had the non-significant result of the chi-square difference test, which supported metric (weak) invariance. Of four factors, scalar invariance was only evidenced in self-kindness, which did not significantly reduce the model fit (*see* Table 4). However, when compared with residual, self-kindness was significantly different, suggesting that residual invariance was not supported. In order to be able to compare the latent mean, a full scalar equivalence is needed. Since only the partial invariance tests were satisfied, it is difficult to conduct the latent mean analysis in the next stage.

Hypothesis 1

“Self-compassion will predict the lower level of depression in both groups.”

Multiple-group SEM was employed to regress depression symptoms on to the latent self-kindness, isolation, mindfulness, and over-identification factors (*see* Table 5). These models retained the aforementioned constraints to factor loadings across the US and Chinese samples, as well as cross-sample intercept constraints for the Self-Kindness factor. Due to the strong correlation among those factors (*see* figure 1), I compared two factors at a time (SK with IS, and MI with OI). Regression weights are allowed to be freely estimate across the groups. Across both samples, higher levels of SK and MI were associated with reduced depression level (SK: $\beta_{us} = -2.34$, $z\text{-test} = -2.34$, $p < .01$; $\beta_c = -3.51$, $z\text{-test} = -2.75$, $p < .01$; MI: $\beta_{us} = -4.32$ $z\text{-test} = -4.21$, $p < .001$; $\beta_c = -2.76$, $z\text{-test} = -2.10$, $p < .05$). Conversely, IS and OI predicted elevated depression level in both samples (IS, $\beta_{us} = 5.24$, $z\text{-test} = 5.36$, $p < .001$; $\beta_c = 6.70$, $z\text{-test} = 7.24$, $p < .001$; OI, $\beta_{us} = 2.21$, $z\text{-test} = 2.49$, $p < .01$; $\beta_c = 6.82$, $z\text{-test} = 5.35$, $p < .001$).

Hypothesis 2

“Low level of self-compassion will incrementally predict higher depression symptoms among Chinese students relative to US students.”

This hypothesis was to examine whether or not culture moderates the relationship between self-compassion and depression. The aforementioned model was evaluated by constraining the regression weight between two sets of factors at a time on CES-D (SK with IS, and MI with OI). For the first set of the model (SK with IS), there was no significant reduction in model fit, which means that the relationship between the first set of the model with CES-D is the same across two cultural groups. However, in the second set of the model, there was a significant reduction in model fit when we constrained the regression weight of MI and OI on CES-D. This implies that this regression weight was not invariance across the US and China. Follow-up analyses revealed that when we constrained the regression weight of MI where OI was freely estimated, Chinese participants having over-identification was more strongly associated with depression compared to the US participants.

CHAPTER V

DISCUSSION

The purpose of this study was to examine the relationship between self-compassion and depression among the US and Chinese college students who reside in their respective countries. Depression is one of the most common mood disorders (APA, 2013), which affects over 300 million individuals across the world in a given year (WHO, 2015). Not only is depression highly prevalent in the U.S., but it is also a global concern, including countries such as China (WHO, 2017). A growing literature suggests that self-compassion is a strong protective factor for depression. Given that the values behind self-compassion are rooted in Asian cultural teachings, the effects of self-compassion may differ across non-Western and Western cultures (Neff, 2003a). However, the effect of cultural background on the relationship between self-compassion and depression remains unknown. As self-compassion has recently surfaced as an important protective factor against depression, it is important to examine whether or not self-compassion can be quantified through the same construct in both cultural groups.

The first aim of this study was to test the measurement invariance of a self-compassion scale across US and Chinese samples to see if the same underlying construct is being measured.

One-factor, six-factor, two-factor, and high-order factor models were tested to establish the best fitting models across two groups. A series of CFAs found one- and two-factor models of SCS showed an inadequate fit. In contrast, the six-factor model had a good fit in the US sample. However, it did not reach the adequate fit in the Chinese sample due to item 16 loading on multiple factors. However, through removing item 16, the six-factor model became the best fitting model for not only the Chinese samples but also the U.S. samples as well. Results of the current study do not align with past research on the self-compassion scale (Chen, Yan & Zhou, 2011; Neff, 2003a & b). Most studies replicated the factor structure of SCS have suggested that six-factor correlated model to be the best fit (William et al., 2014).

In the first step, we conducted a configural invariance test to establish a baseline model across groups. The establishment of configural invariance suggests that the conceptual framework of SCS is the same across the US and China. In the second step, we tested the metric invariance where we constrained all factor loadings to be the same. We established the metric invariance on factors such as self-kindness (SK), isolation (IS), mindfulness (MI), and over-identification (OI) but not for self-judgment (SJ) or common humanity (CH). Meaning that two cultural groups responded to the indicators in the same way for SK, IS, MI, and OI, but not for the other two factors. The third step, we conducted the scalar invariance where we constrained the factor loadings and indicator intercepts to be the same across groups. The result supported scalar invariance only for SK factor. It means that for the same score on the latent variable, the US and Chinese samples do not have different intercepts on the observed variables. In other words, the total score of SCS (besides SK factor) may result in a biased score due to not establishing the scalar

invariance. The current study established configural, metric for SK, IS, MI, and OI, and scalar invariance for SK across the US and Chinese samples. This finding implies that the SK factor explains covariance between its indicators in the same way across the two cultures. However, in this study, SJ (self-judgment), and CH (common humanity) did not support metric invariance, which implies that those factors may not operate the same way and measure the same construct across the two cultural groups.

Another aim of this study was to examine whether or not self-compassion predicts lower levels of depression in both the US and China. The results showed that higher levels of positive subscales (such as self-kindness and mindfulness) was associated with reduced depressive symptoms, while the negative subscales (such as isolation and over-identification) showed elevated depression levels. The result aligned with previous experimental and meta-analytic findings that associate high SCS scores with low depression levels across the US and Chinese samples (Neff, 2004; Neff, Kirpatrick, & Rude, 2007). Specifically, positive factors of self-compassion are associated with psychological well-being, and negative factors of self-compassion are associated with negative emotions such as depression (Yang, Zhang, & Kou, 2016). Another recent study explored the subscales of self-compassion and its link to psychological functioning, which suggested that the positive components of self-compassion have a stronger tendency to associate with higher level of emotional awareness and compassion for others, whereas the negative components were found to have a stronger link to psychopathology such as depression (Neff et al., 2017).

A relative aim was to investigate whether self-compassion deficits would be more detrimental for Chinese students relative to US students. There was no difference among

SK, IS, and MI factors across the two cultures. This implies that a higher level of self-compassion is a protective factor against depression regardless of individuals' cultural backgrounds. Additionally, the results suggested that culture moderated the relationship between over-identification (tendency to exaggerate) and depression. As over-identification is closely tied with perfectionism, this finding may reflect a cultural difference in the value placed on education in the Chinese sample (Wang, 2010), as academic opportunities are extremely competitive in China (Houston, Harris, Moore, Brummett, & Kametani, 2005). A study examining the relationship between Asian values of perfectionism and mental health showed that those with maladaptive perfectionism reported a higher level of depression. Indeed, perfectionism seems to be conceptually aligned with several Asian values such as conforming to norms, collectivism, and family duty and obligation (Wang, 2010). In relation to family values in Asian culture, individuals who perceived their families as perfectionists reported higher family recognition through achievement values (Methikalam, Wang, Slaney, & Yeung, 2015). Research has found that maladaptive perfectionism not only leads to more depressive symptoms (Flett, Hewitt, Oliver, & Macdonald, 2002) but also higher tendencies to engage in excessive critical self-judgment (Shafran & Mansell, 2001). A combination of increased competition, higher expectations on academic performance, and personal and family values in perfectionism might explain the findings of the current research (Zhang, Gan, & Chm, 2007), as over-identification reflects the tendency to be consumed by one's inadequacy following failure.

Limitations and future directions

Limitations of this study should also be taken into consideration when interpreting the results. Firstly, this study used anonymously, self-reported online survey methods. Also, participants were compensated differently. For US participants, they were compensated with extra credit. For Chinese participants, point reduction was waived for not attending one class. A combination of higher incentives and using online anonymous surveys might have resulted in high numbers of careless responders among Chinese samples compared to the US. Secondly, this study used college students in both the US and China. Further, this sample was comprised of more females than males. Given the characteristics of this population, there are limits in generalizing these conclusions to overall populations. Thirdly, this study only established a partial measurement invariance. It did not show invariance for two factors (SJ & CH). Metric invariance was established only on SK, IS, MI, and OI factors. Further, only one (SK) factor was established for scalar invariance. Establishment of this test is required before the latent mean can be compared across the two groups.

Future studies should consider recruiting more balanced samples including both clinical and non-clinical samples. Furthermore, establishing configural, full metric, and full scalar invariance in order to conduct the latent mean comparison would do much to elucidate the relationship between self-compassion and depression risk across US and Chinese cultures.

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Appendix A: Tables

Table I. Descriptive statistics and bivariate correlations of study variables (age, gender, self-compassion, and depression; US n = 350; China n = 215); US (above)/ China (below).

Variable	US- <i>M</i> (<i>SD</i>)	China - <i>M</i> (<i>SD</i>)	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
1. Age	22.29	21.11	--	.12*	.04	-.04	.13*	-.05	.13*	-.14**	.20**	-.13*
2. Gender	78%	77%	-.01	--	.08	-.05	.02	.03	.02	.01	.00	.14**
3. SCS	3.17 (.40)	3.16 (.50)	-.10	-.15*	--	.10*	.32**	.55**	.55**	.51**	.42**	.52**
4. CES-D	15.92 (10.51)	15.46 (10.60)	.16*	.09	-.55**	--	-.31**	.29**	-.25**	.39**	-.32**	.26**
5. SK	3.15 (.81)	2.84 (.78)	-.4	-.11	.68**	-.32**	--	-.43**	.54**	-.39**	.69**	-.37**
6. SJ	3.07 (.83)	3.59 (.71)	-.13	-.06	.56**	.45**	.07	--	-.12*	.66**	-.26**	.67**
7. CH	3.32 (.82)	2.81 (.76)	.04	-.18*	.34**	.01	.39**	-.23**	--	-.19**	.62**	-.19**
8. IS	3.03 (.87)	3.53 (.98)	-.13	-.07	.76**	.55**	.24**	.62**	-.10	--	-.37**	.65**
9. MI	3.36 (.82)	2.81 (.81)	.00	-.10	.64**	-.24**	.65**	-.09	.49**	.21**	--	-.38**
10. OI	3.10 (.89)	3.33 (.80)	-.07	-.07	.70**	.43**	.14	.64**	-.16**	.77**	.16*	--

Note. Gender = 0 = male, 1 = female; SCS (Self-Compassion Scale); CES-D (Center for Epidemiologic Studies Depression Scale); SK (Self-kindness); SJ (Self-judgment); CH (Common Humanity); IS (Isolation); MI (Mindfulness); OI (Over-identification); No significant difference between age, gender, SCS factors, and CES-D; ** $p \leq .01$, * $p \leq .05$

Table II. Confirmatory factor Analyses by country (one-factor, two-factor, high-order factor, six-factor, six-factor without item 16); US (above) /China (below).

Model	Chi-square	df	CFI	RMSEA
One-factor	1804.98/ 1212.87	299	.62/ .48	.11/ .13
Two-factor	867.28/ 759.33	298	.85/ .74	.07/ .09
Higher-order	1786.70/ 1645.13	292	6.50/.53	.18/ .18
Six-factor	654.63/ 664.13	284	0.90/ .78	.06/ .09
Six-(no 16)	617.54/582.26	260	0.90/ .81	.06/ .08

Table III. Model fit indices for invariance tests.

	χ^2	<i>df</i>	χ^2/df	$\Delta\chi^2$	Δdf	CFI	RMSEA
1. Configural invariance	1200.50	520	2.31			.87	.048
2. Metric invariance	1235.25	539	2.29	(1 v. 2) 34.75**	19	.87	.047
3. Scalar invariance	1524.23	564	2.70	(2 v. 3) 288.98***	25	.82	.054
4. Residual invariance	1618.04	589	2.75	(3 v. 4) 93.81***	25	.81	.055

Note. N = 565 (US *n* = 350, China *n* = 215); *** $p \leq .001$, ** $p \leq .01$, * $p \leq .05$

Table IV. Configural, metric, and scalar invariance tests

	χ^2	<i>df</i>	$\Delta\chi^2$	Δdf	<i>p-value</i>
<i>a</i> Configural	1200.50	520	-	-	-
Metric	1235.25	539	34.75**	-	-
Metric SK	1203.40	524	2.90	4	.17
Metric SK, SJ	1213.80	527	13.30	7	.02
Metric SK, CH	1216.80	527	16.30	7	.01
Metric SK, IS	1207.30	527	6.80	7	.11
Metric SK, MI	1208.90	530	8.40	10	.10
Metric SK, OI	1212	533	11.50	13	.08
Scalar SK	1243.80	538	8.55	14	.06
Scalar SK, IS	1344.90	537	109.65	13	< .001
Scalar SK, MI	1285.90	537	50.65	13	< .001
Scalar SK, OI	1290.70	537	55.45	13	< .001
Residual SK	1258.10	543	14.30	5	<.01

Note. *a*Configural model served as baseline model for Metric Invariance comparison

Table V. Laten self-compassion SK, IS, MI, and OI factor effects on depression symptoms.

	US/CHINA	<i>Regression weight</i>	<i>z-test</i>	<i>p-value</i>
1. SK		-2.34/ -3.51	-2.34/ -2.75	< .01/ < .01
2. IS		5.24/ 6.70	5.36/ 7.24	< .001/< .001
3. MI		-4.32/ -2.76	-4.21/ -2.10	< .001/ <.05
4. OI		2.21/ 6.74	2.49/ 4.94	< .01/ <.001

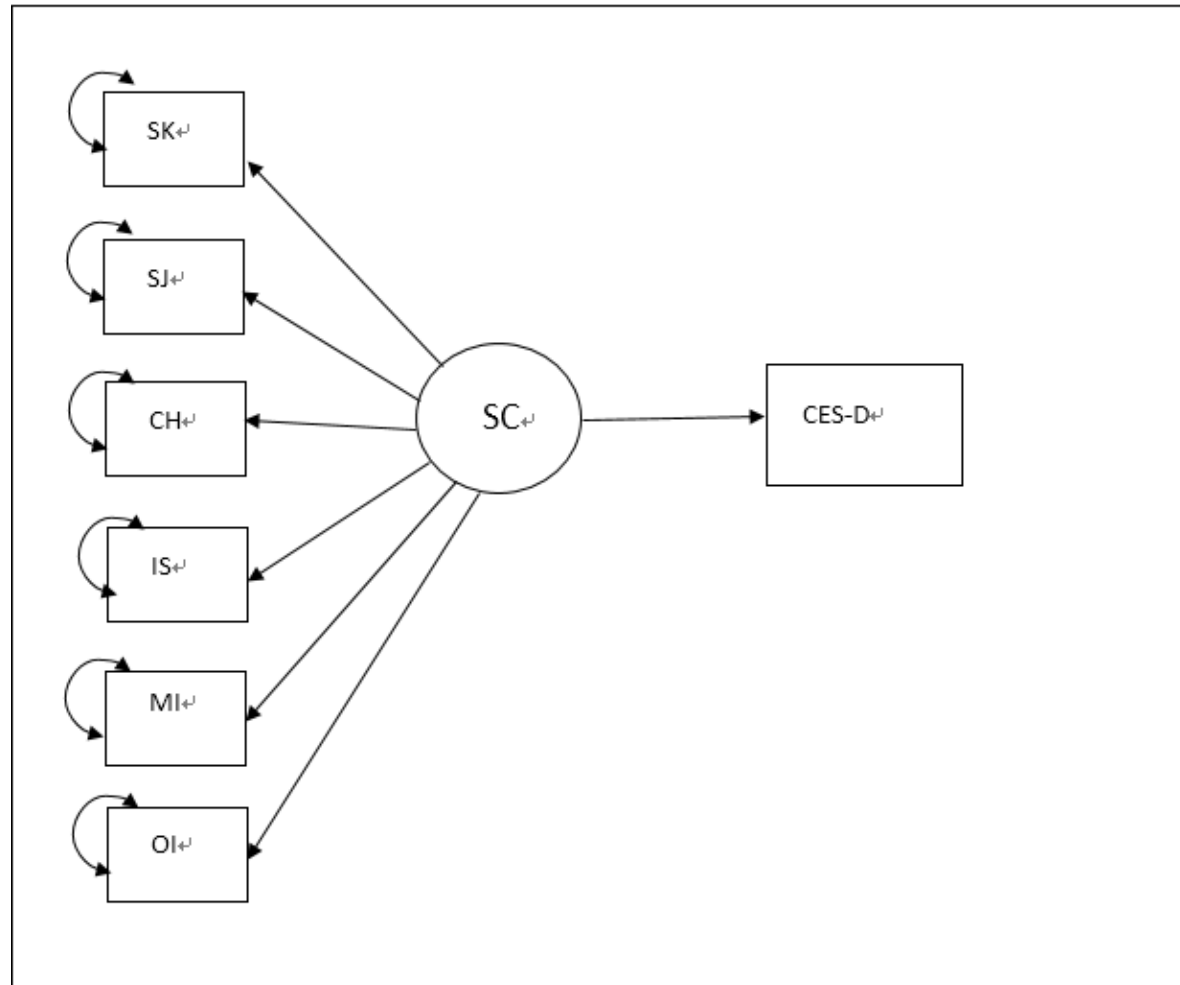
Note. SK (Self-kindness); IS (Isolation); MI (Mindfulness); OI (Over-identification)

Table VI. Multiple-group analyses of SCS factors on depression symptoms.

SK-IS-CESD	Chi-square	df	$\Delta\chi^2$	<i>p-value</i>
Metric	198.80	73		
SK	199.40	74	.60	.38
SK IS	202	75	3.20	.10
MI-OI-CESD	Chi-square	df	$\Delta\chi^2$	<i>p-value</i>
Metric	130	56		
MI	130.90	57	.90	.27
MI OI	139.30	58	9.30	<.01

Note. SK (self-kindness), IS (isolation), MI (mindfulness), OI (over-identification)

Appendix B: Figures



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Figure 1. Hypothesis Model. (SK = Self-Kindness, SJ = Self-Judgment, CH = Common Humanity, IS = Isolation, MI = Mindfulness, and OI = over-identification, SC = Self-Compassion, CES-D = Center for Epidemiologic Studies of Depression).

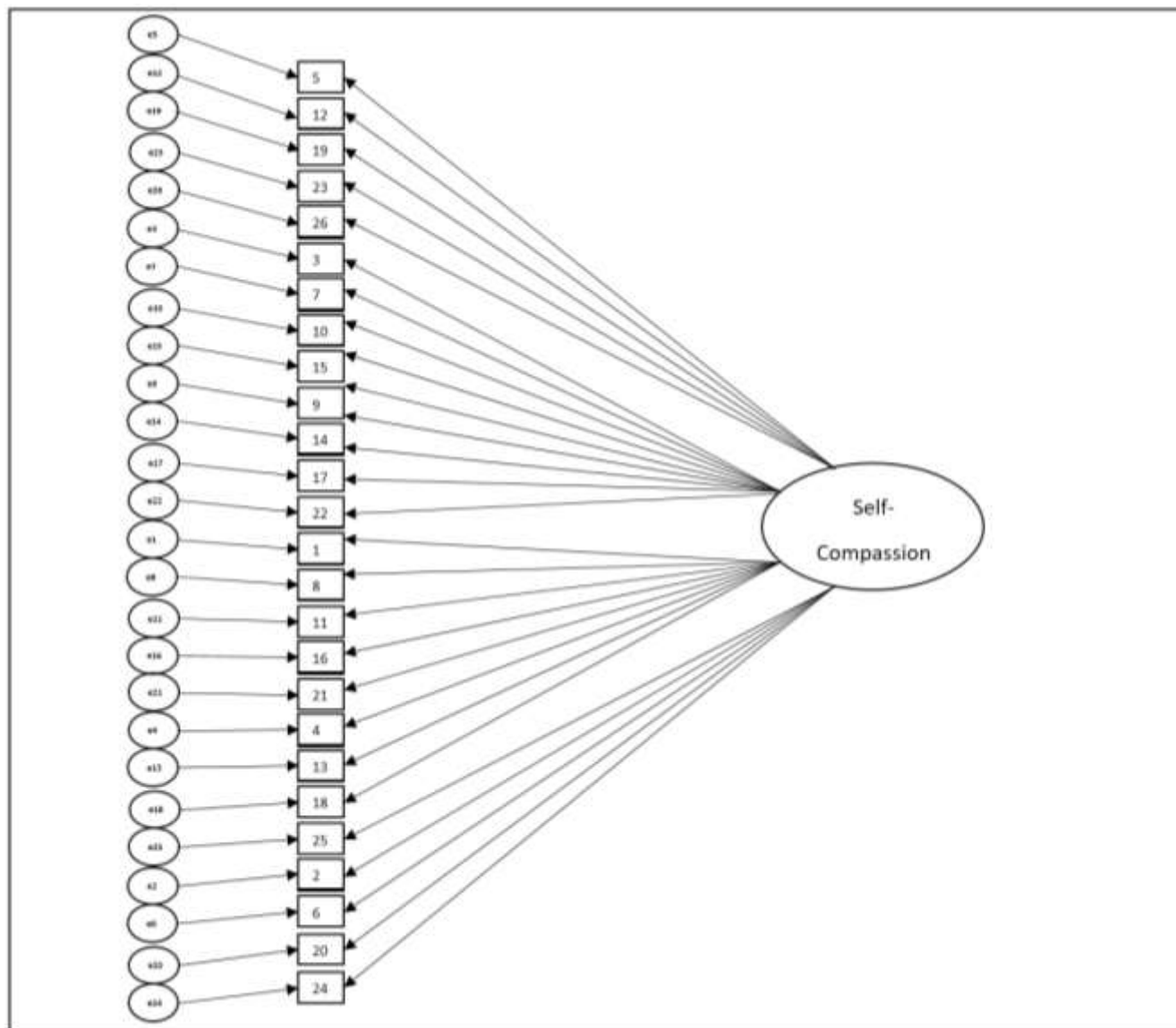


Figure 2. One-factor model.

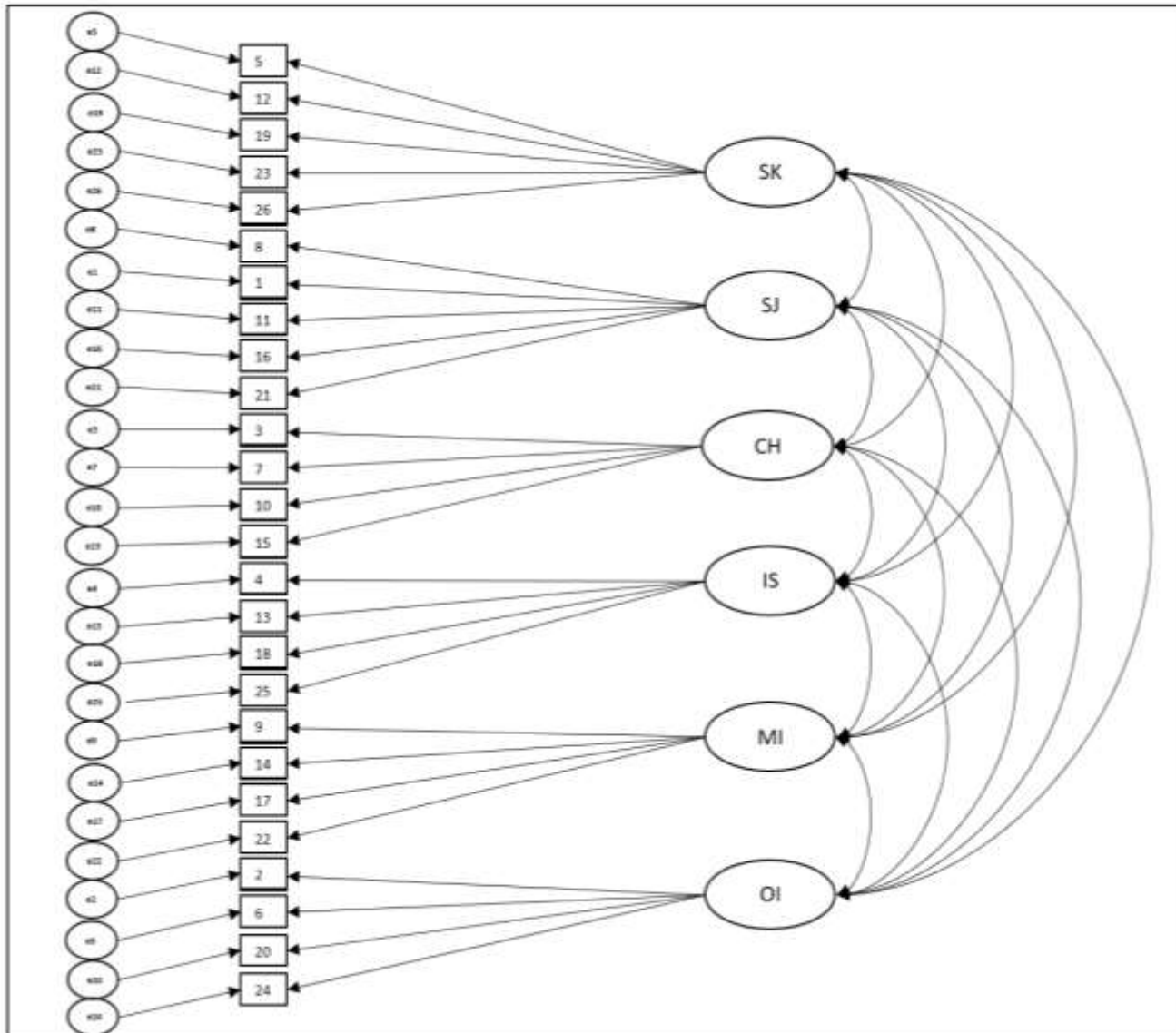


Figure 3. Six-factor model.

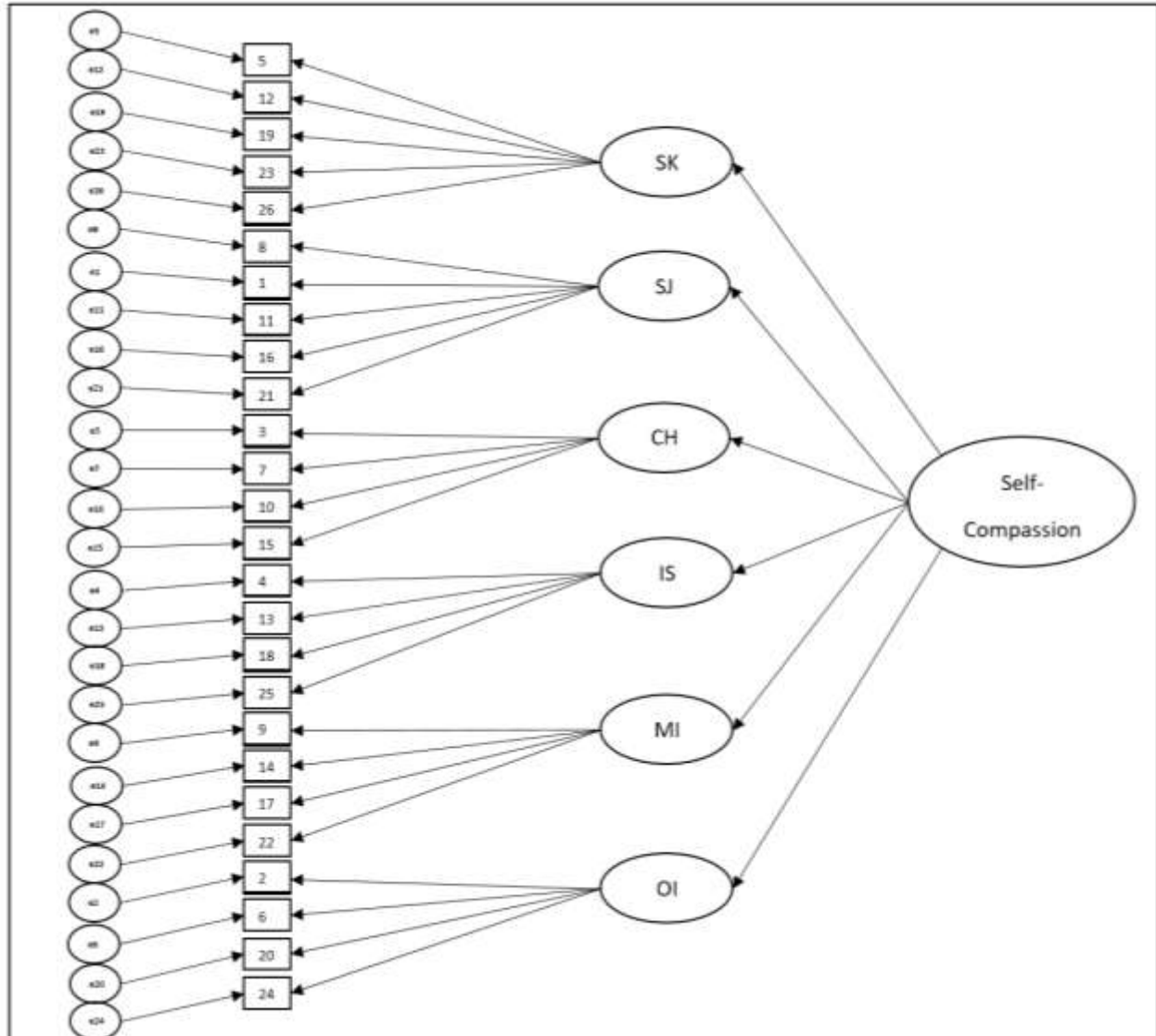


Figure 4. Higher-order model.

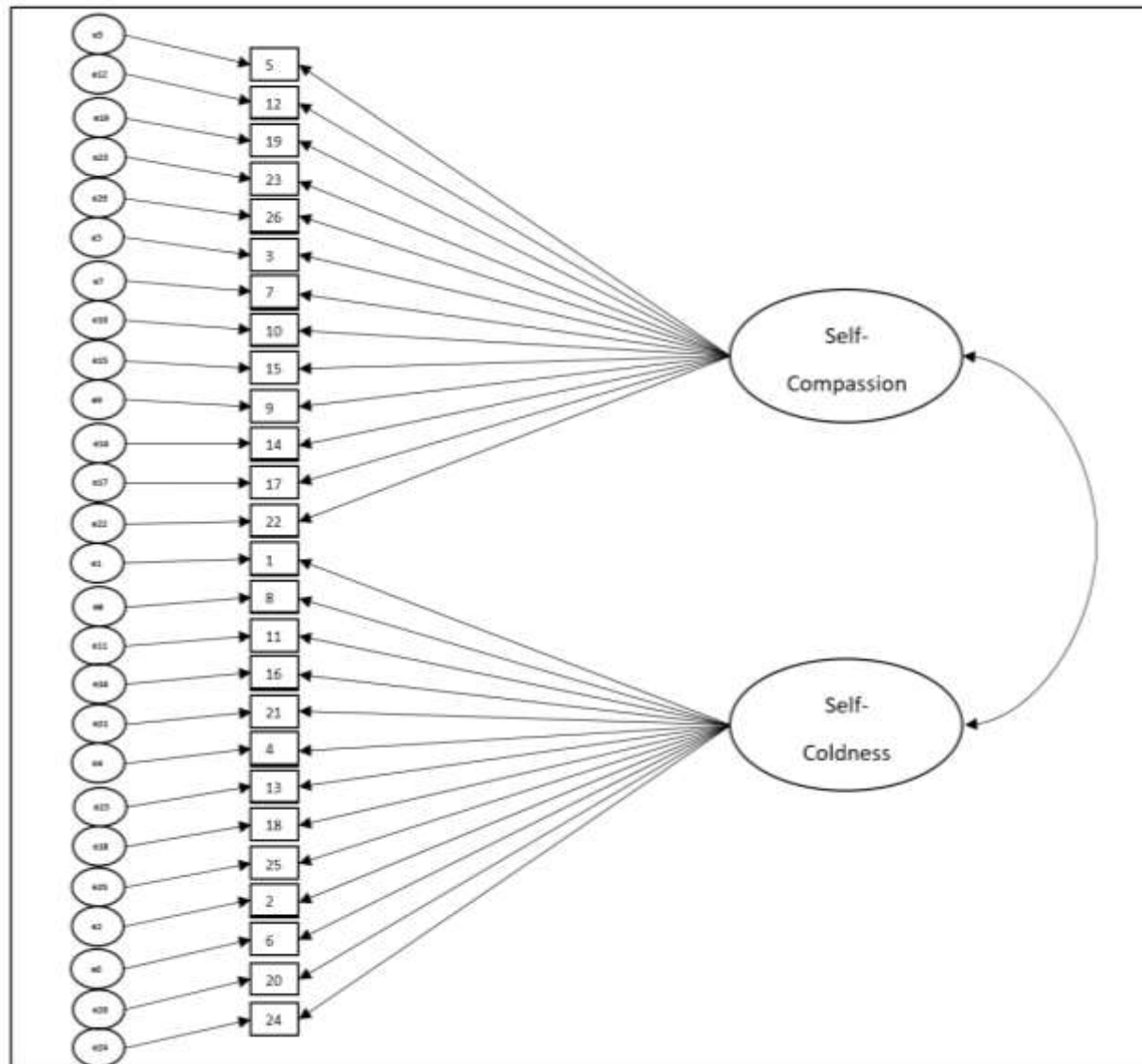


Figure 5. Two-factor model

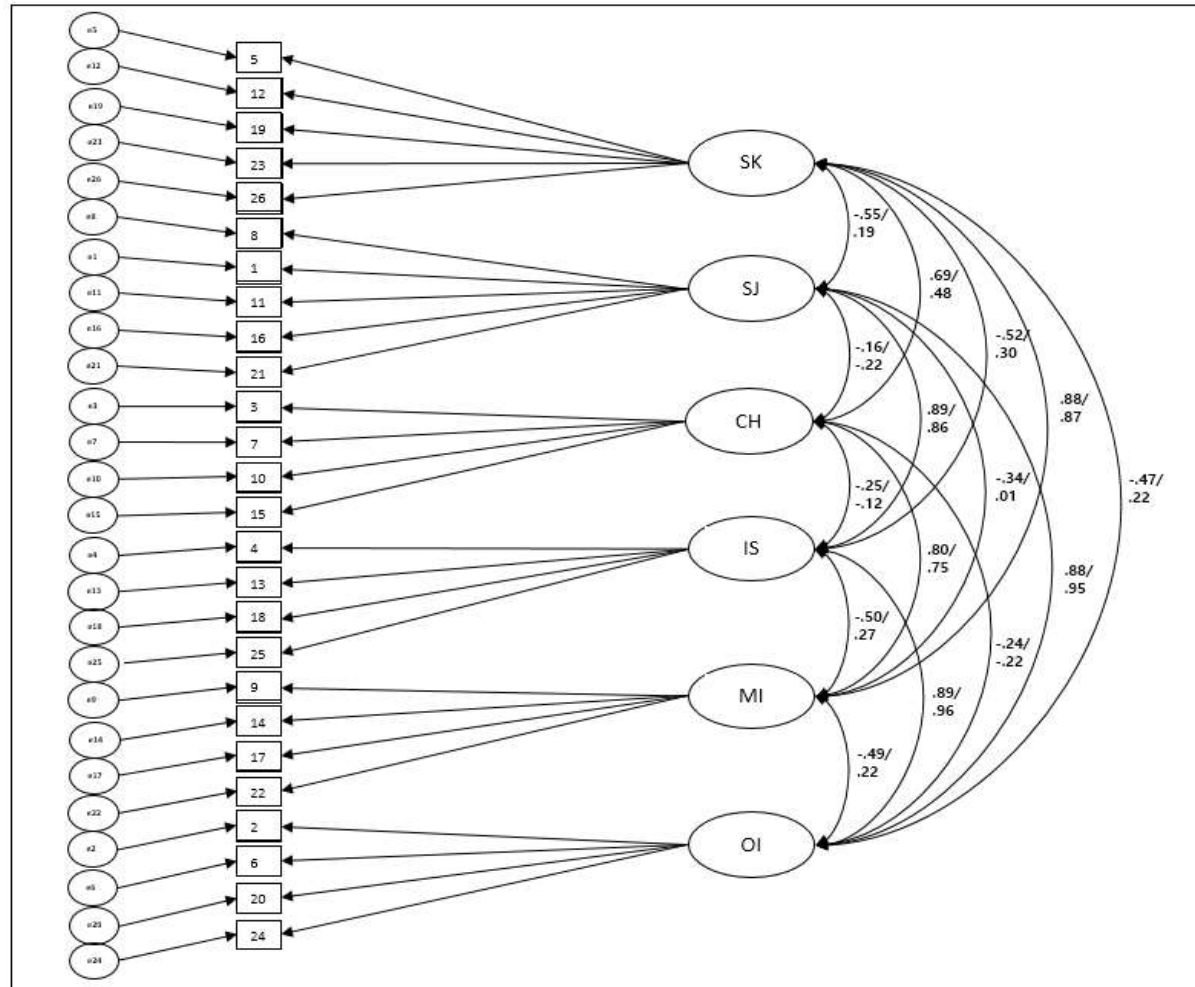


Figure 6. Correlations among latent factors to assess for multicollinearity; US (above) /China (below)