

Cross-Cultural Comparison of the Relationship Between Emotion Regulation
Strategies and Perceived Stress in Irish College Students and Chinese International
College Students

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Abstract

Previous studies have shown that there is an association between the use of emotion regulation strategies and mental health. However, less is known about the association between emotion regulation strategies and perceived stress in college students, and less is known about whether cultural differences influence this association. The current study examined if differences exist in the habitual use of emotion regulation strategies between Irish college students (n=74) and Chinese international college students (n=96) studying in Ireland, and investigated the relationship between emotion regulation strategies and perceived stress in these two student populations. Chinese students reported more frequent use of both cognitive reappraisal and expressive suppression compared with Irish students. There was a statistically significant negative association between the habitual use of cognitive reappraisal and levels of stress in both Irish and Chinese students. In addition, there was a statistically significant moderator effect of culture on the association between expressive suppression and perceived stress. There was a significant positive relationship between the habitual use of expressive suppression and levels of stress in Irish college students, whereas this relationship was absent in Chinese students. The findings highlight the effects of emotion regulation on levels of stress and the importance of cultural context when investigating the association between emotion regulation strategies and perceived stress.

Keywords: emotion regulation, stress, cultural differences, college students

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Introduction

It is widely recognized that emotions are quintessential to human beings (De Leersnyder et al, 2018). By expressing an emotion, people show their concerns and reveal their goals and intentions to act (De Leersnyder, Boiger, & Mesquita, 2013). Emotions also provide people with necessary information about themselves, their environments, and serve as important social functions (De Leersnyder, Mesquita, & Kim, 2011).

Emotion Regulation

Given the important influence of emotions on humans, many studies have been conducted in order to understand emotions and their related processes. For example, emotion regulation (hereafter ER) has been regarded as one of the fastest growing areas within the field of emotions and has been found to be broadly related to psychosocial adjustment and mental health (Gómez-Ortiz et al., 2016; Zahniser & Conley, 2018). Although there are many different frameworks that help to conceptualize the diverse ways individuals can regulate their emotions, the process model of ER has received empirical support from numerous studies and has been widely used to illustrate ER processes (Gross, 1998a, 1998b, 2001, 2013, 2015). In Gross's model, ER is defined as a process by which individuals modulate their emotional responses in order to fit with environmental and contextual demands (Gross, 1998, 2015).

Specifically, Gross (2001) identified five types of more specific ER strategies that can be classified into antecedents and responses. Antecedent-focused regulation refers

to what individuals do, either consciously or automatically, before an emotion is generated and could change an individual's behaviour and peripheral physiological responses. This broader strategy involves situation selection, situation modification, attentional deployment, and cognitive change. On the other hand, response-focused regulation involves response modulation, referring to what individuals do once an emotion has already been elicited, which could modulate emotion response tendencies and suppress the experience or expression of emotions (Gross, 2001). Hence, according to process model, emotions tend to be regulated by five ER processes that involve specific strategies (Webb, Miles, & Sheeran, 2012). However, among those strategies, cognitive reappraisal and expressive suppression have received more research attention and have been identified as the most commonly used and valuable strategies (Hu et al., 2014; Koole, 2009). In addition, Gross and John (2003) noted that these two strategies are used more commonly by individuals in daily life and they could represent the distinction between antecedent-focused and response-focused strategies. Therefore, cognitive reappraisal and expressive suppression will be used as the two ER strategies in this project.

Cognitive Reappraisal, Expressive Suppression, and Mental Health

Cognitive reappraisal, which is a form of antecedent-focused regulation, involves reinterpreting emotion-eliciting situations in order to change or modulate emotional meaning (Troy, Wilhelm, Shallcross, & Mauss, 2010). For example, individuals reinterpret an insult as indicating the character of the insulter rather than their own character (Zahniser & Conley, 2018). Ochsner and Gross (2008) showed that there are

two types of cognitive reappraisal: people can either reinterpret contextual or situational aspects of events or they can distance themselves from events by viewing them from a detached, third-person perspective. In addition, reappraisal intervenes relatively early and can occur before emotions have been fully elicited and so can alter the entire subsequent emotional trajectory (Goldin, McRae, Ramel, & Gross, 2008).

In contrast, expressive suppression, which is a type of response-focused regulation, involves inhibiting or reducing the ongoing emotion-expressive behaviour (Butler, Lee, & Gross, 2007). By using expressive suppression, people may hide an emotional response when they hear bad news or may remain silent when they hear something offensive. Suppression occurs relatively late compared with reappraisal in the emotion-eliciting process and it is primarily concerned with the modulation of behavioural aspects of the emotion response tendencies (Gross & John, 2003).

Moreover, as suppression occurs late in the emotion-eliciting processes and it requires the person to control emotion response tendencies, it may consume a large amount of psychological resources that may be used for improving performance in social environments in which the emotions arise and may lead to adverse effects on the body and mind (Cheng, Yuan, He, & Li, 2009). Additionally, Higgins (1987) argued that suppression may cause individuals to experience discrepancies between outer expressions and inner experiences, which may cause negative feelings about oneself, resulting in unhealthy development of emotionally close relationships (Butler et al., 2003). In summary, antecedent-focused strategies, such as cognitive reappraisal, have

an influence on whether or not particular emotions are triggered, whereas response-focused strategies, such as expressive suppression, have an influence on modulating the particular emotion once it has been triggered (John & Gross, 2004).

A significant number of studies have examined the relationship between those two ER strategies and mental health. Specifically, the habitual use of cognitive reappraisal is usually considered as an adaptive strategy and has been found to be linked with many desirable outcomes, such as positive emotions, closer interpersonal relationships, a high level of willingness to seek social support, and enhanced well-being (Beath, Jones, & Fitness, 2015; English, John, Srivastava, & Gross, 2012). In addition, by using cognitive reappraisal, individuals experience more outwardly expressed positive emotions than negative ones, and have higher levels of self-esteem, optimism, and life satisfaction (Brewer, Zahniser, & Conley, 2016; Nowlan et al, 2015). Dryman and Heimberg (2018) noted that people who habitually use cognitive reappraisal may also have high levels of confidence in their ability to manage their emotions and control their lives. In addition, other researchers demonstrated that individuals who habitually use cognitive reappraisal experience fewer clinical symptoms and may also better adapt to social outcomes (Halperin et al., 2013; Kivity & Huppert, 2016).

On the other hand, Gross (2015) noted that expressive suppression involves a continuous focus on the self in order to prevent the activation of emotional responses, and this could be the main reason why it is considered as the maladaptive ER strategy. Some studies found that individuals who use expressive suppression to manage

negative emotions, such as anxiety or sadness, are more likely to experience a high intensity of those negative emotions, whereas individuals who use expressive suppression to manage positive emotions, such as happiness, are more likely to dampen their positive emotional experiences (Campbell-Sills et al., 2006). Other studies also showed that the habitual use of expressive suppression has more long-term effects on self-esteem, wellbeing and a sense of life satisfaction (Haga, Kraft, & Corby, 2009; Kalokerinos, Greenaway, & Denson, 2015). In addition, using expressive suppression to regulate emotions has been shown to have social consequences. For example, Gross and John (2003) demonstrated that participants who habitually used expressive suppression reported receiving less emotional and social support from their peers, and their peers reported it was difficult to build a relationship with them. Srivastava and colleagues (2009) also found that participants who frequently engage in expressive suppression exhibit less relationship closeness.

ER Strategies and Culture

However, it should be noted that the research studies mentioned above mainly focused on Western populations. Butler and Gross (2009) pointed out that it is necessary to consider cultural values when investigating the effects of emotional expression on mental health. For example, some cross-cultural studies found that people from different cultures may have different ways of understanding, expressing, and coping with emotions (Yoo, Matsumoto, & LeRoux, 2006). One contrast that has been well documented in the literature is the difference in emotional regulation between Asian and Western cultures. In Asian cultures, individuals are encouraged to

control and suppress their emotional expressions, whereas individuals in Western cultures are more encouraged to freely express their emotions (Butler, Lee, & Gross, 2009). These differences may also reflect the different cultural values that those two cultures have, such as collectivistic culture in Asian countries and individualistic culture in Western countries (Markus & Kitayama, 1991).

Previous studies have also found that there is a difference in the habitual use of ER strategies and their effects between Eastern and Western populations (Butler, Lee, & Gross, 2007). For instance, Asian participants, compared with other cultural groups, are more likely to report less emotion during an elicitation task and are more likely to report the frequent use of expressive suppression (Butler, Lee, & Gross, 2007; Mauss & Butler, 2010). One possible explanation could be that free and open emotional expression, particularly of negative emotions, may cause disruptions in group harmony, which has always been highly valued in Asian cultures, where any disruptions may be considered as unacceptable (Soto, Perez, Kim, Lee, & Minnick, 2011). In Western culture values, group harmony may have less relevance and the free expression of emotions may more often be emphasized (Frijda & Sundararajan, 2007). Moreover, Soto and colleagues (2011) reported that the habitual use of cognitive reappraisal was correlated with positive mental health outcomes, such as higher levels of life satisfaction and lower levels of anxiety or depression in both Asian and European-American participants. Yet, the habitual use of expressive suppression may have different consequences for different cultural groups. For example, more expressive suppression is related to negative mental health outcomes,

such as higher levels of anxiety and lower levels of positive affect, only among individuals from an individualistic culture (e.g. European or American). In contrast, more expressive suppression is associated with positive outcomes among those from a collectivistic culture (e.g. Asian), such as lower levels of loneliness and improved emotional recovery (Arens, Balkir, & Barnow, 2013; Su, Lee, & Oishi, 2013). Therefore, it will be necessary to consider cultural influences when examining the effects of ER strategies on mental health.

ER Strategies and Stress

As mentioned above, both cognitive reappraisal and expressive suppression have meaningful influences on psychosocial functioning. Yet, there is less research about the interaction of ER in stress, and little is known about the effects of ER strategies on levels of stress. Troy and colleagues (2010) found that the habitual use of cognitive reappraisal was associated with fewer depressive symptoms among female participants who reported a higher level of cumulative life stress. However, there was no significant relationship between cognitive reappraisal and levels of depressive symptoms among participants who reported a lower level of depressive symptoms. The authors concluded that cognitive reappraisal could be regarded as a necessary buffer for individuals who experience higher levels of cumulative life stress. In addition, the habitual use of cognitive reappraisal is related with stress-related symptoms, such as lower levels of depression, anxiety symptomology and PTSD in trauma-exposed participants, while the habitual use of expressive suppression is associated with higher levels of those stress-related symptoms (Moore, Zoellner, &

Mollenholt, 2008). However, that study did not include a direct measure of stress, but showed the possibility that the habitual use of either cognitive reappraisal or expressive suppression may influence levels of stress.

ER Strategies, Stress, and College Students

Furthermore, the ability to use ER strategies is considered an important skill during college life, as most college students are in the period of emerging adulthood (Zahniser & Conley, 2018). This period may be accompanied by identity explorations, personal growth, and, most importantly, pressures from both academics and daily life (Blanco et al., 2008; Rankin et al., 2018; VanKim & Nelson, 2014). Indeed, higher levels of stress are becoming more prevalent among college students (Beiter et al., 2015; English et al., 2012). Haidar and colleagues (2018) pointed out that several factors, such as academic pressures, relationships with friends and family, and financial constraints all contributed to higher levels of stress among college students.

Many studies have also focused on the levels of stress among international college students (Akhtar & Kröner-Herwig, 2015; Sullivan & Kashubeck-West, 2015; Szabo, Ward, & Jose, 2016). For example, some researchers reported that international college students experienced high levels of stress due to insufficient language skills, a lack of friends, and homesickness (Forbush, Foucault-Welles, 2016; Harrer et al., 2018).

Therefore, effective ER strategies seem to have an important influence on college students, as there is a significant relationship between the habitual use of ER strategies and mental health outcomes, as mentioned before. However, fewer research

studies investigated the relationship between ER strategies and levels of stress in this population.

To conclude, the habitual use of ER strategies may have significant influences on mental health outcomes. However, less is known about the relationship between ER strategies and levels of stress, particularly among college students. In addition, the relationship between the habitual use of ER strategies and levels of stress may be different for individuals from different cultures (i.e. Western or Eastern). Furthermore, previous studies on cultural differences in ER strategies have only focused on individuals who are long-term residents in a country, while less is known about temporary residents in a host country, a group that most international college students belong to. To fill this gap, the current study will investigate the relationship between the habitual use of ER strategies and levels of stress in local and international college students in the host country. Hence, the first aim of the current study is to examine if differences exist in the habitual use of ER strategies (cognitive reappraisal and expressive suppression) between Irish college students and Chinese students studying in Ireland. The second aim is to investigate the relationship between ER strategies and perceived stress in these two student populations.

Rationale

In terms of individualism scales (Hofstede, 2001), Ireland could be considered an individualistic culture, where independence and the autonomy of self may be strongly emphasized, and expressive suppression could compromise individuality. On the other hand, China could be considered as a collectivistic culture, where group relations and

group harmony are greatly emphasized, and open emotional expression may be incongruent with their social value systems and cause a disruption to group harmony and group relations (Butler et al., 2009). Therefore, Chinese international college students may report the more frequent use of expressive suppression compared with Irish college students. In addition, the more frequent use of expressive suppression may be related to higher levels of stress among Irish college students, yet this relationship may not be observed in Chinese international college students, as mentioned early, the habitual use of expressive suppression may be associated with mental health benefits for Asian participants.

As cognitive reappraisal occurs early in ER processes, it influences all parts of the subsequent emotional response in a similar manner. Hence, the discrepancy between inner emotional feeling and outer expressive behaviour may not be caused by using cognitive reappraisal (Yuan, Liu, Ding, & Yang, 2014). In addition, cognitive reappraisal focuses on internal processes rather than on emotional behaviours, meaning group harmony or relations may not be disrupted. Therefore, the difference in the habitual use of cognitive reappraisal may not be observed between Irish and Chinese students, and there may be a relationship between the habitual use of cognitive reappraisal and perceived stress for both groups of participants, according to previous studies (Kwon, Yoon, Joormann, & Kwon, 2013).

Consistent with previous findings, Hypothesis 1 of the current study states that Chinese international college students will report a more frequent use of expressive suppression than Irish college students. Hypothesis 2 states that there will be no

difference in the habitual use of cognitive reappraisal between Irish and Chinese students. Hypothesis 3 states that there will be a relationship between habitual use of cognitive reappraisal and perceived stress in Irish students. Hypothesis 4 states that there will be a relationship between habitual use of cognitive reappraisal and perceived stress in Chinese students. Hypothesis 5 states that culture moderates the association between the habitual use of expressive suppression and perceived stress. Specifically, the association between the more frequent use of expressive suppression and higher levels of stress will be seen in Irish students but not Chinese students.

Methods

Participants

A total of 170 college students participated in the current study. They were aged between 18 and 36, with a mean age of 23.43 years ($SD=3.28$). With respect to Irish college students, 74 participants (44 females, 30 males; $M=22.84$ years, $SD=2.94$) completed the online questionnaire. All the participants in this group were self-identified as Irish and were currently studying in one of universities or colleges in Ireland. With respect to Chinese international college students, 96 participants (56 females, 40 males; $M=23.89$ years, $SD=3.47$) completed the online questionnaire. All the participants in this group were self-identified as Chinese and were currently studying in one of the universities or colleges in Ireland.

All participants were recruited through social networks – WhatsApp group and Facebook, by using convenience and snowball sampling techniques, i.e. using a sample of individuals who are easy to contact and who are satisfied with inclusion criteria. Participants could also share the survey link with other individuals known to them and who were also satisfied with inclusion criteria. Inclusion criteria required participants to be over 18 years old, currently studying in one of universities or colleges in Ireland, and self-identified as Irish or Chinese.

Measures

The survey included an information sheet, a consent form, some demographic questions, two separate psychological measures, and a debriefing sheet (See Appendix A for a full review of all questions asked in the survey). Demographic questions were

designed by the researcher to describe the diversity of the participants. Demographic variables in the current study consist of gender, age, nationality, degree programme, and length of stay in Ireland (the latter for Chinese international college students only). There were also two psychological measures used in the current study: the Emotion Regulation Questionnaire (ERQ; Gross & John, 2003), and the Perceived Stress Scale (PSS; Cohen, Kamarck & Mermelstein, 1983).

The ERQ was used to assess emotion regulation strategies. The 10-item scale, which is rated on a seven-point Likert scale (1=strongly disagree, 7=strongly agree), includes two dimensions that assess subjective habitual use of cognitive reappraisal (six items: e.g. “When I want to feel less negative emotion, I change what I’m thinking”) and expressive suppression (four items: e.g. “When I am feeling positive emotions, I am careful not to express them”). Higher scores on the subscales indicated more frequent use of the emotion regulation strategy. ERQ has been found to have good construct validity, adequate internal consistency for both cognitive reappraisal ($\alpha = .79$) and expressive suppression subscales ($\alpha = .73$), and adequate test-retest reliability ($r=.69$) (Gross & John, 2003). In the current study, Cronbach’s alphas were .94 and .86 for cognitive reappraisal and expressive suppression, respectively, in the Irish group. Cronbach’s alphas were .81 and .69 for cognitive reappraisal and expressive suppression, respectively, in the Chinese group.

The PSS was used to measure the degree to which life circumstances are appraised as stressful. The 10-item scale was rated on a five-point Likert scale (0=never, 4=very often). Total scores can range from 0 to 40, with higher scores

indicating a greater degree of perceived stress. Example items include “In the last month, how often have you been upset because of something that happened unexpectedly?” and “In the last month, how often have you felt that things were going your way?” The scale has been widely used for assessing nonspecific perceived stress worldwide due to ease of administration and it also has been found to have adequate 2-day ($r=.85$) and 6-week ($r=.55$) test-retest reliability, and good convergent validity (Cohen, Kamarck & Mermelstein, 1983; Myers et al., 2012). In the current study, Cronbach’s alphas were .93 in Irish group and .83 in Chinese group.

Design

A cross-sectional design was employed in the current study, as the data being collected and the relationships being assessed at one point in time.

The current study examined if differences exist in the habitual use of ER strategies between Irish students and Chinese students. Hence, the independent variable was culture groups that include two categorical, independent groups – Irish students and Chinese students. The dependent variable was scores on ER strategies (cognitive reappraisal and expressive suppression).

The current study also examined if the association between emotion regulation strategies and perceived stress is different for Irish students and Chinese students. As recommended by Wu and Zumbo (2008), a moderator analysis was conducted by using a hierarchical multiple regression. Hence, the predictor variable was scores expressive suppression. The criterion variable was levels of perceived stress. The moderator variable was culture groups that include two categorical, independent

groups – Irish students and Chinese students.

Procedure

All surveys were completed online on Google Forms and made accessible at <https://goo.gl/forms/1d7tEII29jdD3Cbp1> from December 2018 to February 2019. Initially, ethical approval was granted for the current study by NCI ethics committee. After obtaining ethical approval, emails requesting permission to share the survey link on the Facebook page were sent to several universities in Ireland (See Appendix B). In addition, the survey was sent out via WhatsApp, Facebook, and WeChat (a Chinese social networking site) to groups that are relevant to the aim of the current study. Participants who completed the survey were able to send the survey link to their friends if they also wanted to participate, and who fulfilled the requirements.

Before completing the survey, an information sheet and consent form were provided. The information sheet informed the participants about the purpose of the study, and the risks and benefits of participating. The participants were also informed that their participation was voluntary and they could withdraw at any time without reason if they were not comfortable with the survey. Moreover, participants were made aware that their responses were anonymous and kept confidential. Hence, the responses could not be deleted after submitting the survey because of the complete anonymity of the study. In addition, contact information for the researcher and the supervisor was provided.

Participants who wanted to take part in the study were required to tick the box on the consent form before completing the following questionnaires. On the consent

form, participants were made aware that they should be over 18, their participation was voluntary, and their data could not be withdrawn. Once participants ticked the box, they could access the questionnaires (demographic questionnaire, ERQ, and PSS). The instructions on how to answer these questionnaires were provided at the beginning, and after completing these questionnaires, participants were required to click the submit button at the end. After submitting, a debrief sheet was provided. Although any potential psychological risk of the current study would not go beyond risks that participants may encounter in day-to-day life, contact details for helplines was provided in the debrief sheet in case of any psychological distress caused by taking part in the survey. Finally, participants were thanked for their participation and further contact information was provided.

Results

Descriptive Statistics

Descriptive statistics, including frequencies and percentages, for all participants on each demographic variable were presented in Table 1. Descriptive statistics, including frequencies and percentages, for each group of participants on each demographic variable were presented in Table 2 and Table 3.

With respect to Irish college students, the majority (82.4%) were aged between 18 and 25 years, and the majority (64.9%) were currently enrolled in an undergraduate programme. With respect to Chinese international college students, the majority (69.8%) were aged between 18 and 25 years, with 53.1% currently enrolled in a postgraduate programme. In addition, at the time of data collection, 47.9% of Chinese students reported that the length of stay in Ireland was between 1 and 3 years.

Table 1

Frequencies and Valid Percentages for All Participants on Each Demographic Variable (N=170)

Variable	Frequency	Valid Percentage (%)
Gender		
Male	70	41.2
Female	100	58.8
Age Groups		
18-25	128	75.3
26-30	37	21.8
31+	5	2.9
Nationality		
Irish	74	43.5
Chinese	96	56.5
Education		
Undergraduate	93	54.7
Postgraduate	77	45.3

Table 2

Frequencies and Valid Percentages for Irish Students on Each Demographic Variable (n=74)

Variable	Frequency	Valid Percentage (%)
Gender		
Male	30	40.5
Female	44	59.5
Age Groups		
18-25	61	82.4
26-30	10	13.5
31+	3	4.1
Education		
Undergraduate	48	64.9
Postgraduate	26	35.1

Table 3

Frequencies and Valid Percentages for Chinese Students on Each Demographic Variable (n=96)

Variable	Frequency	Valid Percentage (%)
Gender		
Male	40	41.7
Female	56	58.3
Age Groups		
18-25	67	69.8
26-30	27	28.1
31+	2	2.1
Education		
Undergraduate	45	46.9
Postgraduate	51	53.1
Length of Stay in Ireland		
Less than 1 year	22	22.9
1-3 years	46	47.9
3+	28	29.2

Descriptive statistics for all continuous variables for all participants were presented in Table 4. In addition, descriptive statistics for all continuous variables for each group of participants were presented in Table 5 and Table 6.

As can be seen in Table 4, the mean score for cognitive reappraisal ($M=26.96$, $SD=7.19$) showed that participants reported relatively moderate levels of cognitive reappraisal, on average. However, there was a very wide range of responses (actual range =12-42, possible range=0-42), indicating that participants varied greatly on cognitive reappraisal.

The mean score for expressive suppression ($M=13.41$, $SD=5.67$) showed that participants reported moderate levels of expressive suppression, on average. However, as can be seen in Table 5 and Table 6, Irish college students reported relative low levels of expressive suppression ($M=9.46$, $SD=4$), whereas Chinese students reported relatively moderate levels of expression suppression ($M=16.45$, $SD=4.83$). This indicates that participants varied greatly on expressive suppression (actual range = 4-28, possible range = 0-28).

The mean score for perceived stress ($M=22.03$, $SD=6.66$) showed that participants reported moderate levels of perceived stress, on average. However, there was a very wide range of responses (actual range=8-40, possible range=0-40), indicating that participants varied greatly on perceived stress.

In addition, the cognitive reappraisal scores and the expressive suppression scores were approximately normally distributed for Chinese students but not for Irish students, and the perceived stress scores were approximately normally distributed for Irish students but not for Chinese students, as assessed by Kolmogorov Smirnov test and visual inspection of their Normal Q-Q plots and histograms (See Appendix C).

Table 4

Descriptive Statistics of all Continuous Variables for all Participants (N = 170)

	Mean (95% Confidence Intervals)	Std. Error Mean	Median	SD	Range	Possible Range
Cognitive Reappraisal	26.96 (25.91 – 28.04)	.55	27	7.19	12-42	0-42
Expressive Suppression	13.41 (12.58 – 14.28)	.43	13	5.67	4-28	0-28
Perceived Stress	22.03 (21.00 – 23.06)	.51	21.5	6.66	8-40	0-40

Table 5

Descriptive Statistics of all Continuous Variables for Irish Students (n = 74)

	Mean (95% Confidence Intervals)	Std. Error Mean	Median	SD	Range	Possible Range
Cognitive Reappraisal	24.26 (22.41–26.08)	.95	22.5	8.21	12-41	0-42
Expressive Suppression	9.46 (8.58–10.41)	.46	9	4	4-26	0-28
Perceived Stress	23.43(21.66 – 25.2)	.91	23	7.89	8-36	0-40

Table 6

Descriptive Statistics of all Continuous Variables for Chinese Students (n = 96)

	Mean (95% Confidence Intervals)	Std. Error Mean	Median	SD	Range	Possible Range
Cognitive Reappraisal	29.05 (27.94–30.22)	.56	29	5.49	15-42	0-42
Expressive Suppression	16.45(15.47–17.34)	.49	16.5	4.84	4-28	0-28
Perceived Stress	20.95(19.90 – 21.95)	.54	21	5.32	9-40	0-40

Inferential Statistics

As expressive suppression scores and cognitive reappraisal scores were approximately normally distributed for Chinese students but not for Irish students, a non-parametric test (Mann-Whitney U test) was used to determine if there were differences in expressive suppression scores and cognitive reappraisal scores between Irish students and Chinese students.

Specifically, a Mann-Whitney U test was run to determine if there were differences in expressive suppression scores between Irish students and Chinese students. Distributions of the expressive suppression scores for Irish and Chinese were not similar, as assessed by visual inspection. As can be seen in Figure 1, expressive suppression scores for Chinese students ($Md=16.5$, mean rank=113.26) were statistically significantly higher than for Irish students ($Md=9$, mean rank=49.49), $U=6216$, $z=8.39$, $p<.001$. The effect size was large ($r=.6$), according to Cohen (1988).

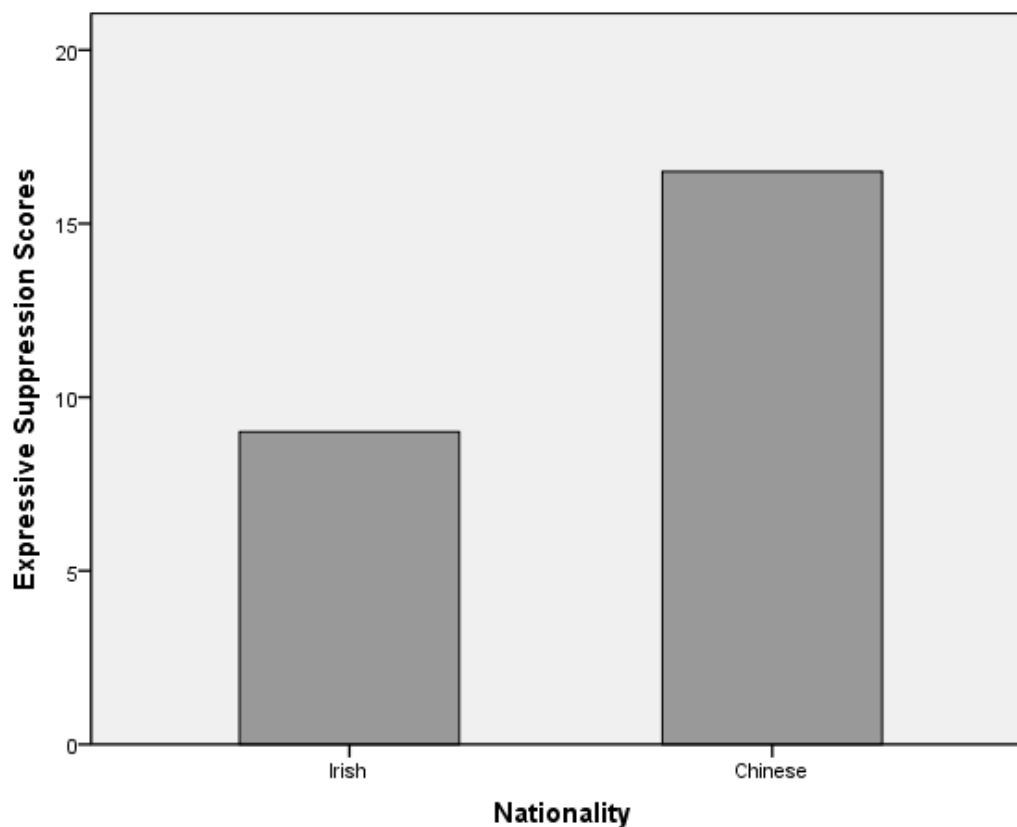


Figure 1. Nationality and Median Levels of Expressive Suppression Scores

A Mann-Whitney U test was also run to determine if there were differences in cognitive reappraisal scores between Irish students and Chinese students.

Distributions of the cognitive reappraisal scores for Irish and Chinese were not similar, as assessed by visual inspection. As can be seen in Figure 2, Cognitive reappraisal scores for Chinese students ($Md=29$, mean rank=98.69) were statistically significantly higher than for Irish students ($Md=22.5$, mean rank=68.51), $U=4809$, $z=3.95$, $p<.001$. The effect size was medium ($r=.3$), according to Cohen (1988).

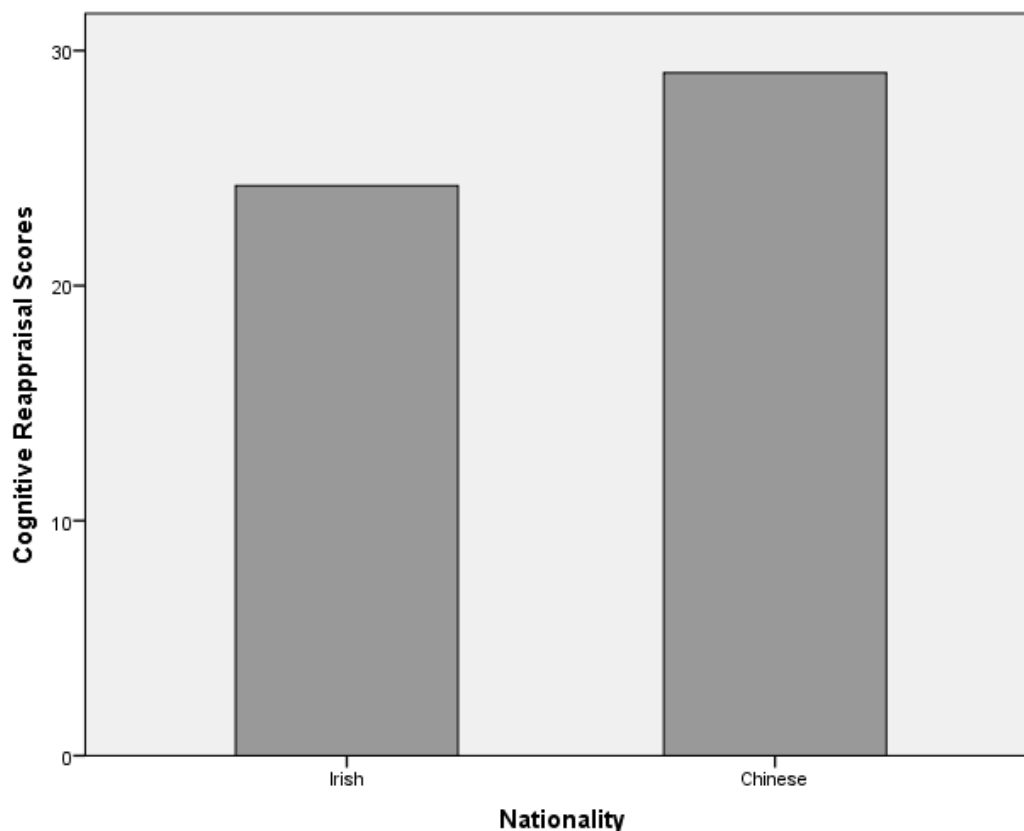


Figure 2. Nationality and Median Levels of Cognitive Reappraisal Scores

As mentioned in Descriptive Statistics, the cognitive reappraisal scores were non-normally distributed for Irish students and the perceived stress scores were non-normally distributed for Chinese students. Hence, the nonparametric test (Spearman's Rho correlation analysis) was used to assess the relationship between cognitive reappraisal and perceived stress for both groups of participants.

Preliminary analysis showed the relationship between cognitive reappraisal and perceived stress for both groups of participants to be monotonic, as assessed by visual inspection of a scatterplot. There was a statistically significant and strong negative correlation between cognitive reappraisal and perceived stress in Irish college students ($r_s = -.78$, [95% CI= $-.67 - -.85$], $n=74$, $p<.01$). This indicates that the two variables

share approximately of 61% of variance in common, and the more frequent use of cognitive reappraisal is associated with the lower levels of stress in Irish students.

There was a statistically significant, however weak, negative correlation between cognitive reappraisal and perceived stress in Chinese students ($r_s = -.23$, [95% CI = $-.02 - -.42$], $n=96$, $p<.05$). This indicates that the two variables share approximately of 5% of variance in common, and the more frequent use of cognitive reappraisal is also associated with the lower levels of stress in Chinese students.

In order to test the hypothesis that culture moderates the association between the habitual use of expressive suppression and perceived stress, a hierarchical multiple regression was conducted. Specifically, hierarchical multiple regression analysis was performed to investigate if the addition of the interaction term (Expressive Suppression \times Culture) to the existing regression model improves the prediction of levels of stress. Dummy variables were created, and the continuous predictor (i.e. expressive suppression scores) was mean centred when performing a moderator analysis for interpretation reasons, as suggested by researchers (Cohen, Cohen, West, Aiken, 2014). See more details in Appendix D

Preliminary analyses were conducted to ensure no violation of the assumptions of linearity, multicollinearity, homoscedasticity, and normality (See Appendix E). A scatterplot of habitual use of expressive suppression against levels of perceived stress was plotted. Visual inspection of this plot indicated that the assumption of linearity was acceptable. There was no evidence of multicollinearity, as evidenced by no Tolerance values less than 0.1 and no VIF values greater than 10. Although four

unusual points were identified, none were deemed to need removal (Tabachnick & Fidell, 2007). There was homoscedasticity, as assessed by visual inspection of the studentized residuals plotted against the predicted values for Irish students and Chinese students. The studentized residuals were approximately normally distributed, as assessed by visual inspection of the Normal Q-Q plots. The Normal Q-Q plots showed a reasonably linearity, indicating that the studentized residuals achieved a reasonable degree of normal distribution.

It should be noted that only one dummy variable is required to be entered into the moderated multiple regression. However, as Frazier and colleagues (2004) suggested, creating two dummy variables would simplify the analysis of both simple regression lines when doing follow up tests. Hence, the first moderator analysis used Expressive Suppression (independent variable), Irish (dummy variable), and Expressive Suppression \times Irish (the interaction term). The second moderator analysis used Expressive Suppression (independent variable), Chinese (dummy variable), and Expressive Suppression \times Chinese (the interaction term).

In the first step, two variables were included: Culture (Irish or Chinese) and expressive suppression scores. This model was statistically significant $F(2, 167) = 6.42; p = .002$ and explained 7.1% of variance in levels of stress. After the entry of interaction term (Expressive Suppression \times culture) at Step 2 the total variance explained by the model was 16.1% ($F(3, 166) = 10.65; p < .001$). There was a statistically significant moderator effect of culture, as evidenced by a statistically significant increase in total variation explained of 9%, $F(1, 166) = 17.82, p < .001$.

(See Table 7 and Table 8) Simple slopes analysis revealed that there was a statistically significant positive linear relationship ($B = .90$, $SE = 0.18$) between habitual use of expressive suppression and levels of perceived stress in Irish college students, $p < .001$, but not in Chinese international college students ($B = -.04$, $SE = .13$), $p = .779$. (See Figure 3 and see more details in Appendix F).

Table 7

Hierarchical Multiple Regression Model Predicting Levels of Stress (With Dummy Variable: Irish)

	R	R ²	R ² Change	B	SE	β	t
Step 1	.26	.07***					
ES				.28	.11	.24*	2.58
Irish				4.48	1.26	.33***	3.54
Step 2	.40	.16***	.09***				-
ES				-.04	.13	-.03	-.28
Irish				5.93	1.25	.44***	4.73
ES × Irish				.93	.22	.46***	4.22

Note. ES = Expressive Suppression, Statistical significance: * $p < .05$; *** $p < .001$

Table 8

Hierarchical Multiple Regression Model Predicting Levels of Stress (With Dummy Variable: Chinese)

	R	R ²	<i>R2</i>	B	SE	β	<i>t</i>
	<i>Change</i>						
Step 1	.26	.07***					
ES				.28	.11	.24*	2.58
Chinese				-4.48	1.26	.33***	-3.54
Step 2	.40	.16***	.09***				-
ES				.90	.18	.76***	5
Chinese				-5.93	1.25	-.44***	-4.73
ES × Chinese				-.93	.22	-.55***	-4.22

Note. ES = Expressive Suppression, Statistical significance: * $p < .05$; *** $p < .001$

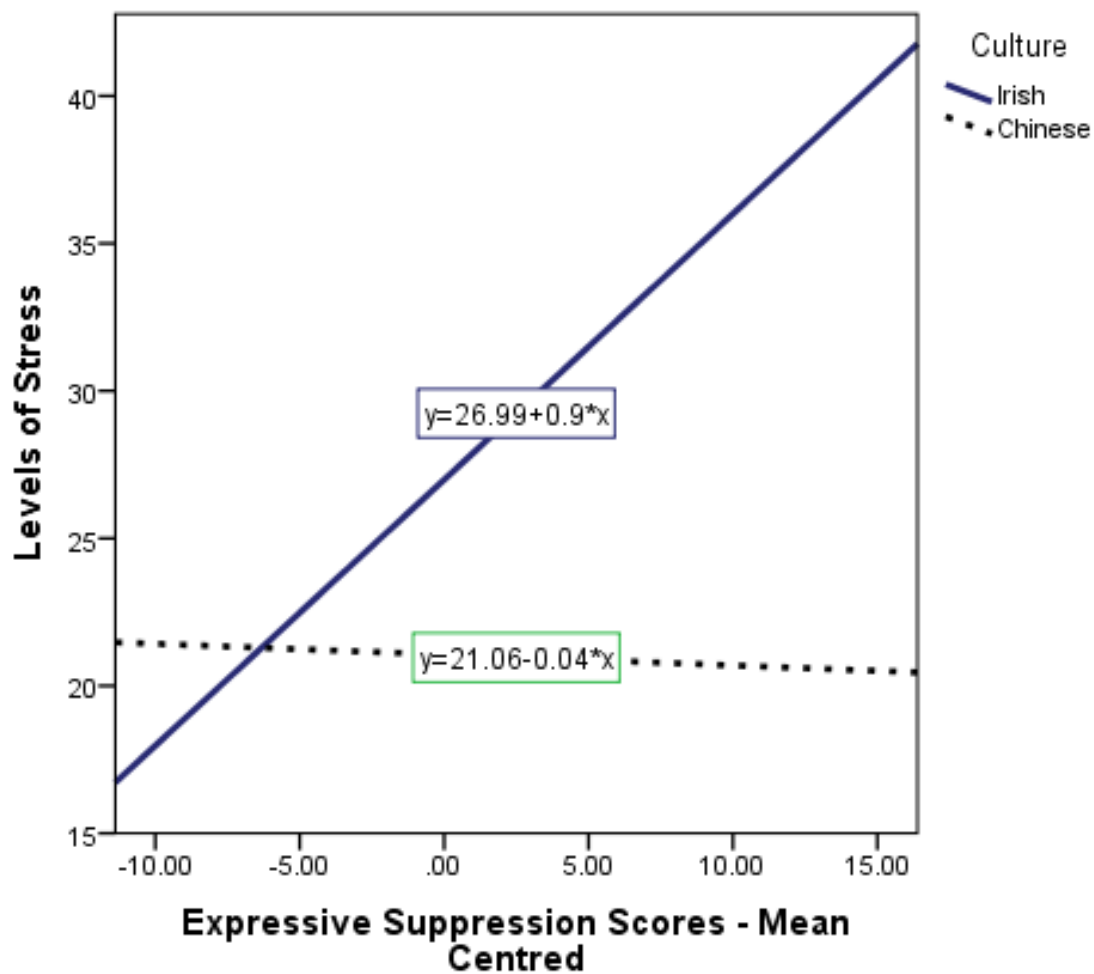


Figure 3. Moderated Effects of the Culture On the Relationship Between the Habitual Use of Expressive Suppression and Levels of Stress

Discussion

The aim of the current study was to investigate whether there is a difference in the habitual use of ER strategies (cognitive reappraisal and expressive suppression) between Irish college students and Chinese international college students, and to examine the association between these two ER strategies and levels of stress in Irish and Chinese students. The current study was undertaken in order to contribute to the field of emotion regulation and mental health by investigating the relationship between ER strategies and perceived stress among college students. In addition, the current study was conducted in order to highlight the importance of culture context when investigating the association between ER strategies and levels of stress.

Specifically, the first hypothesis stated that Chinese students would report more frequent use of expressive suppression than Irish students. The current study found that expressive suppression scores for Chinese students were statistically significantly higher than for Irish students, indicating that Chinese students reported more frequent use of expressive suppression than Irish students. This result is also supported by previous studies. For instance, in the study conducted by Soto and colleagues (2011), Chinese college students reported using expressive suppression with significantly greater frequency than European American college students. Matsumoto and colleagues (2008) demonstrated that participants from Western countries, such as the United States and Canada, reported less use of expressive suppression than did participants from East Asian countries, such as China, Japan, and Korea.

In addition, the current finding is also congruent with the culture norms of

emotion suppression (English & John, 2013). As mentioned in the literature review, the norms for emotion suppression differ between Western cultures and East Asian cultures (Butler, Lee, & Gross, 2007). For example, expressive suppression is encouraged and used more frequently in East Asian cultures (Sun & Lau, 2018). People from East Asian cultures (i.e. collectivistic cultures) are more likely to define themselves based on their social roles and relationships with social groups and are more likely to value the needs of their groups over their personal needs. Hence, expressive suppression is used more frequently in that culture, as it is helpful for achieving group goals, preserving relationships with social groups and maintaining social harmony (Bedford & Hwang, 2003; Tsai & Lu, 2018). In contrast, expressive suppression is discouraged in Western cultures (Roberts, Levenson, & Gross, 2008). From an early age, children from Western countries (i.e. individualistic cultures) are encouraged to speak up and express their identity and needs through emotional expression (Matsumoto, 2006). Furthermore, emotional expression is considered as a way of asserting individuality and autonomy, which could also be regarded as a societal norm in European American cultural contexts (Su et al., 2015). Therefore, this societal norm may result in less frequent use of expressive suppression among Irish college students compared with Chinese students in the current study.

However, it should be noted that the questionnaire (ERQ; Gross & John, 2003) used in the current study assessed both positive and negative emotions in general on the suppression subscale, but it did not assess specific emotions, like anger or sadness, on the suppression subscale. Hence, it is not known which specific emotion that

Chinese students would more often suppress. Yet, other studies found that Chinese and Asian Americans are more likely to report habitual suppression of emotions in general, and greater suppression of positive emotions, such as joy and amusement, in particular (Cheung & Park, 2010; Tsai & Levenson, 1997). Overall, the current finding supports the first hypothesis.

The second hypothesis stated that there would be no difference in cognitive reappraisal scores between Irish students and Chinese students. However, the current study found that cognitive reappraisal scores for Chinese students were statistically significantly higher than for Irish students, indicating that Chinese students reported use of cognitive reappraisal more frequently compared with Irish students. This result contradicts some previous studies. For example, Soto and colleagues (2011) reported that there were no statistically significant differences in the habitual use of cognitive reappraisal between Chinese and European American students. Kwon and colleagues (2013) found there were no cultural differences (i.e. Western cultures and Eastern Asian cultures) in the habitual use of cognitive reappraisal between Korean and American college students. Gross and John (2003) also noted that there were no ethnic differences in the frequent use of cognitive reappraisal.

One possible explanation for the current finding could be that there is more than one way of categorizing individualistic cultures (Kitayama, Park, Sevincer, Karasawa, & Uskul, 2009). Although the United States and Western Europe have both been regarded as Western individualist cultures, there is a difference in individualism between the United States and Western Europe (Boiger, De Deyne, & Mesquita). For

example, while people from the United States favour a more competitive form of individualism, people from Western Europe endorse a more egalitarian variant of individualism (Schwartz & Bardi, 2001). This difference could be reflected in the strategies that people utilize to regulate their emotions (Haga, Kraft, & Corby, 2009). Hence, Irish college students in the current study demonstrated a difference in the habitual use of cognitive reappraisal compared with previous studies, which were conducted between American college students and Chinese or Korean college students. In addition, all the above-mentioned studies and most cross-cultural studies on emotion regulation mainly focused on the difference between the United States and Eastern countries such as China, Japan, or Korea (Tsai, Miao, Seppala, Fung, & Yeung, 2007). More research is needed to examine differences in the frequent use of ER strategies between Western Europeans and Asians.

The third and fourth hypotheses stated that there would be a relationship between the habitual use of cognitive reappraisal and perceived stress in Irish students and Chinese students. The results found there was a statistically significant negative association between the habitual use of cognitive reappraisal and levels of stress in both Irish and Chinese students, indicating that the more frequent use of cognitive reappraisal, the lower levels of stress participants could experience. The current findings are also supported by previous studies. For example, more frequent use of cognitive reappraisal has been found to be correlated with less perceived stress in psychology graduate students (Myers et al., 2012), and negatively related with psychological distress in adolescents (Boyes, Hasking, & Martin, 2016). Moore and

colleagues (2008) showed that cognitive reappraisal was linked with lower levels of stress-related symptoms. Other researchers also reported that increased use of cognitive reappraisal was negatively related with both behavioural and emotional problems (Flouri & Mavroveli, 2013). In addition, the meta-analysis, including 48 studies, demonstrated that cognitive reappraisal was significantly positively related with positive mental health outcomes and was significantly negatively related with negative mental health outcomes (Hu et al., 2014).

As researchers noted, cognitive reappraisal is a type of antecedent-focused regulation; it occurs early and could alter the effect of emotion-generating cues, or change the emotional impact of emotion-eliciting situations before emotion response tendencies have been fully generated (Brans, Koval, Verduyn, Lim, & Kuppens, 2013; Cutuli, 2014). Thus, cognitive reappraisal may be more effective in regulating current emotional experience, which may also result in positive mental health outcomes (Strauss, Kivity, & Huppert, 2018). However, the strength of the relationship between the habitual use of cognitive reappraisal and lower levels of stress is weak for Chinese students in the current study. Although some studies reported that there is no significant moderating effect of culture on the association between the use of cognitive reappraisal and mental health, it is still necessary for future research to investigate whether the role of culture influences the strength of that association, even among college students (Ehring, Tuschek-Caffier, Schnulle, Fischer, & Gross, 2010; Pothoff et al., 2016).

The fifth hypothesis stated that culture moderates the relationship between the

habitual use of expressive suppression and perceived stress. The results found there was a statistically significant moderator effect of culture. That is to say, the association between the habitual use of expressive suppression and levels of stress is different for Irish students and Chinese students. Specifically, there was a significant positive relationship between the habitual use of expressive suppression and levels of stress in Irish students, whereas this relationship was absent in Chinese students. The current finding is also supported by previous studies. For instance, Soto and colleagues (2011) found that expressive suppression was correlated with adverse psychological functioning for European American students, but not for Chinese students. Butler and colleagues (2007) reported that the habitual use of expressive suppression was linked with negative emotional experience in participants who hold Western-European values, but this relationship was reversed in participants who hold Asian values. In the meta-analysis, Hu and colleagues (2014) also reported that the effect of expressive suppression on negative mental health outcomes differ between Western and Eastern cultures, as the strength of the association between the frequent use of expressive suppression and negative mental health outcomes was stronger for Western participants.

Furthermore, the current finding is also consistent with the idea that culture shapes if emotion regulation is adaptive or maladaptive (Wei, Su, Carrera, Lin, & Yi, 2013). As mentioned in the literature review, expressive suppression is generally regarded as maladaptive in individualistic cultural contexts (e.g. Ireland), as it may discourage individualistically-focused behaviours such as authenticity and self-

assertion. On the other hand, the habitual use of expressive suppression could be more valuable in collectivistic cultural contexts (e.g. China), as it could be used to achieve goals and group harmony (Mauss, Butler, Roberts, & Chu, 2010). Therefore, behaviours that are congruent with a culture's values may receive more social reward and become more practised (Ford & Mauss, 2015). As a result, the habitual use of expressive suppression in Irish college students is not congruent with the cultural context and hence associated with higher levels of stress in the current study. In contrast, this relationship was absent in Chinese students, as the habitual use of expressive suppression is consistent with Chinese cultural context and hence associated with lower levels of stress in the current study. However, it should be noted that the association between the habitual use of cognitive reappraisal and lower levels of stress for Chinese international college students was not statistically significant.

Strength

The current study possess some strengths. While many previous studies have reported the relationship between the habitual use of ER strategies and levels of depression, anxiety and life satisfaction (Garnefski & Kraaij, 2006; Verzeletti, Zammuner, Galli, & Agnoli, 2016), there is very limited research investigating the relationship between the habitual use of ER strategies and perceived stress. In particular, there is very little research that attempts to investigate that relationship among college students. Therefore, the current study extends the existing findings in this area and adds to it.

In addition, most of the sample used in previous studies, when investigating

cultural differences in emotion regulation, comprised immigrants and long-term residents (e.g. foreign born Asian Americans) (Dixon-Gordon, Aldao, & De Los Reyes, 2015). The current study focused on participants who are short-term residents (i.e. international college students) in the host country and investigated how emotion regulation influences perceived stress among international college students. As there have been a large number of studies showing that international college students face difficulties in adapting to host cultures and usually experience higher levels of stress when studying in an unfamiliar culture (Cho & Yu, 2015; Han, Pistole, & Caldwell, 2017), it would be necessary to examine which ER strategies are beneficial for this population.

Limitations

The current study also has some limitations. First, the sample size was relatively small and there are more Chinese students (n=96) compared with Irish students (n=74) in the study. Thus, caution should be applied when interpreting these results. For example, small and unequal sample sizes may lead to a general loss of statistical power (Field, 2013), and may not represent all Irish or Chinese students in Ireland. Second, because of cross-sectional research design, the findings are correlational in nature, and hence causality cannot be established. Third, all participants completed the original English version of the questionnaires and there might be some misunderstandings due to language barriers for Chinese students. However, the minimum language requirement for international students entering third-level institutions in Ireland is upper intermediate level, meaning the participants have the

ability to understand questionnaires and give responses (Sawir, Marginson, Deumert, Nyland, & Ramia, 2008).

Future Research

It is recommended that future research using different methods to measure emotion regulation and to investigate if the results of the current study could be replicated. For example, future research could assess daily ER strategies used by participants and examine how the effects of emotion regulation on levels of stress vary on a daily basis (Blalock, Kashdan, & Farmer, 2016). Furthermore, the difference in culture values between Ireland and China is based on individualism scales developed by Hofstede (2001). It should be noted that the scales may not consider individual differences and may not be updated for the current world, e.g. globalization (Chen et al., 2016). In addition, there are even different culture values within different regions of China (Talhelm et al., 2014). Hence, it is recommended that future research uses the Individualism-Collectivism Scale (Triandis & Gelfand, 1998), which could reflect individual differences on dimensions of individualism and collectivism, to measure the culture values of each participant. Moreover, there are more Chinese students reported where the length of stay in Ireland was between 1 and 3 years (47.9%) in the study compared with less than 1 year (22.9%) and more than 3 years (29.2). It would be necessary for future research to investigate whether the length of stay in the host country influences the emotion regulation or influences the association between ER strategies and levels of stress, as researchers found individuals who interact or cooperate together with local people over time are more

likely to have similar patterns of emotional experience (De Leersnyder, Mesquita, & Kim, 2011).

Implications

The current findings also have some implications for stress management among both Irish and Chinese students. It would be necessary for colleges to introduce emotion management workshops for students, particular in how to reappraise negative thoughts and stressful events, in order to help them adapt to college life and reduce levels of stress. However, with respect to Chinese international college students, cultural differences should be taken into consideration. For example, practitioners or therapists can help Chinese students to differentiate ER strategies under different situations and increase their flexibility with respect to when and with whom to suppress their emotions (Wei et al., 2013).

Conclusion

The current study investigated the association between ER strategies (cognitive reappraisal and expressive suppression) and levels of stress in both Irish college students and Chinese international college students in Ireland. The findings from the current study highlight the effects of the habitual use of ER strategies on levels of stress and also highlight the importance of considering cultural differences when examining those associations. Taken together, understanding different types of emotion regulation and specific cultural values and norms tends to expand or enrich current knowledge with respect to psychological well-being.

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Appendix A

Questionnaires

Cross-cultural Comparison of the Relationship Between Emotion Regulation Strategies and Perceived Stress in Irish College Students and Chinese International Students

Participant Information Leaflet

You are invited to participate in a research study that will form the basis for an undergraduate thesis. Please read the following information sheet carefully before deciding whether or not to participate.

Purpose of the study

This study is being carried out to investigate the relationship between emotion regulation strategies and perceived stress in Irish college students and Chinese international college students. The study is interested in evaluating if the frequent use of emotion regulation strategies is different between Irish college students and Chinese international college students. Additionally, this study will consider how factors such as cognitive reappraisal and expressive suppression can influence levels of stress.

Voluntary participation

Participation in this study is entirely voluntary. For individuals wishing to participate, you will be asked to tick the box in the consent form which will express your intention to take part in the subsequent research project.

Procedures

As a volunteer in this study, you will be asked to do the following: Please fill out an online questionnaire, which will include demographic questions as well as questions regarding emotion regulation strategies and perceived stress. The duration of completing the questionnaire is **approximately 5 minutes**, however, it is possible to stop and continue the survey at a later point in time. No time limit will be imposed for survey completion.

What are the benefits of participating in this study?

There are no direct benefits from participating in this study. Your participation will, however, support efforts in helping to understand the relationship between emotion regulation strategies and perceived stress for both Irish college students and Chinese international students.

What are the risks?

There are no known physical risks associated with this study. Participants should be aware that potential risks associated with participation in the proposed study may include psychological distress related to the questionnaire utilized in the survey. Any potential psychological risk is not considered greater than risks that you may encounter in your daily life. However, if you experience any distress or discomfort following your participation, you may contact the following helpline: NiteLine: 1800793793

Confidentiality

All information provided by participants will be anonymous, meaning your name will not be required and there will be no way to trace your questionnaire back to you or your computer. Only the researcher will have access to the information. In addition, the information provided will only be used for research purposes only, and the results of the study will be used as part of an undergraduate final project and.

Right to withdraw

Participation in this research is voluntary, and you may discontinue your participation at any point of completing the questionnaire, should you feel that you do not wish to be involved. Due to the complete anonymity of the research, once your survey has been submitted to the researcher you will no longer be able to withdraw your response. If you change your mind during the course of the survey, you can withdraw from taking part. You may also refuse to answer questions you do not want to answer.

If you require further information regarding any aspect of the proposed study now or at any time in the future, please contact: x15031047@student.ncirl.ie or contact my supervisor at conor.nolan@ncirl.ie

Thank you for taking the time to read this sheet

Consent Form

I have read and understood the information sheet regarding this study, and I have been informed of the objectives and participant requirements.

I understand that participation in this research is voluntary, and I may discontinue my participation at any point of completing the questionnaire. Due to the complete anonymity of the research, once the survey has been submitted to the researcher I will no longer be able to withdraw my response

I am over 18 years old

By ticking the box, I agree to take part in the study.

I agree to participate in this study

Demographic Questionnaire

What is your gender?

Female

Male

What is your age?

What is your Nationality?

Irish

Chinese

Are you enrolled in an undergraduate programme or postgraduate programme?

Undergraduate

Postgraduate

The length of stay in Ireland? (For Chinese students only)

less than 1 year

1 - 3 Years

more than 3 Years

Emotion Regulation Questionnaire (Gross & John, 2003)

Instructions:

We would like to ask you some questions about your emotional life, in particular, how you control (that is, regulate and manage) your emotions. The questions below involve two distinct aspects of your emotional life. One is your emotional experience, or what you feel like inside. The other is your emotional expression, or how you show your emotions in the way you talk, gesture, or behave. Although some of the following questions may seem similar to one another, they differ in important ways. For each item, please answer using the following scale:

1-----2-----3-----4-----5-----6-----7

strongly disagree

neutral

strongly agree

1. ____ When I want to feel more positive emotion (such as joy or amusement), I change what I'm thinking about.

2. ____ I keep my emotions to myself.

3. ____ When I want to feel less negative emotion (such as sadness or anger), I change what I'm thinking about.

4. ____ When I am feeling positive emotions, I am careful not to express them.

5. ____ When I'm faced with a stressful situation, I make myself think about it in a way that helps me stay calm.

6. ____ I control my emotions by not expressing them.

7. ____ When I want to feel more positive emotion, I change the way I'm thinking about

the situation.

8. ____ I control my emotions by changing the way I think about the situation I'm in.
9. ____ When I am feeling negative emotions, I make sure not to express them.
10. ____ When I want to feel less negative emotion, I change the way I'm thinking about the situation.

Perceived Stress Scale (Cohen, Kamarck & Mermelstein, 1983)

The questions in this scale ask you about your feelings and thoughts during the last month. In each case, please indicate with a check how often you felt or thought a certain way

0=never 1=almost never 2=sometimes 3=fairly often 4=very often

1. In the last month, how often have you been upset because of something that happened unexpectedly?
2. In the last month, how often have you felt that you were unable to control the important things in your life?
3. In the last month, how often have you felt nervous and "stressed"?
4. In the last month, how often have you felt confident about your ability to handle your personal problems?
5. In the last month, how often have you felt that things were going your way?
6. In the last month, how often have you found that you could not cope with all the things that you had to do?
7. In the last month, how often have you been able to control irritations in your life?
8. In the last month, how often have you felt that you were on top of things?
9. In the last month, how often have you been angered because of things that were outside of your control?
10. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?

Debriefing form

Thank you for participating in this study! This form provides background about the research to help you learn more about why we are doing this study. Please feel free to ask any questions on any aspect of the study.

The aim of the study is to investigate whether differences exist in the frequent use of emotion regulation strategies between Irish college students and Chinese international students and to investigate the association between emotion regulation strategies and perceived stress. This project also examined if the relationship between emotion regulation strategies and levels of stress moderated by culture.

This research was considered low risk. However, if responding to the questionnaire have caused you discomfort, anxious, or upset, and you wish to talk about it you may call NiteLine at 1800 793 793.

Thank you for your participation in this study. If you're looking to get a summary of the results, please do let me know. If you have further questions about the study, please feel free to contact me at x15031047@student.ncirl.ie or contact my supervisor at conor.nolan@ncirl.ie


Best Wishes!


Yuning Sun

Appendix B

Proof of Permission

Proof of Permission from DIT International Students Office


Chinese International Students - Survey 






AT Arnaud Teyssou <452882@dit.ie>
Tue 05/02/2019 10:56 

Dear Yuning

I just posted it

Wishing you the best

Arnaud



YS Yuning Sun
Tue 05/02/2019 10:38
arnaud.teyssou@dit.ie     

Dear Arnaud,

My name is Yuning Sun and I am a final year psychology student in National College of Ireland. As part of my final year project I am researching the emotion regulation strategies and perceived stress in Irish college students and Chinese international students.

I am wondering if it is possible to post the survey link on DIT international students facebook page in order to get more Chinese participants for the research. The survey should take no more than 5 minutes to complete.

Proof of Permission from NCI International Students Office


Sheila Mahon
Fri 11/01/2019 19:15 






Hi Yuning

I am happy to share this for you on our social media pages, however it will go to all International Students.

Hopefully, only some Chinese students will complete it for you.

Best of luck with your project.

Regards
Sheila


Yuning Sun
Fri 11/01/2019 10:34
Sheila Mahon     

Dear Sheila,

My name is Yuning Sun and I am a final year psychology student. As part of my final year project I am researching the emotion regulation strategies and perceived stress in Irish college students and Chinese international students.

Appendix C

Testing for Normality

Table 9

Tests of Normality By Using Kolmogorov-Smirnov Test (P value)

Cognitive Reappraisal	Irish	.005
	Chinese	.200*
Expressive Suppression	Irish	.004
	Chinese	.200*
Perceived Stress	Irish	.058
	Chinese	.000

Note. * This is a lower bound of the true significance

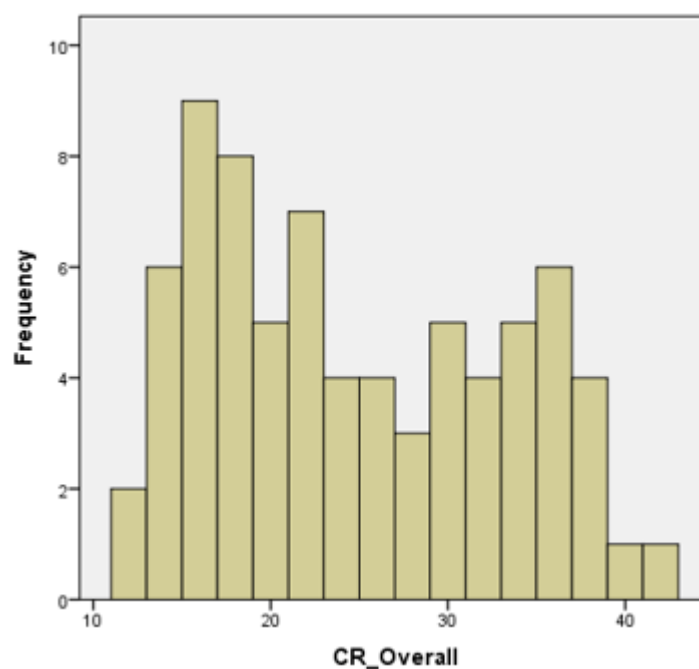


Figure 4. Histogram of Cognitive Reappraisal for Irish

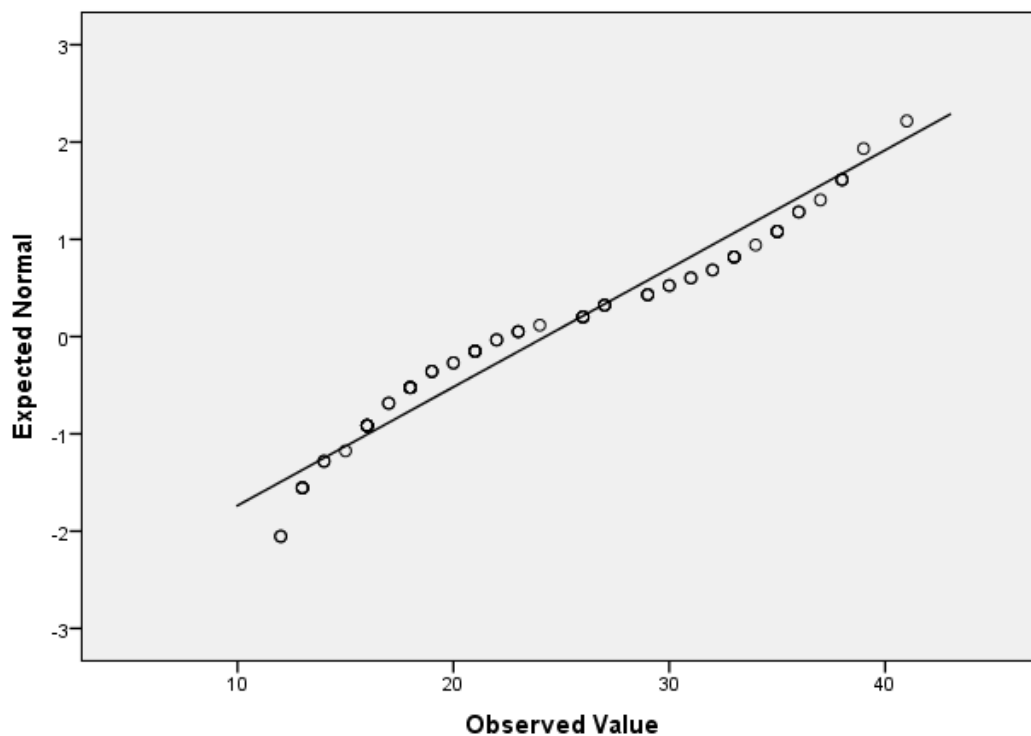


Figure 5. Normal Q-Q Plot of Cognitive Reappraisal for Irish

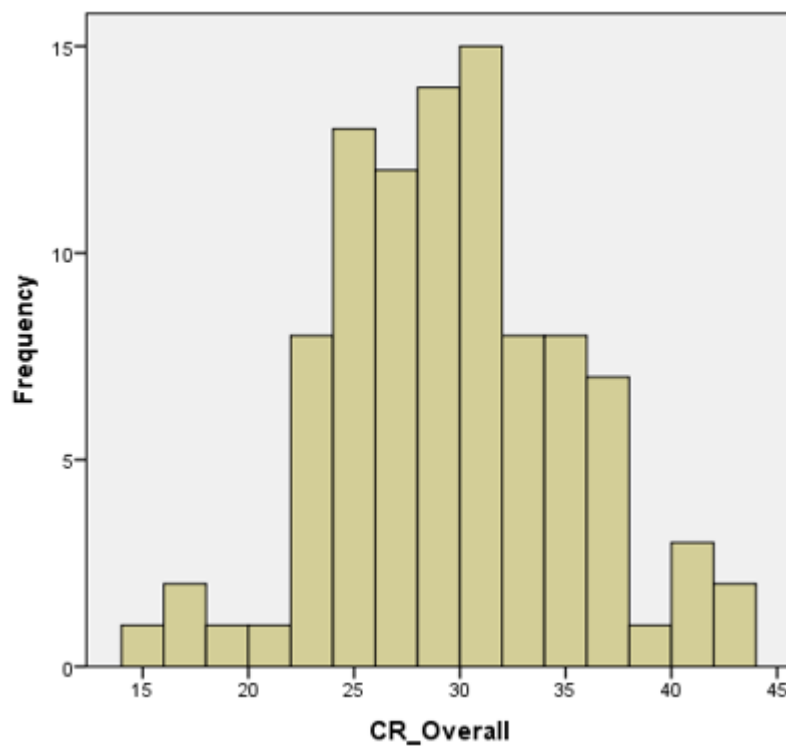


Figure 6. Histogram of Cognitive Reappraisal for Chinese

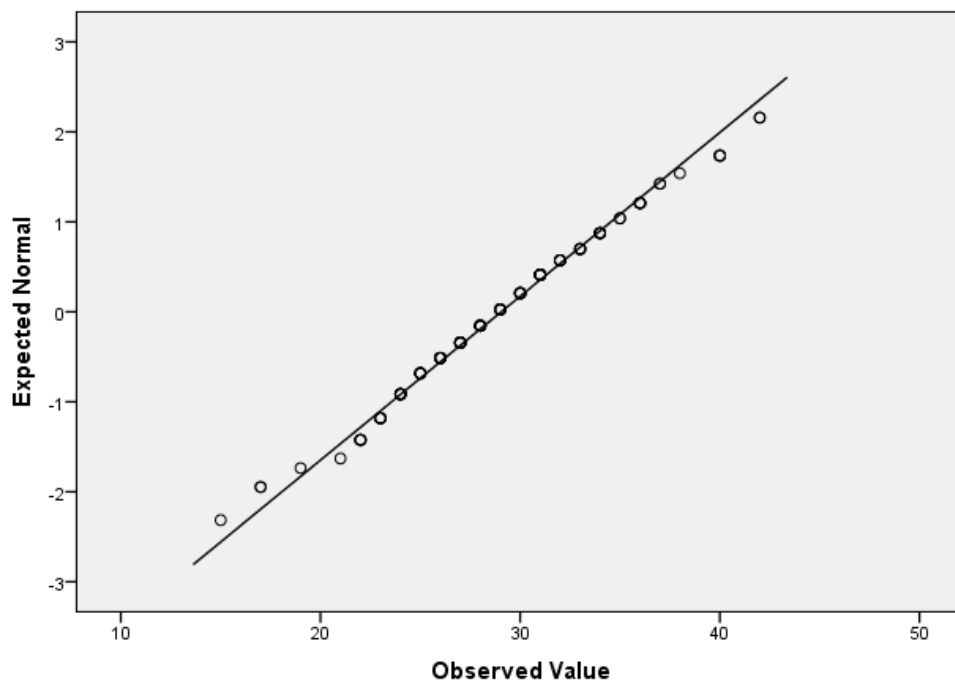


Figure 7. Normal Q-Q Plot of Cognitive Reappraisal for Chinese

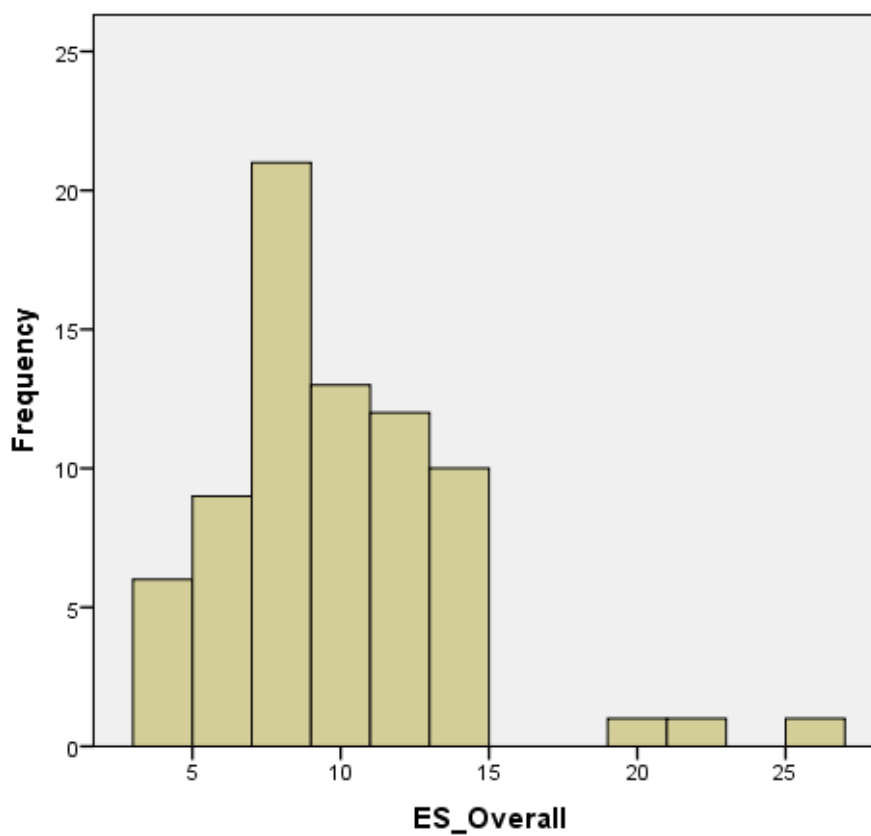


Figure 8. Histogram of Expressive Suppression for Irish

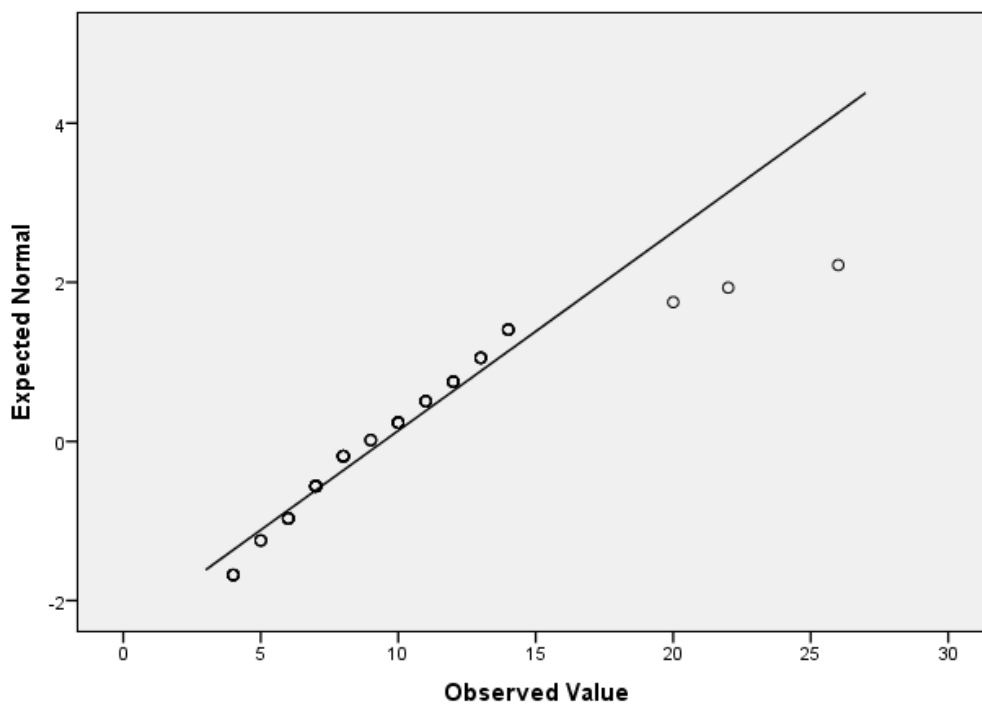


Figure 9. Normal Q-Q Plot of Expressive Suppression for Irish

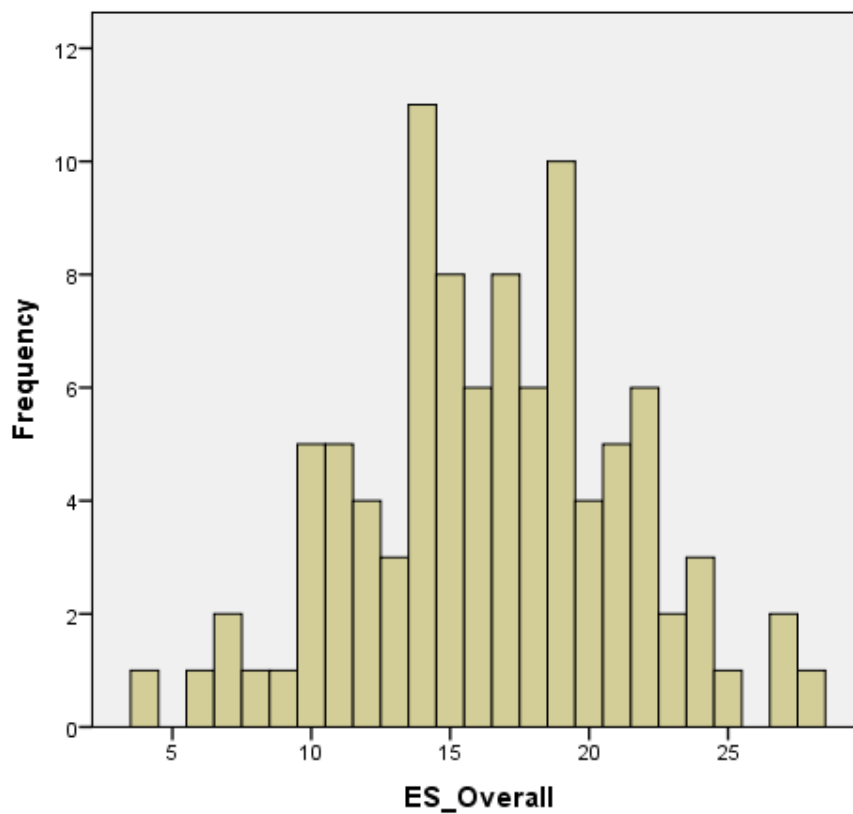


Figure 10. Histogram of Expressive Suppression for Chinese

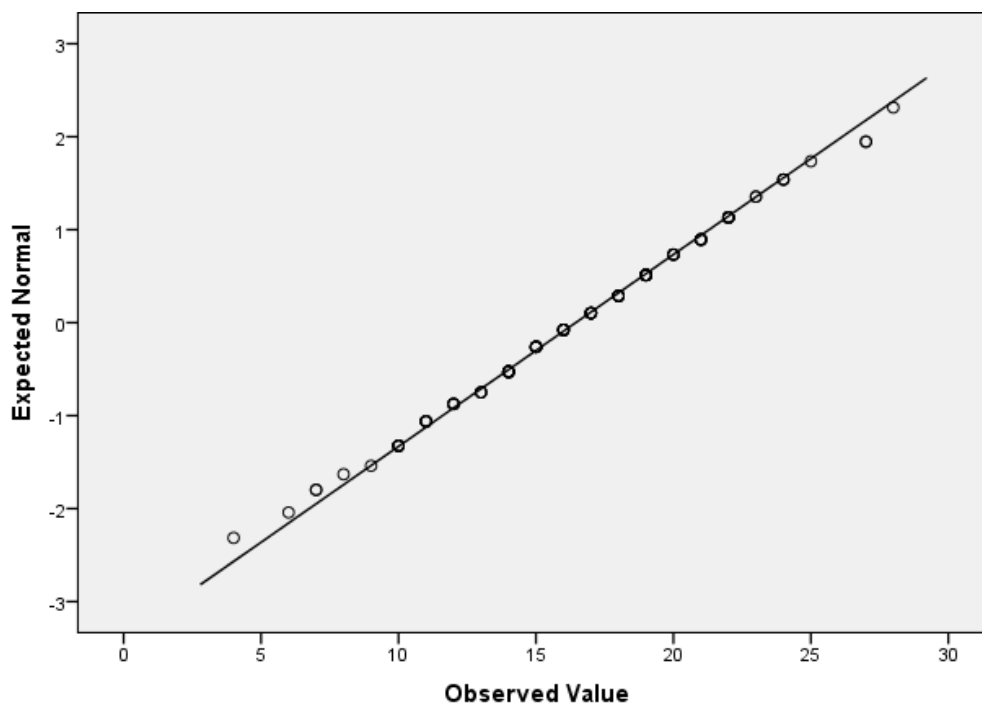


Figure 11. Normal Q-Q Plot of Expressive Suppression for Chinese

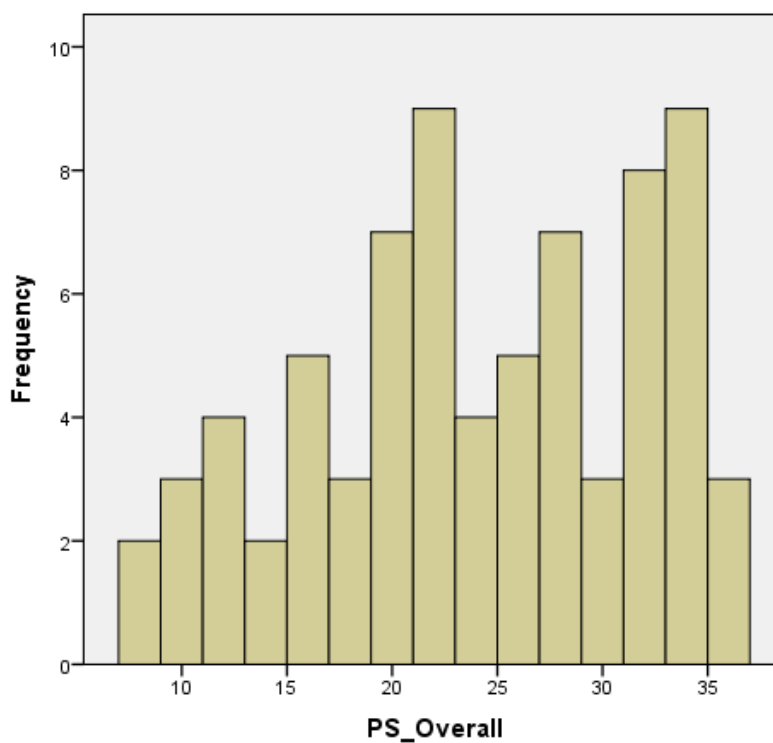


Figure 12. Histogram of Perceived Stress for Irish

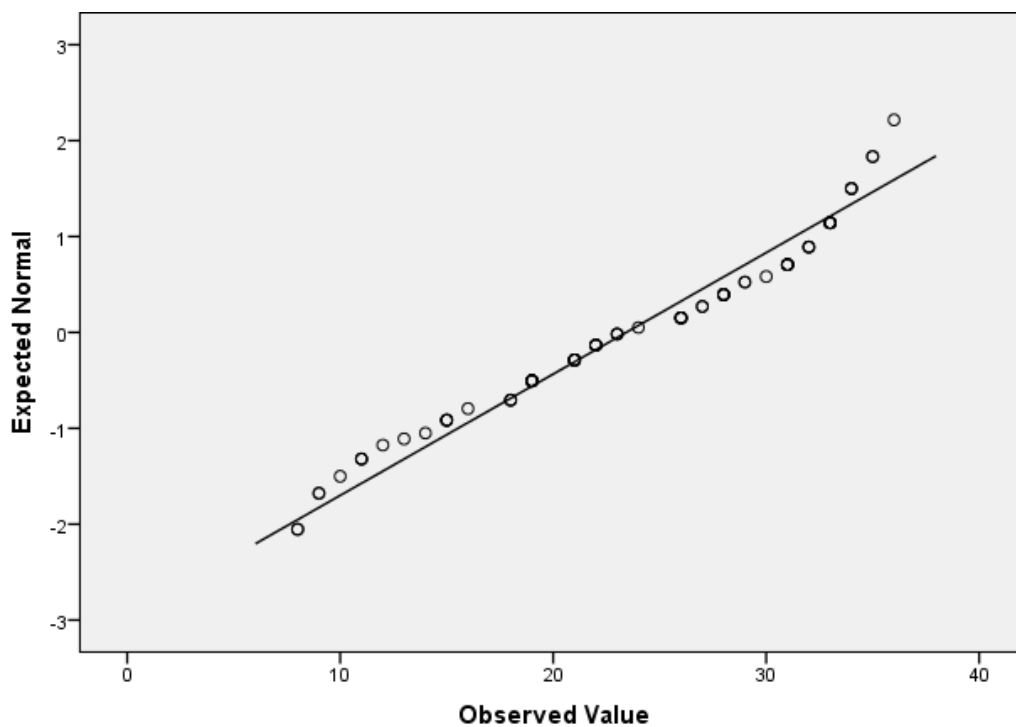


Figure 13. Normal Q-Q Plot of Perceived Stress for Irish

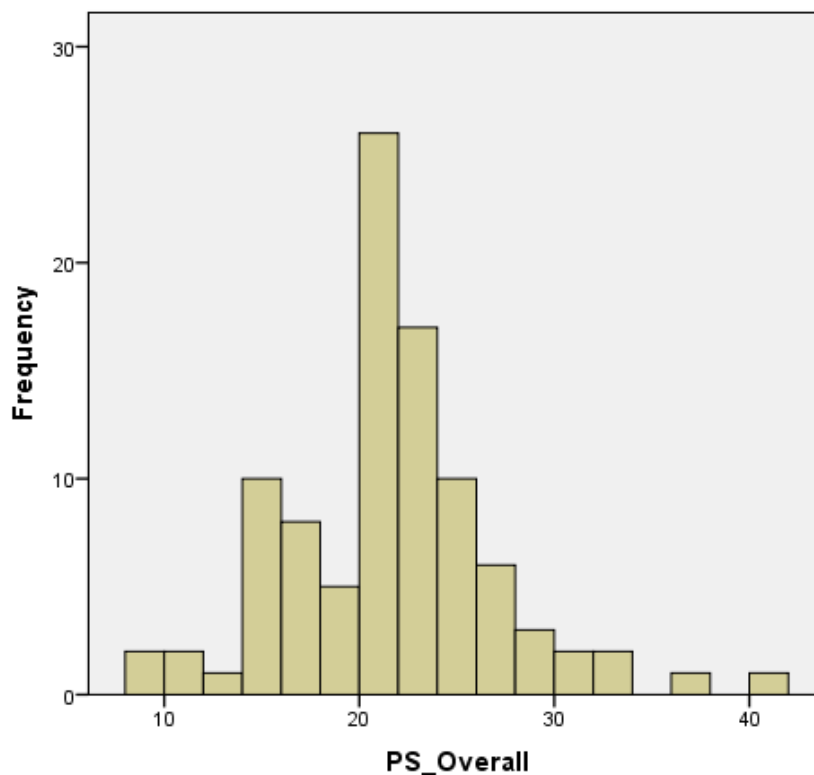


Figure 14. Histogram of Perceived Stress for Chinese

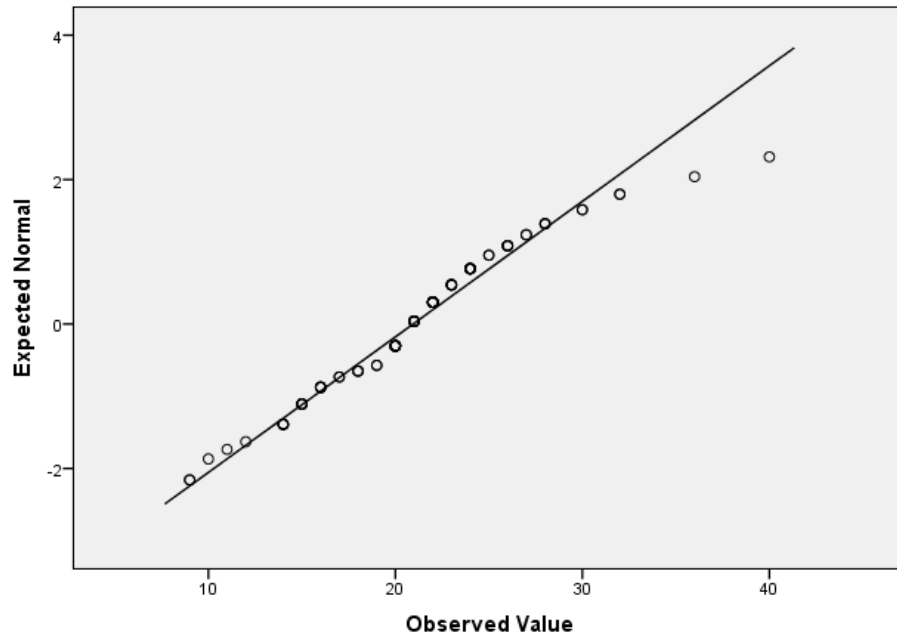


Figure 15. Normal Q-Q Plot of Perceived Stress for Chinese

Appendix D

Creating Dummy Variables and Mean Centring Expressive Suppression Scores

The “Irish” dummy variable indicates whether a participant is in the “Irish” category of the “culture” moderator variable. Hence, participants who are Irish are coded as “1” and participants who are Chinese are coded as “0”. As shown in Table 9.

In addition, another dummy variable (Chinese) that has the opposite coding was also created so that the analysis of both simple regression lines would be simplified when doing follow up tests, as suggested by Field (2013). The “Chinese” dummy variable indicates whether a participant is in the “Chinese” category of the “Culture” moderator variable. Hence, participants who are Chinese are coded as “1” and participants who are Irish are coded as “0”. As shown in Table 10.

Table 10

Dummy Variables for the Dichotomous Moderator Variable

Dummy Variable	Coded “1” (Yes)	Coded “0” (No)
Irish	Irish Participants	Chinese Participants
Chinese	Chinese Participants	Irish Participants

As suggested by Field (2013), it is common to transform the predictors using grand mean centring for interpretational purposes in a moderated multiple regression. The procedure to mean centre Expressive Suppression Scores in SPSS is in two parts:

1. The mean of Expressive Suppression Scores was calculated.
2. a new variable (Expressive Suppression Scores – Mean Centred) was created

where the values were calculated as the original Expressive Suppression Scores minus the mean value of Expressive Suppression Scores.

Appendix E

Testing for Assumptions for the Moderator Analysis

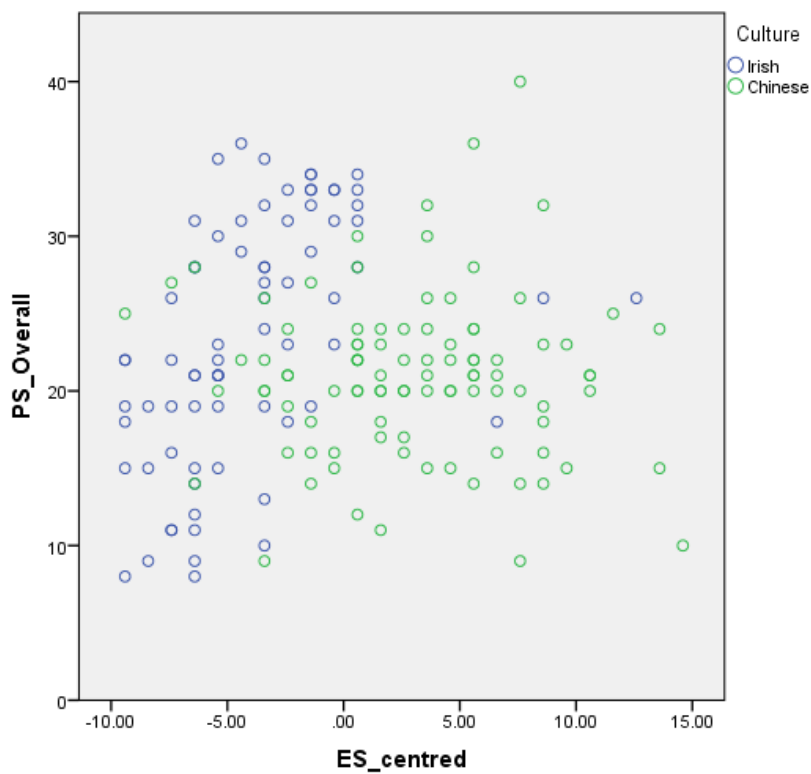


Figure 16. Testing for Linearity

Table 11

Testing for Multicollinearity (Dummy Variable: Irish)

Collinearity Statistics		
Model	Tolerance	VIF
ES_centred	.41	2.4
Irish	.57	1.7
ES_centred × Irish	.42	2.3

Note. ES = Expressive Suppression

Table 12

Testing for Multicollinearity (Dummy Variable: Chinese)

Collinearity Statistics		
Model	Tolerance	VIF
ES_centred	.21	4.65
Chinese	.57	1.72
ES_centred × Chinese	.29	3.41

Note. ES = Expressive Suppression

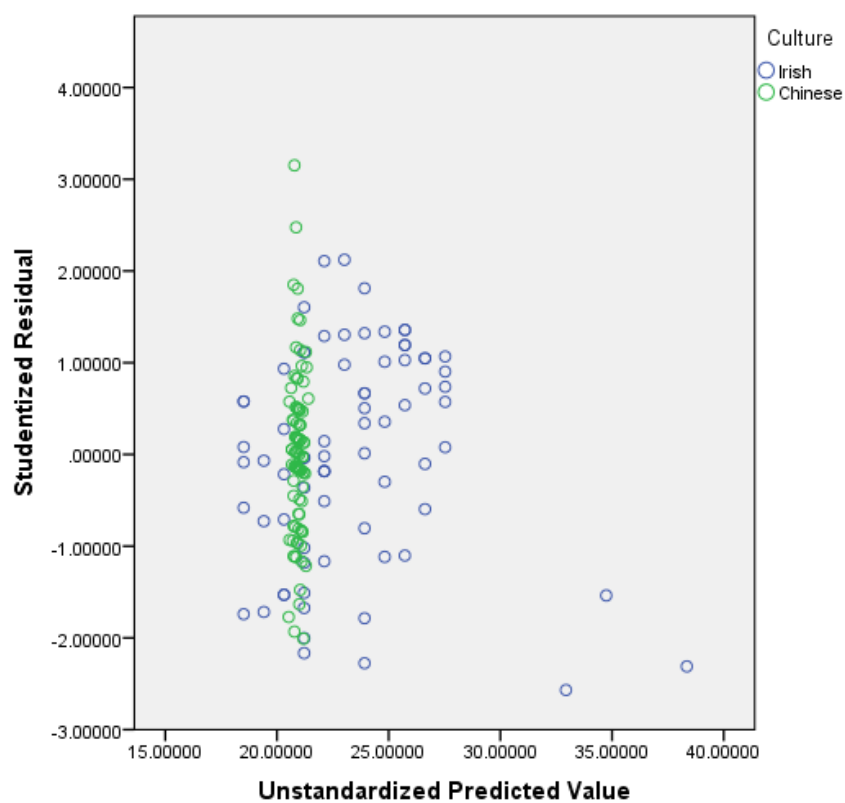


Figure 17. Testing for Homoscedasticity

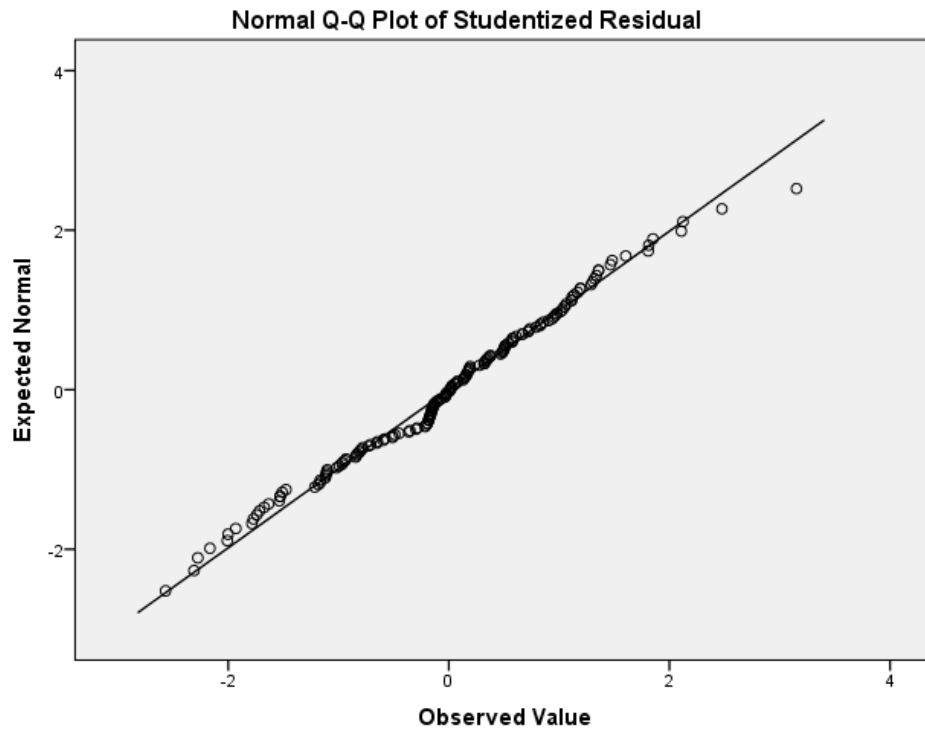


Figure 18. Testing for Normality

Appendix F

Simple Regression Lines Analysis

Simple regression line for Irish participants:

$$\text{Levels of Stress} = 26.991 + (0.902 \times \text{Expressive Suppression})$$

The equation above shows that a one unit increase in Expressive Suppression is correlated with a 0.902 increase in Levels of Stress, and this relationship is statistically significant (as shown in Results section).

Simple regression line for Chinese participants:

$$\text{Levels of Stress} = 21.059 + (-0.037 \times \text{Expressive Suppression})$$

The equation above shows that a one unit increase in Expressive Suppression is correlated with a 0.037 decrease in Levels of Stress, but this relationship is not statistically significant (as shown in Results section).