Social Support Seeking: The Influence of Culture and Childhood Experience

Shaofeng Zheng

Acknowledgements

First and foremost, I would like to thank my supervisor Dr. Keiko Ishii for her support and guidance over the course of my PhD study. From her, I learnt what a good researcher should be like. Working with her in Japan is one of the best decisions that I have ever made.

A thank you to Dr. Minoru Karasawa and Dr. Hideki Ohira. Their insightful suggestions and comments on my mid-term presentation and the first draft of this dissertation really helped me format and write it better.

I owe special thanks to Dr. Takahiko Masuda, Dr. Masahiro Matsunaga, Dr. Yohsuke Ohtsubo, Dr. Yasuki Noguchi, and Dr. Hidenori Yamasue for their contribution to the gene-environment interaction project. Thanks also go to Dr. Yang Li for all her suggestions about my research and others.

And for my family, they are always supportive to me. Especially for my grandpa who could not be with us any longer, I missed his funeral due to the pandemic. Without their support, I would never have been able to achieve what I have today.

Lastly, I would like to thank myself. You are very brave that you decided to pursue a PhD in Japan even if you suck at spoken English and Japanese. And you make it! You overcame homesickness, loneliness, language barriers, and numerous frustrations. Thanks for not giving up.

A Note on Personal Pronouns

This dissertation was developed mainly on three published works in which I collaborated with my supervisor Keiko Ishii and her colleagues – Takahiko Masuda, Masahiro Matsunaga, Yasuki Noguchi, Hidenori Yamasue, and Yohsuke Ohtsubo. To maintain consistency throughout this dissertation, however, the singular personal pronoun of "I" rather than the collective term of "we" will be used.

Abstract

Social support is considered effective for coping with stress and beneficial to psychological and physical health. The empirical research on what influences social support seeking, however, is limited. In eight studies, the work within this dissertation examined how culture and childhood experience influence individuals' willingness to ask general others for support separately and what predicts distant and close support seeking of international students.

The first part of this dissertation investigated the effect of culture on support seeking. Chapter 2 presents the results from four cross-cultural studies in which European Canadians/Americans reported higher empathic concern and a higher frequency of support seeking, compared with the Japanese participants. The results of Studies 1 and 2 showed that empathic concern mediated the cultural differences in support seeking. Studies 3 and 4 expanded on this and showed that expectation of others' prosocial willingness explained the link between empathic concern and support seeking and repressive suffering construal explained the cultural difference in empathic concern. The findings suggest that, compared with Westerners, East Asians with lower empathic concern are likely to have a lower expectation of others' prosocial willingness, which, in turn, prevents them from seeking support.

The second part of this dissertation investigated gene × childhood interactions on general trust and support seeking (Chapter 3). The results showed that childhood adversity only significantly predicted general trust of the participants carrying the AA homozygotes of *OXTR* rs53576 (Study 1), whereas perceived parental attention only significantly predicted supports seeking of those carrying the GG homozygotes of *OPRM1* (Study 2). These findings support the differential susceptibility hypothesis and suggest that the effect of perceived parental attention on support seeking is modified by *OPRM1* polymorphisms.

The third part of this dissertation investigated social support seeking of international students (Chapter 4). Using a sample of Chinese international students in Japan, the results of Study 1 in Chapter 4 showed that home culture orientation predicted more distant support seeking, whereas host culture orientation predicted more close support seeking. Importantly, distant emotional support seeking partly explained the negative effect of home culture orientation and psychological adaptation. Using a sample of Chinese international students in U.S., Study 2 replicated and expanded on these findings showing that motivation to maintain networks in home country partly explained the positive link between home culture orientation and distant emotional support seeking. These findings suggest that international students' preference for distant/close support networks is influenced by their orientation toward the corresponding culture.

Lastly, Chapter 5 summarized the main findings of all 8 studies and discussed the limitations of this work and future directions of research on support seeking.

Table of Contents

Chapter 1: Introduction

Social Support Seeking

Social support is broadly defined as the experience or perception that one is loved, treasured, and cared for by someone (Cobb, 1976), which is considered as one of the major positive functions of social connection (Holt-Lunstad, 2018). It signifies that one is part of a network of mutual obligations and communication and may come from families, friends, romantic partners, communities, colleagues, and even from pets (e.g., McConnell et al., 2011; Taylor, 2011).

It has been long known that social support contributes to psychological and physical health (e.g., Barth et al., 2010; Charuvastra & Cloitre, 2008; Chida et al., 2008; Chu et al., 2010). Considerable evidence suggests that social support, particularly perceived social support, consistently is associated with low levels of negative psychological outcomes, such as depression and anxiety, in response to various stressful contexts, such as disasters (e.g., 9/11, Great East Japan Earthquake; Ando et al., 2017; Sasaki et al., 2019; Simeon et al., 2005), and chronic illness (e.g., cancer, diabetes, and heart disease; Sacco & Yanover, 2006; Shen et al., 2004; Simpson et al., 2002; Usta, 2012), which ultimately is beneficial to one's psychological well-being. For example, Chen et al. (2019) used the data from the 2014 China Longitudinal Aging Social Survey and found that social support from friends was related to lower risks for depression and loneliness among elderly people in China.

Also, past research consistently found that social support effectively helps ameliorate various physical diseases and increase survival (e.g., Holt-Lunstad, 2018). Shen et al. (2004), for example, found that perceived social support was associated with better posttreatment physical functioning of coronary heart disease patients. In a longitudinal interview of 50 Germans

diagnosed with acute myelogenous, leukaemia, Pinquart, Höffken, Silbereisen, and Wedding (2007) found that high levels of perceived social support increased survival for 2 years following diagnosis. The protective effect of social support on physical health may be through enhancing good health habits, promoting the use of more adaptive coping strategies (Zeidner et al., 2016), improving immune function or endocrine regulation (Taylor, 2011).

Social support literature suggests that the beneficial effect of social support could be produced through either the explicit transaction of resources from one person to another, or the perception of the availability of such social resources (Taylor, 2011). In most cases, however, to receive the support needed, people have to proactively enlist the resources they need from others first — *social support seeking*.

Social support seeking usually is categorized into *instrumental support seeking* and *emotional support seeking* (Carver et al., 1989), though the classifications may vary according to specific research focuses. Instrumental support seeking refers to seeking information, suggestions, or assistance from other people to resolve the stressful issues directly. Emotional support seeking refers to seeking understanding, consolation, or sympathy from others to mitigate the psychological distress induced by the stressful situations. While it is a general consensus among researchers that these two types of social support seeking are distinct conceptually, in actual practice, they often coincide (Aldwin & Revenson, 1987).

Social support seeking has been considered as one of the most effective coping strategies. Coping refers to cognitive and behavioral efforts to manage specific situations or events that are appraised as stressful (Carver & Connor-Smith, 2010; Folkman et al., 1986). While the way people cope with a specific stressful encounter may depend on the stressor types and available resources they have, there is some evidence suggesting that people habitually employ specific

coping strategies more frequently than others (e.g., Carver & Connor-Smith, 2010; Connor-Smith & Flachsbart, 2007; Moos & Holahan, 2003).

As perceived or received social support, the dispositional use of social support seeking has been positively linked to well-being. For instance, a weeklong diary study by Shiota (2006), in which participants were asked to record the most negative event of the day and how they handle it, found that those who sought social support more often (e.g., talking with a friend) reported lower distress and negative engagement (e.g., upset, nervous et al.) in general. Likewise, Larose and his colleagues (2002) found that the high frequency of social support seeking reported by a close friend was related to less self-reported loneliness.

However, previous work focused more on either the effect of receiving social support or perceived social support. By contrast, little work has examined the issues before social support receiving — social support seeking. We often take it for granted that people will seek and receive support when they are in need. So far, little has been known about why some individuals, compared to others, are more hesitant about seeking support even if they are badly in need of it. As a result, even though governments and organizations have been investing a lot in establishing various social support institutions, it is currently not clear whether these institutions could sufficiently be used by those in need. Thus, this dissertation aims at contributing to the social support literature by disclosing how cultural environments and early-life experiences could influence social support seeking.

Antecedents of Social Support Seeking

Before enlisting any support/help, people usually wonder how likely is that the person they turn into would say “yes” to their requests (DePaulo, 1982). Even a minor request entails a risk of being rejected. Being rejected is not a pleasant experience, which usually makes seekers

embarrassed, awkward, or even pained (e.g., Craighead et al., 1979; Downey & Feldman, 1996). The desire to avoid rejection has been suggested as a central human motive (Baumeister & Leary, 1995). Therefore, people may refrain from seeking social support to avoid being rejected if they expect that their requests are likely to be declined. Previous research has found that people tend to underestimate others' willingness to comply with a direct support/help request (Bohns et al., 2011; Flynn & Lake, 2008). And low expectation of others' willingness to provide support/help is suggested as a potential barrier to support/help seeking (Bohns & Flynn, 2021), though this association has not been examined directly.

Another prominent barrier to seeking social support is concern for social cost of enlisting support. Although the name or definition of social cost varied on research, it generally refers to the potentially negative implications of support seeking on social relationship (e.g., Kim et al., 2008; Lim et al., 2013; Taylor, Davis et al., 2004). For one thing, the first step in seeking support is to disclose one's vulnerability and need to others. People may perceive social support seeking as a sign of incompetence or inferiority, which makes the support seekers concerned that they would lose their face or relative social status as a result of seeking support (Lee, 2002). Also, disclosing one's plight may disrupt the harmony within the social groups by worrying others (Taylor, Davis et al., 2004). For another, social support seeking elicits others' resources to cope with one's own problem. Support seeking demands of others' time or effort. Therefore, even if the supporters are willing to support, the support seekers might still be concerned that they would be evaluated negatively as a result of burdening the supporters (Taylor, Davis et al., 2004). Taken together, despite the evident benefits of social support, social support seeking put the seekers at risk for being evaluated negatively. Such negative evaluation could ultimately influence the relationships between the support seekers and the supporters. For instance, the

supporters may think that the support seeker is not worthy of connection in the future because he or she is incompetent or burdensome. As a result, people may prefer not to ask for support if they are overly concerned about the potential social costs.

Of course, people's expectation of others' willingness to support and concern of potential social cost of support seeking can vary with situations (e.g., the event type, stressor severity et al.). For example, concern of social cost might be especially salient for a demanding request, whereas it might be negligible in other situations. They also can be considered as individual difference variables. Research has found that some people appeared to be more optimistic that their requests for support would be granted across situations than others (Bohns & Flynn, 2021). Although it is important to consider the influence of situational complexity in specific decision making, research on support seeking has suggested that the individual differences in the general expectations of the nature and possible outcomes of enlisting support are important determinants of the frequency with which people seek social support and the ways in which people prefer to request it (e.g., DePaulo et al., 1984; Ishii et al., 2017; Lim et al., 2013; Williams & Mickelson, 2008).

While a wealth of research has examined the influence of concern for potential social cost in social support seeking (e.g., Chang et al., 2020; Ito et al., 2015; Jiang et al., 2018; Kim et al., 2006), little attention has been paid to the role of expectation of others' willingness to support in social support seeking. This formed the motivations for Chapter 2 and Chapter 3, where I discussed how different cultural environments and childhood experiences (especially early parenting) would shape people's expectations of social support seeking and ultimately contribute to the variations in social support seeking.

In addition to predictors in the dispositional use of social support, another topic worthy of additional research attention is what influence people's decision of whom to approach when enlisting support. Previous research on this topic has focused on the influence of characteristics of stressors (e.g., event types, severity of stressfulness et al.) or perceived cost in the decision of whom to ask support for (e.g., Lee, 1997; Wang et al., 2010). For example, in a 10-day diary study, Wang et al. (2010) found that with the increase in perceived stressfulness of the events, students were more likely to turn to their families. However, this topic is still poorly understood, with relatively few research investigating other potential factors in the preference for support networks/providers. Instead of focusing on the attributes of stressors, this dissertation seeks to understand this topic from the perspective of social motivation.

MacGeorge et al. (2011) defined social support seeking as "intentional communicative activity with the aim of eliciting supportive actions from others" (p.330). Although exposing one's vulnerability has a risk of being judged negatively, it also signifies trust and intimacy toward the support providers. And people strengthen their connections with each other through social support transactions. Therefore, in addition to acquire coping resources, as a social interaction initiated by the support seekers, social support seeking might serve as an opportunity to develop and maintain a well-established social network (DePaulo et al., 1984). In this sense, besides the availability of support, whether people seek support may also be determined by the extent to which they want to engage with the support providers. Sometimes, people do not ask for support just because they are not willing to develop or deepen the existing relationship with specific others. Considering this, I speculated that the motivation to establish and maintain social relationship might be an important predictor of seeking support from certain networks/targets, which was the focus of Chapter 4. Specifically, using samples of international students, the

studies in Chapter 4 firstly attempted to examine whether students' support seeking from people back in their home country and from people in host country would be predicted by their motivation to engage with the corresponding networks.

Cultural Differences in Social Support Seeking

Now, this dissertation will review the representative cross-cultural research on social support seeking, which consistently reveals that compared with Westerners, East Asians are more reluctant to seek support from others in times of need (e.g., Ishii et al., 2017; Kim et al., 2006; Kitayama et al., 2009; Mojaverian et al., 2013; Mortenson, 2009; Taylor, Davis et al., 2004), and then discuss the possible explanations for the cultural differences in support seeking. But what is culture?

What is culture?

Culture is a dynamic and complex systems of meanings, practices, and associated mental functions and behaviors (Kitayama, 2002). A cultural meaning system is not something abstract in one's mind but externalized in various historically accumulated public artifacts and collective patterns of behaviors and psychological tendencies (Farr, 1991; Kitayama, 2002), including social institutions, daily practices, symbols, tools and so on. And these artifacts guide the way people think, feel and act in particular group, even if they rarely think about what the cultural meaning system is (Kitayama & Markus, 1999). Therefore, culture can be expected as one of the most important factors that shape one's behaviors and psychological processes.

According to the major norms and shared expectations of how a person is connected to his/her social networks (interdependent or independent), cultures can be fundamentally classified into 2 types: collectivism and individualism (Markus & Kitayama, 1991a; Triandis, 1989). In more collectivistic cultures, people tend to regard a person as fundamentally connected with

others and actively accommodate their social networks (that is, interdependent self-construal; Kim & Markus, 1999; Markus & Kitayama, 1991a). In these cultures, social relationships are relatively fixed and less voluntary (Adams & Plaut, 2003). People in more collectivistic cultures are inclined to subordinate their personal goals to the group goals and maintain the harmony of their groups (Triandis, 1989, 1993). By contrast, in more individualistic cultures, people tend to regard a person as separate from others and actively act on their own volitions (that is, independent self-construal; Markus & Kitayama, 1991a). In these cultures, social relationships are freely chosen and relatively fluid (Adams & Plaut, 2003). People in more individualistic cultures are expected to express their own beliefs and opinions, and achieve their personal goals (Kim & Markus, 1999). However, it is important to note that all individualistic and collectivist tendencies are available for all individuals and cultures, and just emphasized either more or less in each culture at certain times (Fiske, 1992; Kitayama, 2002; Triandis, 1993).

It is generally agreed that collectivism is prevalent in many East Asian countries (e.g., Japan, China et al.), whereas individualism is high in many Western countries, particularly North America (e.g., U.S., Canada et al.; Kitayama et al., 2007; Markus & Kitayama, 1991b; Triandis, 1993). Although it sounds dichotomous and there is criticism against it (see Oyserman et al., 2002), evidence has been accumulating that people in East and West are different in various psychological tendencies corresponding to the individualism-collectivism dimension. For example, research has demonstrated that European Americans are more likely than East Asians to favor products with unique characteristics (e.g., uncommon color; Kim et al., 1999), experience higher self-efficacy when influencing surrounding others (Morling et al., 2002), and associate their well-being with personal achievements (e.g., Kitayama, Mesquita, et al., 2006; Oishi & Diener, 2009). By contrast, East Asians favors common/popular choices more (e.g., Kim

et al., 1999; Liang & He, 2012), feel higher relatedness when adjusting themselves to others (Morling et al., 2002), and their well-being is more related to socially engaging emotion and interdependent goals (e.g., Kitayama, Mesquita, et al., 2006; Oishi & Diener, 2009).

Researchers have proposed some ideas on the origin of individualism-collectivism and factors fostering individualism (or collectivism) such as religion (e.g., Schulz et al., 2019), residential and relational mobility (e.g., Oishi & Kisling, 2013; Thomson et al., 2018), voluntary settlement (e.g., Kitayama & Bowman, 2010; Kitayama, Ishii, et al., 2006), subsistence style (e.g., Ang et al., 2021; Talhelm et al., 2014), and so on. The widespread of the Roman Catholic Church, for example, has been proposed to contribute to the great individualism by breaking the intensive kin-based institutions (e.g., banning cousin marriage) in Europe (Schulz et al., 2019). Besides the influence of Western European culture, researchers claim that the history of voluntary settlement also reinforce the individualism in North America (Kitayama et al., 2006). Rice farming that requires extensive cooperation (especially in irrigation) has been found to foster a tight and collectivism culture (Talhelm et al., 2014).

Social support seeking and relational concern

At first glance, the emphasis of East Asian society on social network and accommodating others could be confused with an inherently reliance on social support seeking to deal with daily stressors. As aforementioned, however, empirical findings totally refute this intuition. The first investigations to explore cultural differences in the dispositional use of social support were carried out by Taylor et al. (2004). Using both open-ended and closed-ended questions, Taylor et al. (2004) found that, compared with European Americans, Koreans (Study 1) and Asian Americans (Study 2 & Study 3) reported using social support for coping with stress less frequently. Likewise, a subsequent study by Mortenson et al. (2009) found that European

Americans not only viewed support seeking as a more favorable coping strategy but also sought social support more frequently, especially emotional support, than did Chinese. Using samples of undergraduates, Mojaverian, Hashimoto, and Kim (2013) further found that, in addition to daily interpersonal support seeking, Japanese students were less willing to seek help from professionals (e.g., psychiatrists, psychologists, and social workers et al.) than European Americans. Similar findings have also been found by several other cross-cultural/national studies examining different types of stressors (e.g., academic, health et al.) and samples (e.g., different generations of Asian Americans, Australians, and Singaporeans et al.; Kim et al., 2006; Wang et al., 2010; Wong et al., 2009). These findings constitute reliable evidence for cultural differences in social support seeking between Westerners (especially European Americans) and East Asians (including Asian Americans). But what aspects of East Asian culture leads East Asians' reluctance to seek support?

In prior research, concern for the potential social cost of seeking support, which is known as relational concern, has been suggested as an important factor contributes the cultural variation in social support seeking (Kim et al., 2006; Taylor, Davis et al., 2004). In this dissertation, relational concern is conceptualized as involving the extent to which a support seeker concerns that soliciting support is likely to disrupt social relationships (Taylor, Davis et al., 2004). Researchers in the field of cross-cultural psychology have argued that the emphasis of collectivistic cultures on maintaining harmony within social groups may make East Asians concern more about the potentially social cost of seeking social support than those in Western cultural contexts (Kim et al., 2008; Taylor, Davis et al., 2004). As aforementioned, social support seeking may undermine relationship harmony through worrying or burdening others. Therefore, to avoid these potential social costs, people in East Asian cultural contexts may prefer not to

disclose their distress to ask for the support or assistance of others. In support of this argument, Taylor and her colleagues (2004) invited two groups of undergraduate students consisting of Asian and Asian Americans and European Americans to discuss the reasons for the underutilization of social support by Asian Americans and Asians for dealing with stress (Pilot Study 3a). As expected, the explanations generated from the discussions were particularly related to the desire to avoid social cost of soliciting support including disrupting group harmony, being judged negatively, worrying others and so on. And follow-up studies further demonstrated that relational concern mediates the cultural differences in support seeking tendencies (e.g., Kim et al., 2006; Miller et al., 2017; Mojaverian et al., 2013; Taylor, Davis et al., 2004).

However, currently the literature on social support seeking still falls short in identifying the other factors accounting for this cross-cultural difference. As previously mentioned, in addition to relational concern, low expectations of others' prosocial willingness might also be an important barrier to seeking social support. Given the profound effect of cultures in people's behavioral and psychological tendencies in social situations, different cultural environments may also shape people's expectations of others' willingness to support. But how? In the light of a recent finding of the positive association between empathic concern and expectation of others' willingness to help (Bohns & Flynn, 2021), in this dissertation, I proposed that empathic concern might also contribute to the cultural differences in seeking social support through expectation of others' willingness to support. In the following paragraphs, this dissertation will elaborate the relations between empathic concern, expectations of others' prosocial willingness, and support seeking first, and then, present a brief review of existing research on cultural differences in empathic concern.

Empathic concern

Before delving into empathic concern, let me introduce the concept of empathy briefly. The English word "empathy" originated from the German word — Einfühlung literally referring to "feeling into" or projecting oneself into another environment or body (Ganczarek et al., 2018). Initially, Einfühlung was used particularly for artefacts in German aesthetics. However, its translation "empathy" has been widely used in the domain of psychology research ever since Lipps first appropriated Einfühlung for explaining how people understand the inner states of others (Lipps, 1903, 1907). In social psychology, empathy is broadly defined as a set of constructs relating to one's reactions to the observed experience of another. And these constructs generally can be categorized into either "cognitive reactions" or "emotional/affective reactions". The cognitive facet of empathy usually refers to the ability or process to project oneself into another, whereas the emotional facet of empathy are all feelings produced by witnessing another suffer, such as compassion, discomfort, and anger (Davis, 2018). Although psychology research regarding empathy exclusively focused on one or the other of these facets for a long time (e.g., Batson et al., 1987; Cuff et al., 2014; Kerr & Speroff, 1954; Stotland, 1969), now, the multidimensional approach of empathy has been widely accepted.

Empathic concern refers to the tendency to feel compassion and concern for unfortunate others (Davis, 1983), which is one of the two major reactively affective outcomes of empathy (Davis, 2018). The other is personal distress referring to the tendency to feel anxious and uncomfortable when seeing someone suffering (Davis, 2018). In a general sense, personal distress entails experiencing motivation to alleviate one's own aversive feelings (Batson et al., 1987). Hence, personal distress is usually considered as a self-centered emotional response (Davis, 1983). In contrast to personal distress, empathic concern is defined as an other-oriented

or prosocial emotional response, which produces a motivation to attenuate the distress of those who suffer (Eisenberg et al., 1994). Such concern for others' welfare can drive empathic individuals to act altruistically (Batson, 2010; Jordan et al., 2016; Schroeder et al., 1988).

The association between empathy and prosocial behaviors has been the topic of empirical research for half a century, which started around 1970 (Eisenberg & Miller, 1987). Considerable evidence supports that empathic concern promotes prosocial thoughts and behaviors (e.g., Dovidio et al., 1990; Eisenberg et al., 1989; FeldmanHall et al., 2015; Hu et al., 2015; Jordan et al., 2016; Omoto et al., 2009; Penner & Finkelstein, 1998). For instance, Levy, Antonio, and Peter (2002) found that high school students self-reporting more empathic concern toward sick children, homeless people and senior citizens were more willing to participant in volunteer activities to help the three groups. In a similar vein, Sze et al. (2012) found that, in addition to trait empathic concern, empathic concern experience (compassionate, sympathetic, moved) induced by watching videos portraying people in need (e.g., the Darfur crisis) positively related to later charitable donations to support the corresponding group. In addition to prosocial intention and behaviors in laboratory settings, an investigation by Unger and Thumuluri (1997) revealed that trait empathic concern was positively associated with volunteerism in the last year.

Further, a growing body of research suggests that dispositional empathic concern positively correlates to the provision of social support to romantic partners, families, friends, and colleagues. For example, using a sample of college students, Trobst et al. (1994) found that individuals high in trait empathic concern were more willing to offer social support to friends with alcoholism and strangers facing the break-up of a relationship. Devoldre et al. (2010) conducted a survey among 128 heterosexual married couples and found that wives self-reporting high empathic concern tended to offer more emotional support to their partners (Study 2).

Consistent with this pattern, Harber and his colleagues (2008) found that people with high empathic concern were more willing to provide nondirective support (e.g., letting the recipient know that you will be there whenever they need; Study 5).

Empathic concern and social support seeking

As an other-oriented construal, empathic concern has not received much attention in self-oriented behaviors. However, recent work suggests that, in addition to providing more help or support for others (e.g., Devoldre et al., 2010; Harber et al., 2008; Trobst et al., 1994), dispositional empathic concern is positively associated with the dispositional use of social support seeking (Sun et al., 2019; Williams et al., 2018). For instance, Williams, Morelli, Ong, and Zaki (2018) found that people high in dispositional empathic concern were more likely to recruit social resources to regulate their own emotions, such as drawing support from others. More recently, Sun, Vuillier, Hui, and Kogan (Sun et al., 2019) conducted a set of studies to explore the association between dispositional empathy and coping strategies. In the first 4 studies employing 3 different survey panels, the positive association between trait empathic concern and the frequency of seeking social support was consistently found. The last study (Study 5) collected data from the Cambridge BioResource Center. Consistent with previous findings, they further found that individuals carrying the Oxytocin receptor gene rs53576 (*OXTR* rs53576) GG genotype who were considered as high in empathic concern compared with AA genotype carriers (e.g., Gong et al., 2017; Huetter et al., 2016; Rodrigues et al., 2009; Smith et al., 2014), tended to seek more social support when coping with daily stress.

What account for the positive relation between empathic concern and social support seeking? One possibility is that trait empathic concern facilitates support seeking through increasing the expectation of others' willingness to provide support. As reviewed above, a

wellspring of evidence supports that empathic concern entails a great motivation for prosocial thoughts and behaviors (Davis, 2015). Such prosocial motivation may increase one's expectation of others' prosocial willingness through social projection: people expect that "others are like me" and automatically project what they know about themselves onto others (Krueger, 2007).

"Projection" has been suggested as the starting point for social inference or judgement and it just happens without any consciousness (Cadinu & Rothbart, 1996; Gramzow et al., 2001; Krueger, 2007). Although perspective taking can be achieved through effortful adjustment, the egocentric bias in social judgment remains leading to self-other correspondence (Epley et al., 2004; Nickerson, 1999). An early investigation by Kelley and Stahelski (1970), for instance, found that competitive people tended to expect more competitive behaviors from others in the Prisoner's Dilemma games. In another classic research, Ross, Greene, and House (1977) had the undergraduate students indicate whether you would follow a request described in a hypothetical scenario and estimate how likely other students would be to follow or refuse the same request, and found that students who agreed to the request expected that their fellow students would also be willing to say "yes" in the same situation.

Considering the egocentric bias in social judgment/inference, it is reasonable to assume that high empathic concern, characterized by a strong motivation to support others, can result in a high expectation of others' willingness to offer social support. And this assumption has been well supported by a recent research (Bohns & Flynn, 2021). Using a series of hypothetical helping scenarios, Bohns and Flynn (2021) found that people high in dispositional empathic concern did expect that others (general others) would be more willing to support them if they make a request. Another related evidence comes from two earlier studies by Markstrom et al. (2010) and Wilhelm and Bekkers (2010). The findings of these studies consistently suggested

that people high in empathic concern tended to a strong belief in the principle of care—that is, that people should help others in need (Markstrom et al., 2010; Wilhelm & Bekkers, 2010). And this caring belief has been found to motivate individuals to seek social support (Markstrom & Marshall, 2007). However, so far, no research has directly examined whether the positive association between empathic concern and support seeking results from the high expectation of others' prosocial willingness. This formed the second motivation for Chapter 2, in which I examined whether empathic concern would contribute to the cultural variation on support seeking trough expectation of others' willingness to support.

Cultural differences in empathic concern

As mentioned earlier, the dominant type of self-construal in Western cultures as independent and East Asian cultures as interdependent might suggest that people from East Asian cultures are more likely to feel sympathy toward unfortunate others, because the highly interconnected self-construal may facilitate the process of feeling what others feel which is essential for empathic concern. In perhaps the largest-ever cross-national study on empathy, Chopik, O'Brein, and Konrath (2017) examined how individuals from 63 nations around the world differed in dispositional empathy. Countries characterized with higher levels of collectivism had higher empathic concern. Since collectivism is usually higher in East Asian countries, this finding, to some extent, supports the previous assumption that East Asians with higher interdependent self-construal have higher empathic concern than Westerners do. Except this work, this assumption, however, is often violated in previous research studying the cross-cultural differences in empathy (e.g., de Greck et al., 2012; Kaelber & Schwartz, 2014; Lachmann et al., 2018). For instance, Xu et al. (2009) found that relative to Chinese college students, Caucasian students reported higher empathic concern. This finding is consistent with

work by Chung, Chan, and Cassels (2010) revealing that Western adolescents scored higher in dispositional empathic concern assessments than East Asian adolescents did. Beyond dispositional empathic concern, Atkins and his colleagues (2016) asked participants, after watching videos that a woman describing her socially painful experience, to report their empathy toward the targets in the videos. Although East Asian participants exhibited higher empathic accuracy, British participants showed greater empathic concern toward the targets suffering from social pain. Furthermore, in fact, Chopik et al. (2017) also found that compared to people from North America (e.g., Canada, U.S. et al.), those from East Asia (e.g., China, Japan et al.) reported lower empathic concern, even if in general (across 63 countries), the levels of collectivism were positively correlated to that of empathic concern. Why do East Asians with higher interdependent self-construal sympathize less with unfortunate others than Westerners with higher independent self-construal?

Most researchers interpreted these findings countering the intuitive assumption derived from the cultural differences in self-construal by emphasizing the importance of maintaining self-other differentiation in empathic concern (Decety & Lamm, 2006). In the context of empathy, East Asians whose sense of self depends more on those around them may be more likely to 'absorb' the distress of the unfortunate others. Internalizing others' distress may increase a motivation to decrease one's own distress leading less attention to the unfortunate. In this case, Westerners with high independent self-construal emphasizing the psychological distance between self and others may exhibit more other-oriented empathy for others' misfortune instead. However, recent research found that independent self-construal and interdependent self-construal both promoted empathic concern (Zhao et al., 2019). By conducting a survey among Mainland Chinese and Australian Caucasian, Zhao and her colleagues (2019) firstly investigated

the possible mechanisms underlying the cultural differences in empathic concern. They found that, although Australian Caucasian reported higher empathic concern than Mainland Chinese did, neither personal distress nor self-construal could well explain this cultural difference.

Taken together, the research reviewed above suggests that self-construal theory may not explicitly explain why East Asians reported lower empathic concern compared with Westerners. To the best of my knowledge, however, little research has attempted to explore any other explanatory variables for this cultural difference in empathic concern. Instead of focusing on self-construal, in this dissertation, I supposed that the lower empathic concern of East Asians observed might be due to the high prevalence of repressive suffering construal.

Repressive suffering construal (RSC) refers to interpreting suffering as the punishment for those who have violated the social norms and as serving to reinforce those norms (Sullivan et al., 2012). Although this kind of explanation for suffering has been examined and discussed in varied social phenomena, such as victim blaming and many other studies related to just-world theory or moral judgment (Hafer & Bègue, 2005; Lerner, 1980), the empirical investigation of how culture would influence the proclivity to interpret suffering in this repressive way is relatively recent.

The high prevalence of RSC in East Asian group can be expected for at least two reasons. For one thing, by warning against social violations, RSC contributes to the maintenance of social order and cohesion which is more emphasized in collectivistic/interdependent culture. For another, RSC not only elucidate the causal connection between suffering and social violations for individuals but also recognize the benefit of having people suffer for the whole society, which is more in line with the dominant thinking style of East Asians – holistic and dialectical thinking. It has been well documented that East Asians tend to believe that everything in the world somehow

is interconnected and contradictory elements (e.g., negative and positive) coexist in everything (Nisbett et al., 2001). And recent research has found that, compared with European Canadians, Chinese people are more likely to see the positive side of suffering and the COVID-19 pandemic (Ji et al., 2021). The direct association between collectivism and RSC also has been examined and supported by several studies. The first investigations to explore the association between collectivism and RSC was conducted by Sullivan et al. (2012). In the first study, Sullivan and colleagues (2012) found that dispositional collectivism was associated with the strong endorsement of RSC. Using 2 different self-construal priming methods (a pronoun-circling task in Study 2 and Study 3, and an open-ended writing task in Study 4), they consistently found that compared to people primed with individualistic self-construal, those primed with collectivistic self-construal were more likely to repressively interpret (hypothetical) others' suffering (e.g., AIDS, teenage suffering et al.; Sullivan et al., 2012). In a follow-up research, Sullivan et al. (2016) further examined this issue using a cross-cultural comparison approach. As expected, Chinese characterized with high collectivism were more likely to endorse that suffering induced by depression is necessary and effective for reinforcing social norms than Americans with relatively high individualism.

Together, the findings reviewed above formed reliable evidence that collectivist cultures enhance the endorsement of RSC. Such high proclivity to see suffering as the punishment for social norm violations might make East Asians more likely than Westerners to see suffering as more deserved, leading to lower empathic concern for the unfortunates. Consistent with this assumption, a recent research by Goetz and Peng (2019) found that compared with Americans, Chinese appraised suffering as more merited and reported less sympathy toward the sufferers. Whether this low empathic concern results from the high endorsement of RSC, however, is not

clear. This formed the third motivation for Chapter 2, where I examined whether RSC would mediate the cultural differences in empathic concern.

Childhood Experience and Social Support Seeking: The Role of Gene

The evidence has so far reviewed above indicated that different cultural norms significantly influence social support seeking. Now, let us shift our focus to the influence of childhood experience on social support seeking. It has been well known that, apart from culture, people's expectation of sociality and behaviours are also profoundly affected by their early-life experience. And the relation between childhood experience and support seeking has been documented (Taylor, 2011). Now, this dissertation will present a brief review of this line of research.

Childhood experience

The impact of childhood experience on support seeking behaviours can be inferred from its critical role in the development of interpersonal trust and sense of security in relationships. According to attachment theory, children's experiences with main caregivers give rise to a "working model" that shapes their self-evaluation and expectations of others in relationships (Bowlby, 1969; George & Solomon, 1996). Individuals who grew up in a caring, accepting, and responsive environment are more likely to internalize a positive "working model" that the self is worthy of love/support and others are reliable (Bowlby, 1969). With this positive expectation, secure people should be more confident about others' compliance with their requests and thus more willing to enlist support when distressed (Larose et al., 2001; Ognibene & Collins, 1998). Those who were neglected and rejected repeatedly during childhood, by contrast, tend to be attached insecurely and develop a negative "working model" of the self and others (Lyons-Ruth

& Jacobvitz, 1999; Zietlow et al., 2017). Specifically, children with neglectful caregivers might find it difficult to know when it is appropriate to ask for support. Over time, they are likely to develop a pessimistic belief about seeking social support (i.e., the expectation that asking for support is futile), and avoid relying on others (Ainsworth & Crittenden, 1989; Feldman & Downey, 1994). Once these "working models" are formed, they would persist and guide people's expectation about sociality across the rest of their lives (Bowlby, 2008).

Although little research has examined the direct effect of childhood experience on interpersonal trust in later life (more details provided in Chapter 3), the link between childhood experience and adult attachment has been well documented (e.g., Bifulco et al., 2006; Fraley, 2019; Hinnen et al., 2009; Unger & De Luca, 2014). Nevertheless, extensive research has been conducted into the direct link between childhood experience and social support seeking (e.g., Allbaugh et al., 2018; Gaylord-Harden et al., 2010; Kliewer et al., 1996; Larose et al., 2001; Meesters & Muris, 2004; Ruchkin et al., 1999; Seon et al., 2021). As would be expected, indexes of positive parenting/family environment, such as perceived parental warmth and maternal acceptance, were positively associated with social support seeking in later life (e.g., Gaylord-Harden et al., 2010; Larose et al., 2001; Ruchkin et al., 1999), whereas indexes of childhood adversity, such as emotional abuse and domestic violence, were related to the decreased use of social support (e.g., Allbaugh et al., 2018; Seon et al., 2021). For example, Allbaugh and her colleagues (2018) investigated 150 African Americans who experienced emotional abuse during childhood and found that the willingness to enlist support from families and friends decreased with the severity of emotionally abused experience. And attachment security did account for the link between childhood abuse and support seeking (Allbaugh et al., 2018).

Differential susceptibility hypothesis

Although childhood experience, especially early parenting, has a long-term influence on the varied aspects of one's life, it should be noted that people vary in the degree to which they are influenced by the same experience. Not all individuals with adverse childhood, for instance, suffer attachment disorganization and have troubled relationships in later life. Likewise, those who grew up in a supportive and enriching environment do not have the same degree of felt security in relationships. Why so? Taking the evolutionary perspective, Belsky (1997) theorized differential susceptibility to environmental influence in children, which reflects a variation of rearing strategies to transmit one's genes in unpredictable environments. It is evident that developmental plasticity enables parents to prepare their children for the anticipated future. And of course, if the eventual environment quite matches with their anticipation, higher plastic children are more likely to succeed in survival and reproduction. Future environment, however, is always unpredictable. Compared with individuals with a lower degree of environmental susceptibility, it would be more costly for those who were heavily shaped by their early environment to adapt to an unexpected environment. Thus, high plasticity or susceptibility is not preferable in all situations. Instead, from the perspective of evolution, the interindividual variation in susceptibility is more advantageous to maximize the likelihood of survival and reproduction in a potentially changing environment. In this sense, natural selection should promote individual differences in environmental susceptibility. But what contributes to one's susceptibility?

One of the important markers of differential susceptibility is a genetic one: some people are more genetically susceptible to environmental influence (Belsky et al., 2009). People with particular genes are not only more vulnerable than others to the negative impact of adversity, but

also tend to benefit more from the supportive and enriching experiences (Belsky & Pluess, 2009). This differential susceptibility hypothesis has been supported by research into Gene × Environment (G × E) interactions.

The first clear evidence for differential susceptibility hypothesis came from an investigation of the serotonin transporter gene (*5-HTTLPR*) by Taylor et al. (2006). Extending a breakthrough discovery on G × E interactions that *5-HTTLPR* moderated the impact of childhood maltreatment on depressive symptomatology (Caspi et al., 2003), using a sample of young adults, Taylor et al. (2006) found that individuals homozygous for the short allele, relative to those with the l/l or s/l genotypes, were at greater risk for depression if exposed to an adverse family environment (retrospectively reported), but just the opposite if reared in a supportive family environment. Likewise, Hankin et al. (2011) investigated the moderating effect of *5-HTTLPR* on the association between early parenting and positive affect in a more fine-grained way, by having parents evaluate their own parenting behaviors (Study 1); a well-trained team code the parenting behaviors through watching videotapes of parent-child interaction in the laboratory (Study 2); youths self-report the parenting they received (Study 3). Across 3 studies, Hankin and his colleagues (2011) consistently found that compared with youths with s/l or l/l genotype, the positive association between early parenting and positive affect was stronger for those with s/s genotype. Moreover, van Ijzendoorn et al. (2012) conducted a meta-analysis of 30 studies (published before March 2012) examining the *5-HTTLPR* × Environment interaction on developmental outcomes among children and adolescents under 18 years of age. Results demonstrated that, in Caucasian samples, relative to l/l carriers, those with at least one short allele were more susceptible to both positive and negative environments.

In addition to *5-HTTLPR* polymorphism, the gene-environment interaction has been observed with the dopamine D4 receptor (*DRD4*) gene (e.g., Buchmann et al., 2014; Sasaki et al., 2011), the oxytocin receptor (*OXTR*) genes (e.g., Bradley et al., 2011; Brody et al., 2017; Burkhouse et al., 2016; Kim et al., 2010; Thompson et al., 2014), μ-opioid receptor genes (e.g., Carver et al., 2016; Troisi, Frazzetto, Carola, Di Lorenzo, Coviello, Siracusano, et al., 2011), and so on. Take *OXTR* rs53576 gene for example, in a longitudinal study of school children around 4 years of age, the change of parenting observed when children were 4 to 6 years of age predicted the change of children's relationship with teachers 2 years later (6-8 years of age),"for better and for worse", but only for children homozygous for the A allele (Hygen et al., 2017). And evidence for the μ-opioid receptor gene (*OPRM1*) suggested that the influence of early family environments in shaping individuals' social trait was greater for the G allele carriers than AA carriers (Carver et al., 2016).

Despite a growing body of evidence for Gene × Childhood interaction, to the best of our knowledge, no study has attempted to investigate whether the influence of childhood experience on support seeking would be moderated by certain environmentally sensitive genes. This formed the main motivation of Chapter 3, where I focused on perceived parental attention and μ-opioid receptor gene (*OPRM1*) and explored whether *OPRM1* genotypes and perceived parental attention would interactively influence individuals' support seeking in early adulthood.

Social Support Seeking of International Students

So far, this dissertation has discussed how different cultural environments and childhood experience shape individuals' support seeking regardless of the context and target. Although cultural background and early life experience have a long-term influence on people's behaviors, people adjust their default behaviors to varying degrees when adapting to a new environment.

For instance, people who have moved may be more motivated to seek support from local people to build more social connections regardless of their cultural background. Moving from the dispositional use of social support, this dissertation now will discuss social support seeking toward specific others by focusing on social support seeking of international students. Unlike other population groups, international students usually have two distinct support networks – the well-established network in their home country and the developing network in their host country, which enables researchers to investigate this issue directly.

Social support seeking and adaptation

International students are individuals who leave their own country to pursue higher education in another country. In today's increasingly globalized society, international students represent a considerable and continuously increasing population worldwide, particularly in developed countries (e.g., U.S., Canada, Japan et al.). Although the personal benefits of studying abroad are evident, including but not limited to the opportunities to see the world, learn foreign languages, and expand one's circles, the process of adapting to a new culture can be very challenging and stressful. During their stay, international students have to overcome the language barriers, adapt to different educational systems, establish a new circle, face discrimination, homesickness, and various practical problems (Smith & Khawaja, 2011). Prior research revealed that international students tend to have a higher rate of psychological health problems than domestic students (Mori, 2000).

Adaptation usually involves two aspects: psychological and sociocultural (Berry, 1997; Ward & Kennedy, 1994). Psychological adaptation is defined as to what extent an individual subjectively feels happy and comfortable living in the host country, whereas sociocultural adaptation refers to, at a more practical or behavioral level, how well an individual navigates his

or her daily life in the host country (Ward & Rana-Deuba, 1999). Prior research suggests that psychological adaptation and sociocultural adaptation always interrelate, though they are conceptually different and influenced by different variables (Demes & Geeraert, 2014; Ward & Kennedy, 1999). To clarify what factors contribute to international students' adaptation to life in the host cultures, several systematic reviews of literature on international students' adjustment have been published (e.g., Brunsting et al., 2018; de Araujo, 2011; Mesidor & Sly, 2016; Smith & Khawaja, 2011; Zhang & Goodson, 2011b) covering a wide range peer-reviewed papers published from 1968 to 2018 of international students in Western countries (though some of them only focused on international students in U.S.). Evidence of these reviews consistently suggests that social support is one of the most significant contributors to successful adaptation.

Social support seeking is a powerful way for international students to make their transition to an unfamiliar culture (Mallinckrodt & Leong, 1992). International students discuss their difficulties with their families, close friends, peers, and academic supervisors to get emotional comfort and assistance they need, which, in turn, facilitate their adjustment in a new cultural environment. As mentioned above, previous research into international students suggests that a greater amount or use of social support is associated with less acculturative stress and better adaptation overall (e.g., Bai, 2016; Cemalcilar et al., 2005; Misra et al., 2003; Yang & Clum, 1994). Other research, however, failed to find this beneficial effect of social support on cross-cultural adaptation. Researchers have proposed that the inconsistent findings on the effect of social support on international students' adaptation in the host country may be due to the different sources of social support, and it is important to distinguish between social support from host national groups and social support from co-national/other international groups (Geeraert et al., 2014; Hendrickson et al., 2011; Shu et al., 2020; Wang et al., 2012). Some research has

found that support/contacts from the host nationals was always beneficial to international students throughout their stay, while the benefits of co-national supports weakened over time (Geeraert et al., 2014; Hendrickson et al., 2011; Kashima & Loh, 2006). A recent meta-analysis on this topic, however, found that the positive effect of host national support on psychological adaptation was not significantly higher or lower than that of co-national support (Bender et al., 2019).

Instead of focusing on the nationality of support providers, Demes and Geeraert (2015) suggested that the neglect of geographical locations of support providers might be one possible reason for the inconsistent findings of the role of social support in cross-cultural adaptation. With the popularity of online communication, now, people can easily reach out to each other across large geographical distances. Through following around 2,500 international exchange students in over 50 different countries, Demes and Geeraert (2015) found that, in general, seeking social support from people in the host country (close support seeking) was associated with lower levels of stress, whereas seeking social support from people back in the home country (distant support seeking) was related to higher stress. These findings point toward the idea that distant support seeking might be detrimental to psychological adaptation, whereas close support seeking might promote adaptation to the host country. In line with this idea, using a sample of Chinese international students in Korea, Lee et al. (2011) found that the more Chinese students contacted with people back in China, the worse they emotionally adapted to Korea. Extended from these findings, in Chapter 4, I would examine further the roles of distant support seeking and close support seeking in international students' adaptation to the host society.

Despite a wealth of research into how various sources of social support influences international students' psychosocial adaptation in the host country, little attention to date has

been paid to what predicts international students' support seeking. This formed the main motivation for Chapter 4, in which I focused on acculturation orientation, and attempted to explore the association between acculturation orientation and these two types of social support seeking.

Acculturation orientation

Although the meaning of acculturation has been debated among researchers over the past century, Redfield et al. (1936)'s definition has been most widely quoted — "Acculturation comprehends those phenomena which result when groups of individuals having different cultures come into continuous first-hand contact, with subsequent changes in the original culture patterns of either or both groups." (p. 149). Acculturation orientation or strategies refers to the ways in which people navigate the process of acculturation (Berry, 2005). According to Berry's acculturative framework (1997), living in a new culture, all individuals must deal with the parallel issues of the relatively preference for maintaining their home culture (home culture orientation) and of the relatively preference for adopting or participating in the host culture (host culture orientation). Based on these two underlying issues, four distinctive acculturation strategies were proposed — integration, assimilation, separation, and marginalization. Integration refers to a high orientation toward both cultures, while marginalization refers to a low orientation toward both cultures. Assimilation involves a high orientation toward host culture but low orientation toward home culture, whereas separation involves a low orientation toward host culture but high orientation toward home culture. This typological approach has contributed to the understanding of acculturative processes and yield considerable research in the acculturation field. Due to the methodological concern on how to classify participants into these four acculturation strategies, however, a continuous approach that considering host culture orientation

and home culture orientation as two relatively independent and continuous variables has been preferred (Arends-Tóth & Van de Vijver, 2007; Demes & Geeraert, 2014; Ryder et al., 2000). Taking this approach, research has found that host culture orientation is positively associated with both sociocultural adaptation and psychological adaptation (e.g., Cemalcilar et al., 2005; Demes & Geeraert, 2014; Ryder et al., 2000; Taušová et al., 2019; Wang & Mallinckrodt, 2006; Zhang & Goodson, 2011a). Regarding the association between home culture orientation and cross-cultural adaptation, however, the findings were relatively ambiguous. Some research suggested that home culture orientation was negatively associated with psychological adaptation (e.g., Demes & Geeraert, 2014; Taušová et al., 2019), whereas other research found that home culture orientation unrelated to either psychological or sociocultural adaptation (e.g., Cemalcilar et al., 2005; Ryder et al., 2000; Wang & Mallinckrodt, 2006).

In addition to the basic issues regarding orientations toward home culture and host culture, another parallel issues that most international students must negotiate in are: "Is it of value to maintain my social network in my home country?" and "Is it of value to establish a new social network in the host country?" And the response to these two questions might depend on their acculturation orientation. For those with high home culture orientation, keeping in touch with the social network in their home country may be instrumental in maintaining their heritage. In the case of those high in host culture orientation, by contrast, individuals are likely to put more effort into their local networks in order to engage with the host society. The different attitudes towards these two social networks are likely to be reflected in the utilization of distant/close support seeking. As mentioned at the beginning of this Chapter, when multiple supportive networks are available, people tend to approach those who are able to meet their need for specific support (e.g., suggestions, finance et al.) and relational needs (Wright & Rains, 2013). In this sense, home

culture orientation is likely to be a promising predictor for distant support seeking, whereas host culture orientation may be a potential predictor for close support seeking.

Prior research into the association between acculturation orientation/strategies and social networks in the host country has found that international students with higher host culture orientation reported not only more support from local and international groups but also stronger ties with these two groups in the host country (Doucerain et al., 2017; Kashima & Loh, 2006; Szabó et al., 2020). For example, a longitudinal study by Doucerain et al. (2017) found that international students' host culture orientation assessed on average 27 days after their arrival in Canada significantly predicted more social interactions with the local group. Taken together, these findings support the idea that international students' acculturation orientation would prospectively influence their social engagement and suggest that the frequencies with which international students seek contact or support from people in the host country is likely to be influenced by their host acculturation orientation. Although no study has yet investigated the association between acculturation orientation and contacts with people back in home country, based on the findings on social contacts in host country mentioned, it makes intuitive sense to expect that home culture orientation would prospectively predict more distant support seeking.

Although considerable research has examined the direct effect of acculturation orientation on cross-cultural adaptation, there has been little attempt to investigate the mechanisms of "how" or "why" acculturation orientation affects adaptation to the host country. The little evidence comes from a study by Zhang and Goodson (2011a). Using a sample of Chinese international students in U.S., they found that host culture orientation was associated with social interaction with local people, whereas home culture orientation was unrelated to the interaction with the host nationals. In addition, more social interaction with the Americans mediated the positive effect of

host culture orientation on psychosocial adaptation (Zhang & Goodson, 2011a). These finding suggest that acculturation orientation may influence the adaptation in host country through motivating one's interactions with the corresponding social groups. Inspired by these findings, Chapter 4 examined whether the frequencies with which international students seek distant/close social support would be predicted by their home/host culture orientation respectively, and whether distant/close support seeking would contribute to the effect of home/host culture orientation on psychological adaptation.

Aims and Overview of the Dissertation

Overall, although it has been well known that both culture and childhood experience profoundly influence one's willingness to seek social support, the issues regarding how they work are poorly understood. In addition, despite a growing interest of the topic of support seeking, the predictors of decision of whom to seek support from remain to be known currently. With these in mind, by conducting three series of studies, this dissertation explored/suggested possible mechanisms underlying the effect of culture and childhood experience on support seeking respectively and examined what predicts distant and close support seeking of international students. Specifically, the studies of this dissertation are organized as follow.

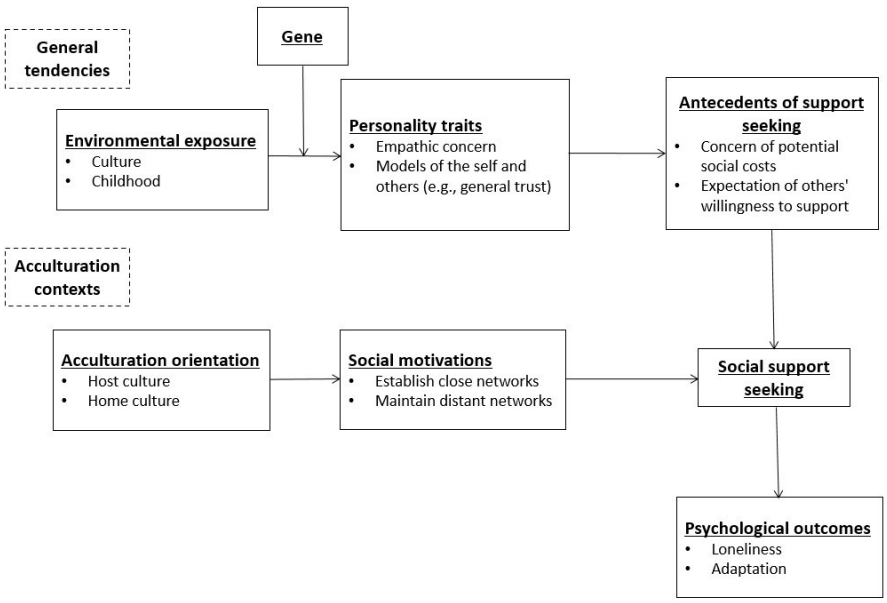


Figure 1 Overview of the research within this dissertation

Part 1. Cultural differences in social support seeking: the role of empathic concern (Chapter 2)

Chapter 2 presented 4 studies comprehensively examining the role of empathic concern in cultural differences in support seeking. Using samples of Japanese, European Canadians (Study 1), and European Americans (Study 2), Studies 1 and 2 aimed to examine, in addition to higher relational concern, whether lower empathic concern would explain why East Asians are less willing to ask for support when coping with stress than Westerners. Studies 3 and 4 built upon the first 2 studies and examined whether expectation of others' prosocial willingness would mediate the positive association between empathic concern and support seeking. Furthermore, to clarify the reason that East Asians exhibit lower empathic concern than Westerners, Study 4 examined whether RSC would mediate this cultural difference.

Part 2. Gene × Childhood interactions

(Chapter 3)

In Chapter 3, I presented 2 studies examining the interactions of gene and childhood experience on general trust and social support seeking respectively. To complete the theoretical basis on the association between childhood experience and support seeking, Study 5 examined whether adverse childhood experience would influence general trust in early adulthood. Also, Study 5 examined whether this association would be moderated by *OXTR* rs53576 polymorphisms. Study 6 built upon Study 5 and examined whether early parenting and *OPRM1* polymorphisms would interactively influence support seeking in early adulthood.

Part 3. Social support seeking of Chinese international students in Japan and U.S.

(Chapter 4)

Chapter 4 presented 2 studies examining the relations among acculturation orientation, social support seeking, and psychological adaptation. There are several aims in this chapter. The first aim was to examine the effect of distant and close support seeking on international students' psychological adaptation separately. Second, it aimed to investigate whether host/home culture orientation would predict close/distant support seeking respectively. Finally, it aimed to understand the mechanisms underlying the associations between acculturation orientation and psychological adaptation by examining whether social support seeking would mediate these associations. To seek initial support for these predicted relations, I conducted a survey among Chinese international students in Japan (Study 7). And Study 8 attempted to replicate and extend the findings of Study 7 in Chinese international students in United States.

In the end, Chapter 5 summarized the main findings from the previous three chapters and contextualized them in the broader literature. I then discussed the major limitations of the studies within this dissertation and some potential directions for future work on social support seeking such as culture × childhood × gene interactions.

Chapter 2: Cultural Differences in Social Support Seeking: The Role of Empathic Concern[1]

As reviewed in Chapter 1, the cultural differences in social support seeking have been well-documented. Compared with Westerners from individualistic culture (e.g., European Americans), East Asians from collectivistic culture are more reluctant to seek social support when coping with daily stress (e.g., Ishii et al., 2017; Kim et al., 2010; Mojaverian et al., 2013; Taylor, Davis et al., 2004; Wang et al., 2010). And high relational concern has been suggested to be an explanation for East Asians' reluctance to enlist social support, because maintaining harmony relationships weighs more than personal needs in collectivistic culture (Kim et al., 2008; Taylor, Davis et al., 2004). However, there have been little attempt to investigate other potential mediators of the cultural differences in support seeking. So far, our understanding of these cultural differences is still limited. In this chapter, I presented four studies in which I investigated whether empathic concern would explain the cultural differences in support seeking.

Empathic concern refers to feeling compassion and sympathy in response to those who suffer. Studies have shown that highly empathic people not only have a high expectation of others' prosocial willingness (Bohns & Flynn, 2021) but also are more willing to seek social support when coping with stress (Sun et al., 2019; Williams et al., 2018). Furthermore, East Asians have been found to have a lower empathic concern than Westerners (e.g., Chopik et al., 2017; Chung et al., 2010; Xu et al., 2009). The evidence from these studies implies that, in

[1] This Chapter is a modified version of:

Zheng, S., Masuda, T., Matsunaga, M., Noguchi, Y., Ohtsubo, Y., Yamasue, H., & Ishii, K. (2022). Cultural differences in social support seeking: The mediating role of empathic concern. *PloS One*, *16*(12), e0262001. https://doi.org/10.1371/journal.pone.0262001

addition to relational concern, empathic concern may play an important role in cultural variations in support seeking. Based on the positive link between empathic concern and support seeking, I speculated that lower empathic concern might be another reason that East Asians are more hesitant about seeking support than Westerners. And I tested this speculation in 4 studies.

In Study 1, I examined the association between empathic concern and support seeking by conducting a survey to a sample of undergraduate students in Japan and Canada. I hypothesized that European Canadian students would be more likely than Japanese students to seek explicit social support and would indicate higher levels of empathic concern. And empathic concern would explain cultural differences in social support seeking between the two groups.

In Study 2, I further tested whether empathic concern and relational concern would independently mediate cultural differences in social support seeking by administering a separate survey to a sample population of Japanese and European American. I anticipated that compared with European Americans, Japanese participants would report lower levels of empathic concern, higher levels of relational concern, and lower frequencies of social support seeking. And empathic concern and relational concern would mediate the cultural differences in social support seeking simultaneously. Additionally, Study 2 also explored whether cultural differences in social support seeking would further contribute to cultural differences in the degree to which feelings of loneliness are experienced.

As reviewed in Chapter 1, current literature contains abundant evidence supporting cultural differences in social support seeking tendencies; however, scant research has further investigated the psychological consequences of these cultural differences. Thus, Study 2 focused on loneliness as a potential social–emotional outcome of cultural differences in social support seeking. Loneliness refers to a distressing situation in which individuals subjectively perceive

deficiencies in certain social relationships (de Jong-Gierveld, 1987). Loneliness not only emerges as an outcome of personal experiences, but also occurs as a pervasive social phenomenon within a larger context (e.g., culture; Rokach et al., 2002). Although some research found the opposite pattern (e.g., Barreto et al., 2021), the majority of cross-cultural research on loneliness suggested that loneliness was generally more prevalent in collectivistic cultures than that in individualistic cultures (e.g., Dykstra, 2009; Lykes & Kemmelmeier, 2014). For example, past research found that, compared with Americans, Japanese and Chinese individuals reported greater degrees of loneliness (e.g., Anderson, 1999; LeClair et al., 2016; Pearl et al., 1990).

In most cases, loneliness arises when individuals fail to satisfy the need for belonging and intimacy. By reminding individuals that they still have supportive relationships, social support can help individuals restore their sense of belonging (Smart Richman & Leary, 2009) and thus, mute the feeling of loneliness (Hagerty et al., 1996). As reviewed in Chapter 1, prior research has revealed that not only receiving social support but also practicing support seeking behaviors can effectively relieve the state of loneliness (e.g., Kong & You, 2013; Larose et al., 2002; Rook, 1987). Along these lines, a high degree of hesitancy toward seeking social support may be a promising mediator in explaining why members of collectivistic cultures feel lonelier than those in individualistic cultures. In Study 2, I expected that Japanese participants would report higher degrees of loneliness than European American participants and that the cultural differences in loneliness would be explained by the cultural differences in empathic concern/relational concern and social support seeking.

Finally, using samples of Japanese and European Americans, Studies 3 and 4 aimed to clarify further the mechanisms underlying (1) the link between empathic concern and social support seeking, and (2) cultural differences in empathic concern respectively.

Although studies have demonstrated that dispositional empathic concern is positively associated with either support seeking (Sun et al., 2019) or expectation of others' prosocial willingness (Bohns & Flynn, 2021), no study has yet investigated whether expectation of others' prosocial willingness would explain the positive association link between empathic concern and social support seeking. To bridge this gap, in Study 3, with a controlled set of help-seeking scenarios, I had Japanese and European American participants report their expectation of others' willingness to provide help in each scenario. Also, the participants' general beliefs about others' willingness to help was assessed. I expected that, in both culture groups, empathic concern would be positively associated with expectation of others' willingness to help both in the help-seeking scenarios and general beliefs. And the positive association between empathic concern and beliefs about others' willingness to help, in turn, would explain the cultural differences in social support seeking.

There is considerable evidence for cultural differences in empathic concern. However, the existing literature falls short of explanations for these cultural differences. In Study 4, I examined whether repressive suffering construal would explain cultural differences in empathic concern. Collectivism has been associated with a high tendency to consider suffering to be instrumental for reinforcing social norms and see suffering as a punishment for social norm violations (Sullivan et al., 2012; Sullivan et al., 2016). I assumed that this teleological and casual view of suffering would explain the reason that East Asians have lower empathic concern than Westerners. To test this assumption, in Study 4, Japanese and European American participants were asked to report their endorsement of RSC. I expected that Japanese participants would report a higher endorsement of RSC and lower empathic concern than European American participants, and RSC would mediate the cultural difference in empathic concern.

Study 1

The goal of Study 1 was to seek initial support for the mediating effect of empathic concern on cultural differences in support seeking with a sample of Japanese and European Canadians.

Method

Ethics statement

Study 1 was reviewed and approved by the ethics committees at Nagoya University (Japan), Kobe University (Japan), and the University of Alberta (Canada). At the beginning of the study, the participants provided written informed consent. All responses were kept confidential.

Participants

A total of 407 Japanese undergraduate students participated, including students from Nagoya University, Japan (94 males and 110 females, M_{age} = 19.82, SD = 1.36) and from Kobe University, Japan (98 males and 105 females, M_{age} = 19.70, SD = 1.42). Also recruited for participation were 381 European Canadian undergraduate students from the University of Alberta, Canada (125 males, 254 females, and 2 unspecified, M_{age} = 19.45, SD = 2.16). The Canadian participants were prescreened based on their self-defined ethnicity. Based on cultural differences between Japanese and American individuals in their means of seeking support (elicited through four items on the Brief-COPE questionnaire) observed in Mojaverian et al. (2013), we anticipated that a sample of 358 from each culture was needed to ensure 95% power to detect effect size (d) = 0.27. Of the 788 participants recruited, 17 did not complete all the measurements

(six Japanese and 11 European Canadians), and thus, these participants were excluded, yielding a final sample size of 771 (401 Japanese and 370 European Canadians).

Measures

Empathic concern. Empathic concern was assessed by using the 7-item empathic concern subscale from the Interpersonal Reactivity Index (IRI; Davis et al., 1983). The empathic concern subscale measures an individual's general ability to feel concern and sympathy toward people suffering misfortunes. Participants were asked to rate how well each item described them using a 5-point scale ranging from *does not describe me well* (1) to *describes me very well* (5). Sample items included "*Sometimes I do not feel very sorry for other people when they are having problems*" (reverse scored) and "*I would describe myself as a pretty soft-hearted person.*" The Japanese translated version of the IRI used in this study was developed by Himichi et al. (2018), using the back-translation method, which confirmed adequate reliability and construct validity, for the Japanese participants. Cronbach's alphas were 0.80 for the Japanese sample and 0.67 for the European Canadian sample.

Support seeking. Support seeking were assessed by using the 2-item emotional support subscale and the 2-item instrumental support subscale from the Brief-COPE questionnaire (Carver, 1997), which is a short version of the COPE instrument (Carver et al., 1989). Participants were asked to rate how often they tried to employ the practice or behavior described by each item using a 5-point Likert-scale ranging from *not at all* (1) to *very much* (5). Sample items included "*I try to get emotional support from others*" (emotional support) and "*I get help and advice from other people*" (instrumental support). These subscales have been used in several prior studies to examine cultural differences in social support seeking (e.g., Mojaverian et al., 2013). Given the high consistencies reported for the four Brief-COPE support seeking items, I

used the average scores of these four items as an indicator of support seeking. The Japanese participants were presented with the Japanese translated items developed by Mojaverian et al. (2013) asking a Japanese-English bilingual to translate the original items and additional Japanese-English bilinguals to check the translated ones for accuracy. Cronbach's alpha coefficients for all four items were 0.91 for the Japanese sample and 0.91 for the European Canadian sample.

Results

Consistent with previous work, the results of the independent sample *t*-tests showed there were significant cultural differences in support seeking ($t(769) = -2.11$, $p = .035$, Cohen's $d = 0.15$) and empathic concern ($t(769) = -7.92$, $p < .001$, Cohen's $d = 0.57$). Compared to the Japanese sample ($M = 3.24$, $SD = 1.02$), European Canadians ($M = 3.40$, $SD = 1.02$) sought social support more frequently. European Canadians ($M = 3.83$, $SD = 0.83$) also reported higher empathic concern than Japanese participants ($M = 3.40$, $SD = 0.68$). Empathic concern significantly correlated to support seeking in both the Japanese ($r(399) = 0.24$, $p < .001$) and European Canadian ($r(368) = 0.28$, $p < .001$) samples.

I used the SPSS PROCESS macro (Model 4) developed by Hayes (2013) to test empathic concern as a mediator of cultural differences in support seeking. Before conducting the mediation analysis, the scores of empathic concern and support seeking were centering by using the means across all individuals, and culture was coded as European Canadian = 1 and Japanese = 0. The indirect effect was estimated using 10,000 bootstrapping samples and presented as 95% bias-corrected confidence intervals (CI).

The results of the mediation model analysis indicated that the total effect of culture (Canadian = 1 and Japanese = 0) on social support seeking ($b = 0.15$, $SE = 0.07$, $t(769) = 2.11$, p

= .035) was reduced when empathic concern was included in the model (b = 0.01, SE = 0.07, t(768) = 0.06, p = .950). The effect of culture on empathic concern was significant: b = 0.43, SE = 0.05, t(769) = 7.92, p < .001. Additionally, empathic concern positively predicted support seeking: b = 0.35, SE = 0.05, t(768) = 7.41, p < .001. More importantly, the indirect effect of empathic concern on the cultural differences in support seeking was significant: indirect effect = 0.15, SE = 0.03, 95% CI = [0.10, 0.21] (see Figure 2).

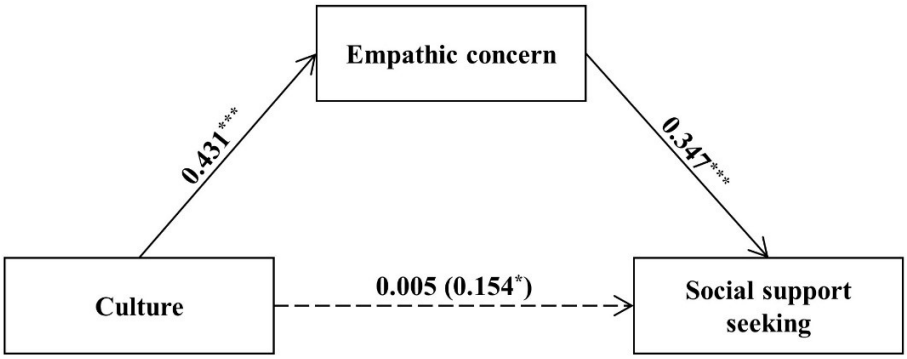


Figure 2 Mediation Model in Study 1

Note. Culture was coded as European Canadian = 1 and Japanese = 0.

*p < .05, ***p < .001

I also conducted another mediation model analysis with gender and age as covariates to test the robustness of this finding. The indirect effect of empathic concern remained significant, indirect effect = 0.12, SE = 0.03, 95% CI = [0.07, 0.18], indicating that the mediating effect of empathic concern was robust, even after controlling for the effects of gender and age. In addition, after controlling for the effect of gender and age, the mediating effects of empathic concern on

the cultural differences in emotional support seeking and instrumental support seeking were both significant (S Table 1).

Summary and discussion

Consistent with previous research, compared with the Japanese participants, the European Canadian participants reported higher empathic concern toward unfortunate others and sought social support during stressful times more frequently. More importantly, as predicted, empathic concern significantly mediated the cultural differences in social support seeking.

Study 2

The aim of Study 2 was to replicate the findings of Study 1 by surveying a nonstudent sample population of Japanese and European American participants. Because most previous research has focused on relational concern in explaining cultural differences in social support seeking, in Study 2, I examined whether relational concern and empathic concern would mediate the cultural differences in social support seeking simultaneously. In addition, given the association between social support seeking and loneliness (Larose et al., 2002), I also examined whether cultural differences in the degree to which loneliness is experienced would be partly due to differences in social support seeking tendencies.

The predictions were as following: European American participants would report higher levels of empathic concern, lower levels of relational concern, more frequent social support seeking, and less loneliness than Japanese participants (Prediction 1); social support seeking tendencies would negatively correlate with loneliness (Prediction 2); empathic concern and relational concern would both mediate the cultural differences in social support seeking (Prediction 3); and the cultural differences in loneliness would be mediated by the cultural

differences in empathic concern/relational concern and social support seeking, in that order (Prediction 4).

Method

Ethics statement

This study and the following 2 studies within this chapter were reviewed and approved by the ethics committee at Nagoya University. All responses were kept confidential.

Participants and procedure

I recruited a total of 496 Japanese participants (274 males and 222 females, M_{age} = 40.30, *SD* = 9.83) and 469 European Americans (233 males, 233 females, and three unspecified, M_{age} = 38.00, *SD* = 12.60) through online crowdsourcing marketplaces (Lancers for Japanese participants and Prolific for American participants). The American participants were recruited with filters on self-defined ethnicity (European American) and nationality (American). Based on the average effect size of Study 1 and Mojaverian et al. (2013) on cultural differences in support seeking, I expected that a sample of roughly 478 for each culture would be appropriate to detect an effect size (*d*) = 0.21. Nine participants (one Japanese and eight European Americans) were excluded because they did not complete the whole questionnaire. Therefore, the final sample size was 956 (495 Japanese and 461 European Americans). After consenting, the participants completed a questionnaire used to measure stressful events, support seeking, relational concern, empathic concern, and loneliness. They were then asked to report their demographic information.

Measures

Stressful events. As performed in previous research on support seeking (Ishii et al., 2017; Kim et al., 2006), participants were asked to first briefly describe the biggest stressful event they had come across within the previous three months and then choose the most relevant type from nine options for their own stressors (family relationship, friend relationship, romantic relationship, academic, health, financial, job, future, or other). After recalling their stressful events, participants were asked to rate the extent to which they perceived the events as stressful, negative, solvable, and controllable and the extent to which they felt responsible for the event by responding to five statements (e.g., "*I felt responsible for this event*") using a 7-point Likert scale (1 = *not at all*, 7 = *very much*).

Support seeking. As in Study 1, the participants indicated how often they tried to cope with their stressors by seeking social support using 5-point scales ranging from *not at all* (1) to *very much* (5) for two emotional support items and two instrumental support items from the Brief-COPE questionnaire (Carver, 1997). Cronbach's alphas for all four items were 0.86 for the Japanese sample and 0.88 for the European American sample.

Relational concern. Relational concern was assessed using an 11-item scale utilized in previous research (Kim et al., 2006). Because the current research only focused on relational concern, we did not include the items (two items) assessing the expectation of unsolicited social support in the original scale (13 items) for the main analyses. Even if the full scale (13 items) was used, the overall trends of the results remained (see S1 Text for more information). These items include several potentially negative implications of seeking support from others regarding interpersonal relationships, such as disrupting interpersonal harmony, making the problems worse, being criticized, and losing face. Sample items included "*I am concerned that if I tell the*

people I am close to about my problems, they would be hurt or worried for me" and "*I would be embarrassed to share my problems with the people I am close to.*" Participants rated how important each of the concerns would be for them in deciding whether to ask for support from others using 5-point scales ranging from *not at all* (1) to *very much* (5). The items were translated and back-translated between Japanese and English by two Japanese–English bilinguals. Japanese participants were presented with the Japanese translated items. Cronbach's alphas were 0.84 for the Japanese sample and 0.92 for the European American sample.

Empathic concern. As in Study 1, the measurement used for empathic concern was the 7-item empathic concern subscale from the IRI (Davis et al., 1983). Participants were asked to indicate how well each statement described them. Each item was rated using a 5-point Likert-scale ranging from *does not describe me well* (1) to *describes me very well* (5). Cronbach's alphas were 0.81 for the Japanese sample and 0.88 for the European Americans.

Loneliness. Loneliness was assessed using the Revised UCLA Loneliness Scale (R-UCLA; Russell et al., 1980). The R-UCLA is a 20-item scale designed to measure the experience of social isolation and loneliness in daily life. Sample items included "*I feel in tune with the people around me*" and "*I do not feel alone*" (reverse scored). Participants were asked to indicate how often they felt the way described by the statements using a 4-point Likert-scale ranging from *never* (1) to *often* (4). Japanese participants were presented with the Japanese translated version developed by Moroi (1992) that confirmed adequate reliability and construct validity. Cronbach's alpha coefficients were 0.95 for the Japanese sample and 0.95 for the European American sample.

Demographics. Participants reported their demographic information (age and gender) and their socioeconomic status (SES). SES was assessed using the MacArthur scale of subjective SES (Adler et al., 2000). Participants were asked to look at a picture of a ladder with 10 rungs,

representing the positions of people in their communities, and choose their own place on the ladder. The description of the ladder is as follows: “At the top of the ladder are the people who have the highest standing in their community (1). At the bottom are the people who have the lowest standing in their community (10).” The answers were reversely scored in the following analyses. A higher score represented a higher SES.

Results

Characteristics of stressful events

The results indicating the cultural differences in the types of stressors are depicted in Figure 3. Japanese participants were more inclined to describe stressful events related to family relationships (U.S. = 14.1%; Japan = 21.8%; $\chi^2(1, N = 956) = 9.59$, $p = .002$) and jobs (U.S. = 21.3%; Japan = 28.3%; $\chi^2(1, N = 956) = 6.30$, $p = .013$) than European Americans. European American participants were more likely to mention stressful events related to romantic relationships (U.S. = 5.2%; Japan = 1.4%; $\chi^2(1, N = 956) = 10.94$, $p = .001$) and academic issues (U.S. = 4.3%; Japan = 0.8%; $\chi^2(1, N = 956) = 12.16$, $p < .001$) than Japanese participants.

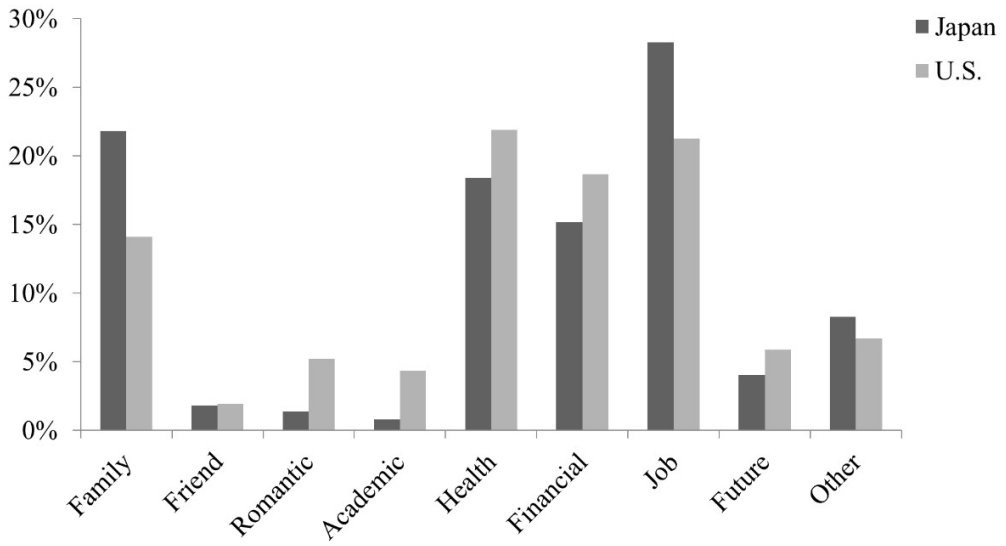


Figure 3 Cultural differences in the types of stressors in Study 2

In addition to the cultural differences in the types of stressors reported, Japanese participants perceived the events as more stressful ($t(881) = 3.56$, $p < .001$, Cohen's $d = 0.23$) and negative ($t(837) = 3.35$, $p = .001$, Cohen's $d = 0.22$) than the European American participants did. Furthermore, the Japanese respondents were also more inclined to perceive the stressful events as controllable ($t(891) = 5.29$, $p < .001$, Cohen's $d = 0.35$) and to believe they were responsible for the event ($t(888) = 7.45$, $p < .001$, Cohen's $d = 0.49$). No cultural differences were observed in the participants' responses regarding their ability to resolve stressful events ($t(873) = 0.64$, $p = .525$, Cohen's $d = 0.04$). Table 1 displays the mean scores by cultures.

Table 1 Means by culture in Study 2

	Japanese (N = 495)		European Americans (N = 461)					
	Mean	*SD*	Mean	*SD*	*t*	*df*	*p*	Cohen's *d*
Empathic concern	3.31	0.66	3.76	0.82	-9.34	885	<.001	0.609
Relational concern	2.93	0.69	2.54	0.92	7.44	847	<.001	0.486
Support seeking	2.53	0.94	2.95	1.03	-6.73	929	<.001	0.437
Loneliness	2.45	0.61	2.04	0.64	10.09	954	<.001	0.653
Stressful	6.22	0.82	6.00	1.02	3.56	881	<.001	0.232
Negative	5.88	1.19	5.57	1.64	3.35	837	.001	0.220
Responsible	4.07	1.83	3.08	2.25	7.45	888	<.001	0.486
Solvable	3.14	1.58	3.06	2.01	0.64	873	.525	0.042
Controllable	3.20	1.47	2.64	1.80	5.29	891	<.001	0.345

Cultural differences in variables under study

The results of the independent sample *t*-tests (Table 1) showed that the European Americans tended to report higher levels of empathic concern ($t(885) = –9.34$, $p < .001$, Cohen's $d = 0.61$) and more frequent support seeking ($t(929) = –6.73$, $p < .001$, Cohen's $d = 0.44$), whereas the Japanese tended to report higher levels of relational concern ($t(847) = 7.44$, $p < .001$, Cohen's $d = 0.49$) and show more loneliness ($t(954) = 10.09$, $p < .001$, Cohen's $d = 0.65$).

Study 2 was conducted in March 2020. Thus, some participants mentioned issues related to COVID-19 in their description of the stressful event. However, whether or not participants

mentioned COVID-19 did not influence either support seeking or loneliness, regardless of culture (see S Table 2 for more detail).

Correlational analyses

In both the Japanese and European American samples, empathic concern positively correlated with support seeking (Japan: $r(493) = 0.23$, $p < .001$; U.S.: $r(459) = 0.24$, $p < .001$), whereas relational concern negatively correlated with support seeking (Japan: $r(493) = –0.11$, $p = .020$; U.S.: $r(459) = –0.21$, $p < .001$). Moreover, significant negative correlations between support seeking and loneliness were observed in the Japanese ($r(493) = –0.28$, $p < .001$) and in the European American ($r(459) = –0.37$, $p < .001$) samples. Table 2 presents the results of the correlational analyses for both samples. Given that the dependent variables were significantly correlated with demographic variables and perceived characteristics of the stressful events, we included the demographic variables and the feelings related to the stressful events (i.e., stressful, negative, responsible, solvable, and controllable) as control variables in the mediation analyses.

Table 2 Pearson correlations by cultures in Study 2

	1	2	3	4	5	6	7	8	9	10	11	12
Demographic variables												
1 Age	-	0.19***	-0.10	-0.07	0.05	-0.12*	-0.11*	-0.08	-0.20***	0.14**	-0.12*	-0.10*
2 Gender (1 = female, 0 = male)	-0.04	-	0.07	0.17**	0.08	-0.08	-0.08	-0.09	-0.09	0.29***	0.07	-0.07
3 Subjective SES	0.03	0.07	-	-0.01	0.01	-0.03	-0.01	0.02	-0.09	-0.03	-0.00	0.02
Feelings for the stressful event												
4 Stressful	0.03	0.08	-0.02	-	0.46***	-0.11*	-0.16***	-0.19***	0.06	0.16**	0.25***	-0.04
5 Negative	0.06	0.01	-0.08	0.44***	-	-0.28***	-0.36***	-0.34***	0.06	0.10*	0.03	0.12**
6 Responsible	-0.07	0.14**	0.02	0.06	-0.12**	-	0.37***	0.54***	0.28***	-0.11*	-0.12**	0.26***
7 Solvable	-0.14**	0.05	0.11*	-0.10*	-0.27***	0.22***	-	0.54***	0.08	-0.20***	-0.01	-0.04
8 Controllable	-0.07	0.08	0.12**	-0.11*	-0.29***	0.21***	0.72***	-	0.18***	-0.17***	-0.09	0.06
Variables under study												
9 Relational concern	-0.02	-0.04	-0.10*	0.00	0.08	0.03	-0.05	-0.04	-	-0.25***	-0.21***	0.44***
10 Empathic concern	0.12**	0.15**	0.15**	0.10*	0.05	0.12**	0.05	0.08	0.01	-	0.24***	-0.26***
11 Support seeking	-0.07	0.17***	0.15**	0.13**	0.02	0.11*	0.09*	0.07	-0.11*	0.23***	-	-0.37***
12 Loneliness	0.01	-0.13**	-0.35***	0.01	0.12**	-0.02	-0.24***	-0.22***	0.23***	-0.34***	-0.28***	

Note. Correlations for the Japanese sample ($N = 495$) are below the diagonal, and correlations for the European American sample ($N = 461$) are above the diagonal. $^{*}p < .05$, $^{**}p < .01$, $^{***}p < .001$

Mediation analyses

First, I ran a multiple mediation analysis (Model 4) to examine whether empathic concern and relational concern could independently mediate cultural differences in support seeking. The results (Figure 4) showed that the effects of culture (European American = 1 and Japanese = 0) on empathic concern (b = 0.45, SE = 0.05, $t(946) = 8.89$, $p < .001$) and on relational concern (b = –0.25, SE = 0.06, $t(946) = –4.54$, $p < .001$) were both significant. Empathic concern positively predicted support seeking (b = 0.26, SE = 0.04, $t(944) = 6.14$, $p < .001$), whereas relational concern negatively predicted support seeking (b = –0.18, SE = 0.04, $t(944) = –4.62$, $p < .001$). Moreover, the total effect of culture on support seeking (b = 0.37, SE = 0.07, $t(946) = 5.39$, $p < .001$) was reduced when empathic concern and relational concern were included in the model (b = 0.20, SE = 0.07, $t(944) = 2.96$, $p = .003$). Both empathic concern and relational concern were found to significantly mediate the cultural differences in support seeking: indirect effect = 0.12, SE = 0.02, 95% CI = [0.07, 0.17] for empathic concern; indirect effect = 0.05, SE = 0.02, 95% CI = [0.02, 0.08] for relational concern (Table 3). Additionally, the results of the mediation analyses revealed that, with 95% confidence, the difference in these two indirect effects (d) was significant, d = 0.07, SE = 0.03, 95% CI = [0.02, 0.13]. This indicated that the mediating effect of empathic concern was stronger than that of relational concern.

I then ran a serial mediation analysis (Model 80) to further examine whether empathic concern/relational concern and support seeking could jointly mediate the cultural differences in loneliness. The results (see Figure 4) indicated that both empathic concern (b = –0.19, SE = 0.02, $t(943) = –7.70$, $p < .001$) and support seeking (b = –0.14, SE = 0.02, $t(943) = –7.72$, $p < .001$) significantly reduced loneliness, whereas relational concern was positively associated with loneliness (b = 0.18, SE = 0.02, $t(943) = 8.19$, $p < .001$). Additionally, the total effect of culture

on loneliness (b = –0.29, SE = 0.04, t(946) = –6.69, p < .001) was reduced when empathic concern, relational concern, and support seeking were included in the model (b = –0.10, SE = 0.04, t(943) = –2.50, p = .013). More importantly, two serial mediating effects were supported: indirect effect = –0.02, SE = 0.00, 95% CI = [–0.03, –0.01] for culture → empathic concern → support seeking → loneliness; indirect effect = –0.01, SE = 0.00, 95% CI = [–0.01, –0.00] for culture → relational concern → support seeking → loneliness (see Table 3). Furthermore, the indirect effect of cultural differences on loneliness through support seeking was also significant: indirect effect = –0.03, SE = 0.01, 95% CI = [–0.05, –0.01].

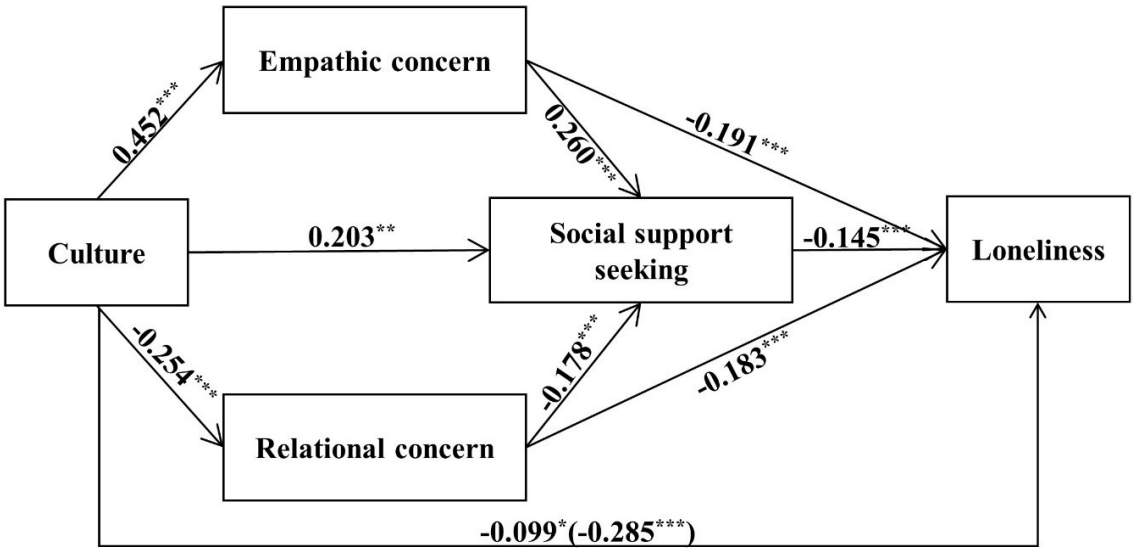


Figure 4 Mediation model in Study 2

Note. Culture was coded as European American = 1 and Japanese = 0.

Gender, age, SES, and five related feelings for the stressful events were included as control variables.

*p < .05, **p < .01, ***p < .001.

Table 3 Indirect effects in Study 2

	Indirect effect	*SE*	95% CI
culture → empathic concern → support seeking	0.117	0.025	[0.073, 0.171]
culture → relational concern → support seeking	0.045	0.015	[0.021, 0.081]
culture → empathic concern → support seeking → loneliness	-0.017	0.005	[-0.027, -0.009]
culture → relational concern → support seeking → loneliness	-0.007	0.002	[-0.012, -0.003]
culture → support seeking → loneliness	-0.029	0.011	[-0.053, -0.009]
culture → empathic concern → loneliness	-0.086	0.016	[-0.120, -0.056]
culture → relational concern → loneliness	-0.047	0.013	[-0.073, -0.024]

As in Study 1, I also performed the mediation analyses (Model 80, Bootstrap = 10,000) for emotional support seeking and instrumental support seeking, respectively. The results showed that all four serial mediating effects were significant (see S Table 1).

Summary and discussion

As predicted, the European American participants indicated more concern for unfortunate others, less concern about the relational implication of seeking social support, a greater likelihood of seeking social support during stressful times, and less loneliness compared with the Japanese participants. In addition, more social support seeking was significantly associated with less loneliness. More importantly, Study 2 found that empathic concern and relational concern jointly mediated the cultural differences in social support seeking. Finally, consistent with Prediction 4, the cultural differences in empathic concern/relational concern partly explained the cultural differences in loneliness through social support seeking.

In Study 2, compared with European American participants, the Japanese participants perceived the stressful events they described as more stressful, negative, and controllable and felt more responsible for the events. Although the levels of participants' feelings related to the events were controlled in a series of the multiple mediation analyses, the unexpected differences in the feelings across cultures suggest that a follow-up study is warranted for the examination of the associations among empathic concern/relational concern, support seeking, and loneliness in a more controlled setting—such as a hypothetical vignette including a commonly experienced stressful event.

Together, the findings of Studies 1 and 2 suggest that, in addition to higher concern about the negative implications of seeking social support on relationships, lower empathic concern for unfortunate others also helps explain why Japanese individuals are less willing than Westerners

(European Canadians and European Americans) to seek social support during stressful times. These findings, however, raised another two important questions: (1) "how" or "why" was empathic concern related to social support seeking? and (2) "why" did Japanese participants from relatively more collectivistic culture exhibited lower empathic concern toward unfortunates than European Canadians/Americans from relatively more individualistic culture? To examine these two questions respectively, I conducted Study 3 and Study 4.

Study 3

The goal of Study 3 was to unfold the link between empathic concern and support seeking by examining whether Japanese people with low empathic concern (vs. European Americans) would have a low expectation of others' willingness to provide help/ support from situational and dispositional approaches, and whether the dispositional expectation of others' willingness to help would illuminate the mediating effect of empathic concern on cultural differences in support seeking further.

Extending recent research showing that, in help-seeking scenarios, individuals with high dispositional empathic concern were more optimistic about probability of receiving help because of their high expectation of others' prosocial desire (Bohns & Flynn, 2021), I expected that, compared with Japanese people, European Americans with higher empathic concern would exhibit higher expectations of others' compliance with requests for help in help-seeking scenarios, and this cultural difference would be mediated by the higher estimations of others' desire to help.

In addition, taking a dispositional approach, participants' general beliefs about others' willingness to help was also assessed. I expected that European Americans with higher empathic

concern would believe that people are more willing to help others in general, which in turn would facilitate social support seeking when coping with their own stress.

Method

Participants and procedure

A total of 527 European Americans and 522 Japanese were recruited through online crowdsourcing marketplaces (Prolific for American participants and Lancers for Japanese participants). However, 149 participants did not complete the full questionnaire and 53 participants failed in the attention check questions. Therefore, the final sample size was 847 including 410 European Americans (234 males and 176 females, M_{age} = 35.42, *SD* = 12.08) and 437 Japanese (247 males and 190 females, M_{age} = 42.40, *SD* = 10.07).

Participants completed the questionnaire online in their first language. After providing informed consent, the participants briefly described the biggest stressor they had faced for the last three months. They then completed a series of self-reporting measures including social support seeking, empathic concern, and general beliefs of others' willingness to help. After that, the participants were presented with 3 help-seeking scenarios and were asked to read each scenario carefully and imagine how (general) others would response toward their help request raised in the situation.

Measures

Note that the materials used in Studies 3 and 4 were developed originally in English. And they were translated into Japanese by two Japanese-English bilinguals following the forward-backward translation procedure.

Stressful events. As in Study 2, the participants described the most stressful event that they had come across over the course of the past three months and rated the event on 5 appraisal dimensions (see Study 2 for details).

Support seeking. As in Study 1, social support seeking was assessed with two subscales from Brief-COPE (Carver, 1997): emotional support subscale (2 items) and instrumental support scale (2 items) (see Study 1 for details). Cronbach's alphas for all four items were 0.88 for the Japanese sample and 0.87 for the European American sample.

Empathic concern. Empathic concern was assessed, using the empathic concern subscale (7 items) of the IRI (Davis, 1983) (see Study 1 for details). Cronbach's alphas were 0.83 for the Japanese sample and 0.88 for the European Americans.

Beliefs about others' willingness to help. Following Bohn and Flynn's (2021) research, the participants' general beliefs in others' willingness to help was assessed using 3 items. Participants rated to what extent they agreed that "*People are generally generous with their time*", "*People are generally willing to help other out in a bind*", and "*People enjoy helping others*" using 7-point scale ranging from *strongly disagree* (1) to *strongly agree* (7). Cronbach's alphas were 0.76 for the Japanese sample and 0.85 for the European American sample.

Help-seeking scenarios. Participants respond to three scenarios adapted from Flynn and Lake (2008) in which they were asked to imagine making requests of different targets: borrowing cell phone from passers-by, asking a neighbor to pick up a package for them, and asking passers-

by to help carry a stroller (See Table 4 for complete scenarios). In each scenario, participants estimated the probability that their request will be fulfilled (2 items): (1) "*How likely is it that someone would agree to this request?*" (1 = extremely unlikely, 7 = extremely likely) and (2) "*What percentage of people would agree if asked this request?*" (0-100%). Also, participants' expectation of others' desire to help in each scenario was assessed (2 items; 1 = not at all, 7 = extremely): (1) "*To what extent would someone want to help you in this situation?*" and (2) "*To what extent would someone enjoy helping in this situation?*" By collapsing participants' answers to these items across all three scenarios, three composite scores were created: (1) *expected likelihood of compliance*, (2) *expected percent compliance*, and (3) *expectation of others' desire to help* ($\alpha_{Japan} = 0.82$, $\alpha_{U.S.} = 0.81$).

Table 4 Help-seeking scenarios used in Study 3

Imagine you're running late for a doctor's appointment. You try hailing a taxi, but you're not having much luck. You decide to call your doctor to let her know you're running late. Unfortunately, your cell phone is dead and you fail to find a public phone booth. Then, you see someone who is just about to put their cell phone away, so you approach them, and ask, "Can I use your cell phone to make a phone call?
Imagine that UPS has been trying to deliver a package to your home for the past few days, but you haven't been available to sign for it. This package cannot be placed either in front of home or in a delivery locker. Now, you find a notice on your door that you can pick up the package at your local post office. You need to be at work during the hours the post office is open, but one of your neighbors has work hours that are more flexible. You knock on your neighbor's door. "The UPS office downtown is holding a package that was sent to me. Will you please go pick it up for me?" you ask.
Imagine that you are standing at the top of a staircase with a baby stroller. You need help carrying the stroller down the stairs. You catch someone's eye as they are walking

down the stairs and say, “Will you please help me with this?

SES. As in Study 2, the participants rated their SES in their communities using the MacArthur scale of subjective SES (Adler et al., 2000; see Study 2 for details).

Results

Characteristics of stressful events

As the results of Study 2, Japanese participants mentioned more stressful events related to their jobs (U.S. = 17.6%; Japan = 24.9%; $\chi^2(1, N = 847) = 6.86$, $p = .009$), whereas European American participants mentioned more stressful events about romantic relationship (U.S. = 6.1%; Japan = 1.1%; $\chi^2(1, N = 847) = 15.19$, $p < .001$) and academic issues (U.S. = 7.1%; Japan = 1.4%; $\chi^2(1, N = 847) = 17.35$, $p < .001$; Figure 5).

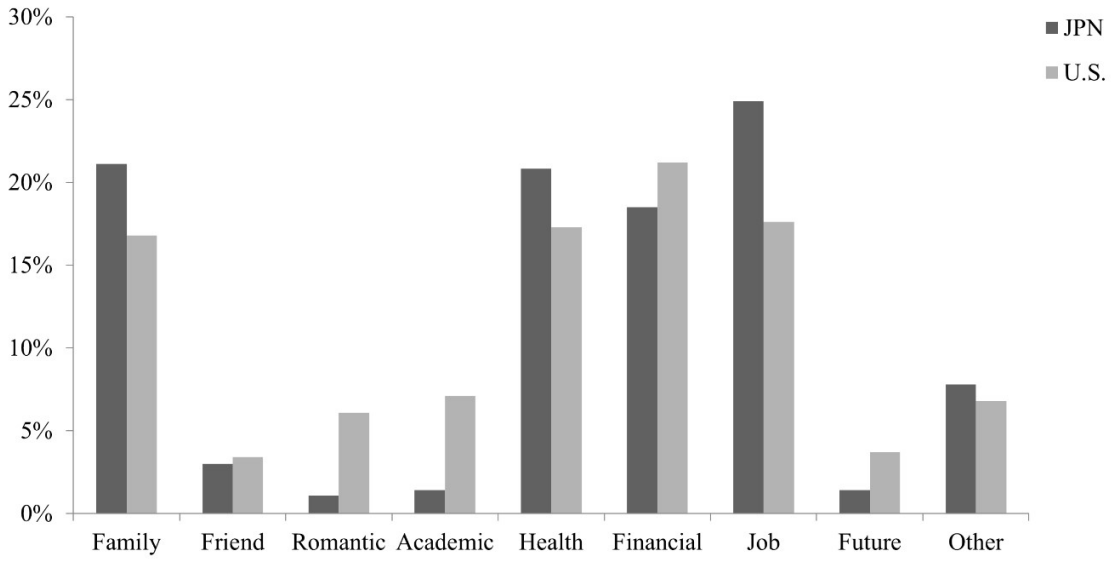


Figure 5 Cultural differences in the types of stressors in Study 3

There was no cultural differences in average stressfulness of the stressful events($t(751) = 1.23$, $p = .219$, Cohen's $d = 0.08$), though the Japanese participants evaluated the events they reported as more negative ($t(692) = 4.11$, $p < .001$, Cohen's $d = 0.28$) than the European American participants did. Also, the Japanese participants were more likely to perceive themselves as responsible for the event ($t(794) = 2.86$, $p = .004$, Cohen's $d = 0.20$). Interestingly, compared with the Japanese respondents, the European American respondents perceived the events as less controllable ($t(793) = 2.66$, $p = .008$, Cohen's $d = 0.18$), but more solvable ($t(764) = -3.38$, $p < .001$, Cohen's $d = 0.23$). Table 5 displays the mean scores by cultures.

Table 5 Means by cultures in Study 3

	Japanese (N = 437)		European Americans (N = 410)					
	Mean	*SD*	Mean	*SD*	*t*	*df*	*p*	Cohen's *d*
Empathic concern	3.37	0.65	3.90	0.81	-10.53	788	<.001	0.726
Others' willingness to help	3.89	1.01	4.66	1.13	-10.45	845	<.001	0.718
Support seeking	2.56	1.02	3.13	1.08	-7.99	845	<.001	0.549
Feelings for the stressful events								
Stressful	6.18	0.80	6.10	1.08	1.23	751	.219	0.085
Negative	5.94	1.04	5.56	1.62	4.11	692	<.001	0.285
Responsible	4.14	1.78	3.74	2.16	2.86	794	.004	0.197
Solvable	3.27	1.54	3.69	2.02	-3.38	764	<.001	0.233
Controllable	3.36	1.54	3.05	1.87	2.66	793	.008	0.184
Help-seeking scenarios								
Expected likelihood of compliance	3.91	1.18	4.65	1.03	-9.66	841	<.001	0.663
Expected percent compliance	47.10	19.17	57.80	16.63	-8.70	840	<.001	0.597
Others' desire to help	3.78	1.01	4.54	1.10	-10.54	845	<.001	0.725

Cultural differences in variables under study

As the results of Studies 1 and 2, the results of the independent sample *t*-test (Table 5) showed that, compared with the European Americans, the Japanese reported lower levels of empathic concern ($t(788) = -10.53$, $p < .001$, Cohen's $d = 0.73$), and less support seeking ($t(845) = -7.99$, $p < .001$, Cohen's $d = 0.55$). Importantly, as predicted, compared with the Japanese, the European Americans tended to have higher beliefs about others' willingness to help ($t(845) = -10.45$, $p < .001$, Cohen's $d = 0.72$).

Help-seeking scenarios. As expected, the European Americans, compared with the Japanese, had higher expectations of others' compliance with requests for help in help-seeking scenarios: expected likelihood of compliance ($t(841) = -9.66$, $p < .001$, Cohen's $d = 0.66$) and expected percent compliance ($t(840) = -8.70$, $p < .001$, Cohen's $d = 0.60$). In addition, compared with the Japanese, European American participants also expected others to have a higher desire to help them ($t(845) = -10.54$, $p < .001$, Cohen's $d = 0.73$).

Correlational analyses

In both cultures, empathic concern was positively correlated to beliefs about others' willingness to help (Japan: $r(435) = 0.36$, $p < .001$; U.S.: $r(408) = 0.29$, $p < .001$) and social support seeking (Japan: $r(435) = 0.36$, $p < .001$; U.S.: $r(408) = 0.29$, $p < .001$). As expected, beliefs about others' willingness to help was also positively correlated to social support seeking (Japan: $r(435) = 0.19$, $p < .001$; U.S.: $r(408) = 0.20$, $p < .001$).

In addition, empathic concern was positively related to the estimations of others' desire to help (Japan: $r(435) = 0.28$, $p < .001$; U.S.: $r(408) = 0.19$, $p < .001$) and compliance with the request for help (Likelihood: Japan: $r(435) = 0.22$, $p < .001$; U.S.: $r\ (408) = 0.17$, $p = .001$;

Percentage: Japan: $r(435) = 0.18$, $p < .001$; U.S.: $r(408) = 0.18$, $p < .001$). Table 6 presents correlations among the variables in each culture.

Table 6 Pearson correlations by cultures in Study 3

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Covariates														
1 Age	-	-0.03	-0.01	0.13**	0.14**	-0.19***	-0.01	-0.12*	0.06	-0.12*	0.10	-0.00	-0.02	0.07
2 Gender (1 = male, 0 = female)	0.08	-	0.02	-0.11*	-0.03	0.00	-0.01	0.06	-0.31***	-0.10	-0.06	-0.05	-0.04	0.04
3 Subjective SES	-0.01	-0.03	-	-0.05	-0.02	-0.04	0.03	0.03	0.04	0.08	0.02	0.02	0.01	0.03
Feelings for the stressful event														
4 Stressful	0.02	-0.09	-0.04	-	0.41***	0.04	-0.02	-0.14**	-0.14**	-0.14**	-0.01	-0.00	0.00	0.01
5 Negative	0.09	0.04	-0.12*	0.53***	-	-0.16**	-0.29***	-0.37***	0.06	-0.03	-0.10*	-0.11*	-0.11*	-0.11*
6 Responsible	0.03	0.01	-0.06	0.05	0.04	-	0.23***	0.53***	-0.04	-0.01	0.04	0.01	0.03	0.03
7 Solvable	-0.12**	0.02	0.11*	-0.22***	-0.34***	0.03	-	0.53***	-0.02	0.13**	0.17**	0.11*	0.10*	0.20***
8 Controllable	-0.07	-0.04	0.07	-0.15**	-0.27***	-0.01	0.70***	-	-0.08	0.08	0.12*	0.10*	0.11*	0.15**
Variables under study														
9 Empathic concern	0.16**	-0.19***	0.01	0.09	0.03	0.09	-0.06	-0.02	-	0.28***	0.29***	0.17**	0.18***	0.19***
10 Support seeking	-0.08	-0.09*	0.08	0.11*	0.07	0.09	0.11*	0.01	0.18***	-	0.20***	0.15**	0.08	0.23***
11 Others' willingness to help	0.06	-0.08	0.11*	-0.03	-0.11*	0.13**	0.08	0.08	0.36***	0.19***	-	0.39***	0.40***	0.55***
Help-seeking scenarios														
12 Likelihood of compliance	-0.02	-0.12**	0.15**	-0.06	-0.10*	0.08	0.07	0.08	0.22***	0.06	0.43***	-	0.84***	0.64***
13 Percent compliance	0.02	-0.08	0.14**	-0.05	-0.10*	0.08	0.07	0.08	0.18***	0.07	0.41***	0.93***	-	0.58***
14 Others' desire to help	0.01	-0.08	0.16**	-0.05	-0.05	0.14**	0.05	0.06	0.28***	0.11*	0.49***	0.75***	0.76***	-

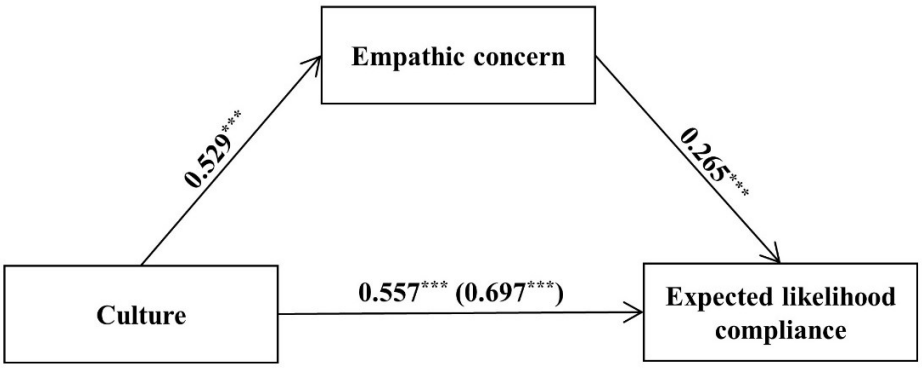
Note. Correlations for the Japanese sample ($N = 437$) are below the diagonal, and correlations for the European American sample ($N = 410$) are above the diagonal. $^{*}p < .05$, $^{**}p < .01$, $^{***}p < .001$.

Mediation analyses: Help-seeking scenarios

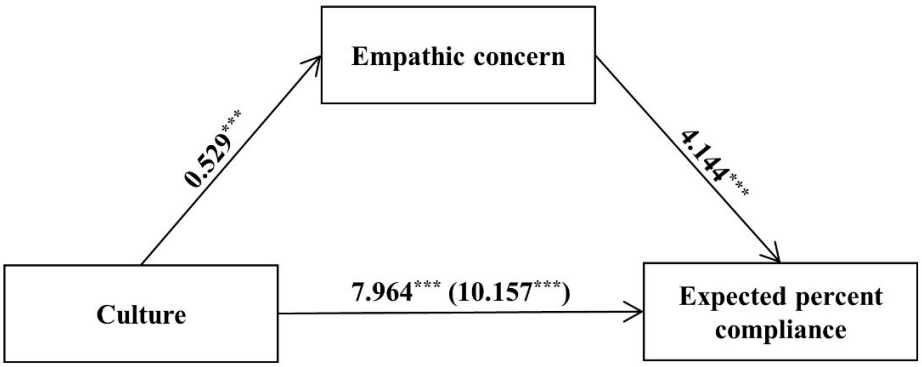
First, to test whether empathic concern would mediate the cultural differences in the expectations of others' compliance with requests for help in help-seeking scenarios, mediation analyses were conducted by using Model 4 of Hayes's (2018) SPSS macro PROCESS v3.4, with 95% bias corrected CI based on 10,000 bootstrapping samples. Gender, and SES all were included in all the models as control variables. The results showed that the effect of culture (European American = 1 and Japanese = 0) on empathic concern (b = 0.53, SE = 0.05, $t(843)$ = 10.67, $p < .001$) was significant.

Expected likelihood of compliance. The results showed that both culture (b = 0.56, SE = 0.08, $t(842)$ = 6.87, $p < .001$) and empathic concern (b = 0.27, SE = 0.05, $t(842)$ = 5.02, $p < .001$) significantly predicted the expected likelihood of compliance. In addition, the total effect of culture on expected likelihood of compliance (b = 0.70, SE = 0.08, $t(843)$ = 9.04, $p < .001$) was reduced after including empathic concern in the model. Importantly, empathic concern significantly mediated the cultural differences in the expected likelihood of compliance (indirect effect = 0.14, SE = 0.03, 95% CI = [0.08, 0.21]; Figure 6a).

Expected percent compliance. Both culture (b = 7.96, SE = 1.32, $t(842)$ = 6.04, $p < .001$) and empathic concern (b = 4.14, SE = 0.86, $t(842)$ = 4.82, $p < .001$) also significantly predicted the expected percent compliance. And the total effect of culture on expected percent compliance (b = 10.16, SE = 1.25, $t(843)$ = 8.10, $p < .001$) decreased when empathic concern was included in the model. As predicted, the mediating effect of empathic concern on the cultural differences in expected percent compliance was significant (indirect effect = 2.19, SE = 0.52, 95% CI = [1.21, 3.28]; Figure 6b).



(Figure 6a)



(Figure 6b)

Figure 6 Mediation models of empathic concern on cultural differences in the expected compliance

Note. Culture was coded as European American = 1 and Japanese = 0.

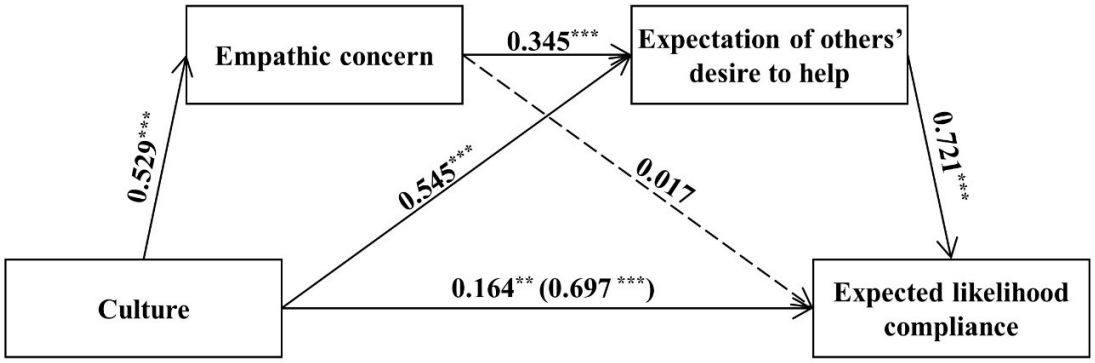
Gender and SES were included as control variables.

Second, serial mediation analyses (Model 6) were conducted to examine whether the effects of empathic concern on the cultural differences in expected compliance would be mediated by

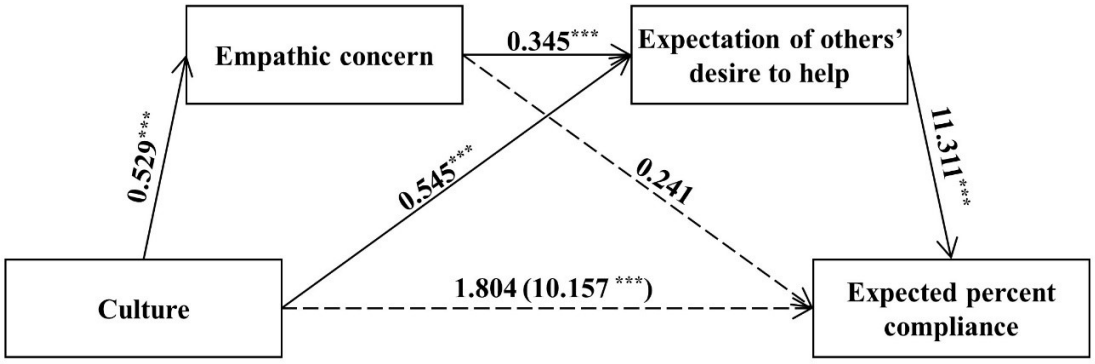
expectation of others' desire to help. Gender and SES were also included in all the models as control variables. The results showed that empathic concern was positively associated with expectation of others' desire to help (b = 0.35, SE = 0.05, t(842) = 6.93, p < .001). Also, the effects of culture on expectation of others' desire to help (b = 0.54, SE = 0.08, t(842) = 7.13, p < .001) was significant.

Expected likelihood of compliance. As predicted, expectation others' desire to help was significantly associated expected likelihood of compliance (b = 0.72, SE = 0.03, t(841) = 26.82, p < .001). After adding expectation of others' desire to help in the model, the effect of culture on expected likelihood of compliance was still significant (b = 0.16, SE = 0.06, t(841) = 2.68, p = .008), whereas the effect of empathic concern was not significant (b = 0.02, SE = 0.04, t(841) = 0.42, p = .676). Importantly, the serial mediating effect for culture → empathic concern → expectation of others' desire to help → expected likelihood of compliance was significant: indirect effect = 0.13, SE = 0.03, 95% CI = [0.08, 0.18] (Figure 7a).

Expected percent compliance. Likewise, expectation of others' desire to help positively predicted expected percent compliance (b =11.31, SE = 0.45, t(841) = 25.15, p < .001). After expectation of others' desire was included in the model, neither culture (b = 1.80, SE = 1.03, t(841) = 1.76, p = .079) nor empathic concern (b = 0.24, SE = 0.67, t(841) = 0.36, p = .718) significantly predicted the expected percent compliance. As predicted, the indirect effect for culture → empathic concern → expectation of others' desire to help → expected percent compliance was significant: indirect effect = 2.06, SE = 0.40, 95% CI = [1.34, 2.90] (Figure 7b).



(Figure 7a)



(Figure 7b)

Figure 7 Mediation models of expectation of others' desire to help on cultural differences in expected compliance

Note. Culture was coded as European American = 1 and Japanese = 0.

Gender and SES were included as control variables.

Mediation analyses: Social support seeking

Finally, I ran a serial mediation analysis (Model 6) to examine whether empathic concern would mediate the cultural differences in social support seeking through beliefs about others' willingness to help. Gender, SES, and all five related feelings for the stressful events were also included in the model as control variables (Figure 8).

The results indicated that the total effect of culture on social support seeking was significant (b = 0.52, SE = 0.07, t(838) = 6.92, p < .001). And the effect of culture on empathic concern was also significant (b = 0.52, SE = 0.05, t(838) = 10.23, p < .001). Both culture (b = 0.46, SE = 0.08, t(837) = 5.99, p < .001) and empathic concern (b = 0.48, SE = 0.05, t(837) = 9.92, p < .001) significantly predicted beliefs about others' willingness to help. Importantly, empathic concern (b = 0.25, SE = 0.05, t(836) = 4.78, p < .001) and beliefs about others' willingness to help (b = 0.12, SE = 0.03, t(836) = 3.43, p = .001) were both significantly associated with social support seeking. After adding empathic concern and beliefs about others' willingness to help, the effect of culture on social support seeking decreased (b = 0.30, SE = 0.08, t(836) = 3.84, p < .001). As previous 2 studies, the mediating effect of empathic concern on the cultural differences in support seeking was significant (indirect effect = 0.13, SE = 0.03, 95% CI = [0.07, 0.19]). More importantly, as predicted, the indirect effect for culture → empathic concern → beliefs about others' willingness to help → support seeking was significant: indirect effect = 0.03, SE = 0.01, 95% CI = [0.01, 0.05].

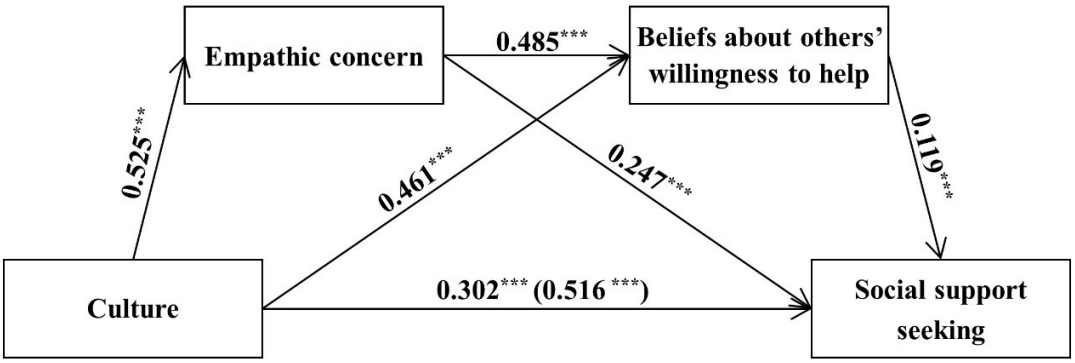


Figure 8 Mediation model of empathic concern on cultural differences in social support seeking through beliefs about others' willingness to help

Note. Culture was coded as European American = 1 and Japanese = 0.

Gender, SES, and all 5 related feelings for stressful events were included as control variables.

Summary and discussion

In sum, the results of Study 3 provide initial support for the mediating effect of expectation of others' prosocial willingness on the positive relation between empathic concern and support seeking. The results showed that, compared with the Japanese participants, European American participants with high empathic concern were more likely to assume that people are willing to help others whether in certain help-seeking scenarios or dispositional beliefs. And with this high expectation, the European American participants (vs. Japanese participants) were more confident that others will agree to their requests in help-seeking scenarios. Furthermore, Study 3 found that the mediating effect of empathic concern in cultural differences in support seeking partly came from its positive association with people's beliefs about others' willingness to provide help.

Study 4

Study 4 explored what produces cultural differences in empathic concern. To this end, participants reported to what extent they endorsed RSC. Given the positive link between collectivism and RSC, I expected that Japanese participants would report a higher endorsement of RSC than European American participants, and the cultural differences in empathic concern would occur via an indirect effect on RSC.

Also, Study 4 aimed to confirm further the relations among cultures, empathic concern, expectation of others' prosocial willingness, and support seeking. In the first three studies, social support seeking was assessed using the subscales of Brief COPE (Carver, 1997). The participants indicated the frequency with which they ask for support to cope stressful events in their lives. It raises the possibility that the cultural differences in support seeking observed were due to differences in the stressors that participants referred to. In Study 4, therefore, participants in both culture groups (Japanese and European Americans) were asked to report the likelihood they will seek instrumental and emotional support in a controlled set of stressful scenarios.

Based on the findings of the earlier studies, I expected that cultural differences in instrumental/emotional support seeking would emerge again: European American participants would report a higher likelihood that they will enlist instrumental/emotional support in response to the stressful events than Japanese participants. In addition, dispositional empathic concern and expectation of others' willingness to provide support in the scenarios would mediate these cultural differences.

Method

Participants and procedure

A total of 398 Japanese (210 males and 188 females, M_{age} = 42.25, *SD* = 9.95) and 388 European Americans (178 males and 210 females, M_{age} = 38.70, *SD* = 14.62) were recruited through Lancers and Prolific respectively.

After providing informed consent, participants were presented with 5 scenarios in which participants were asked to imagine themselves facing various stressful events. Participants were asked to read each scenario carefully and to indicate whether they would ask for support to handle the event. They then completed the measures of dispositional empathic concern, repressive suffering construal, and subjective SES.

Measures

Stressful scenarios. Participants responded to five scenarios in which they were asked to imagine themselves suffering in: family relationship, financial, health, and work (job challenge and communication challenge). The scenarios were designed to represent 4 most typical stressors that the participants reported in Studies 2 and 3. The description of events were adapted from the stressful events that the participants in Studies 2 and 3 described (Table 7).

Stressfulness. After reading each scenario, participants evaluated the stressfulness of the event ("*How stressful would you feel in this situation?*") using a 7-point scale (1 = not at all, 7 = very much).

Instrumental/Emotional support seeking. Participants then indicated the likelihood that they would seek support to cope with the event by answering two questions with a 7-point scale (1 =

extremely unlikely, 7 = extremely likely): "*How likely is it that you would ask advice or help from other people about what to do in this situation?*" (Instrumental support seeking) and "*How likely is it that you would seek comfort or understanding from other people in this situation?*" (Emotional support seeking). The average scores of the five support-seeking scenarios for each question were used as the indexes of instrumental support seeking ($\alpha_{Japanese} = 0.64$, $\alpha_{U.S.} = 0.67$) and emotional support seeking ($\alpha_{Japanese} = 0.73$, $\alpha_{U.S.} = 0.79$) in the following analyses.

Others' willingness to support. Finally, participants estimated others' willingness to provide support in the situation by answering two questions using a 7-point scale (1 = not at all, 7 = very much): "*To what extent would someone want to help or comfort you in this situation?*" and "*To what extent would someone enjoy helping or comforting you in this situation?*" The index of others' willingness to support was generated by averaging the scores of these items across the 5 scenarios. Cronbach's alphas were 0.88 for the Japanese sample and 0.89 for the European American sample.

Table 7 Stressful scenarios used in Study 4

Imagine: A coworker who was a team leader on an important project left unexpectedly. When she/he left, your manager asked you to take it over. However, you had never performed her/his job duties in the past. Although other colleagues said that they were happy to help if you need help, you are stressed out and overburdened.
Imagine: You are cut off by a sibling for some reasons. This makes you isolated because you two used to be very close. You know there is some misunderstanding between you. But she/he refuses to talk with you.
Imagine: Your income drops due to the reduced work hours. Although you are still able to pay all your bills and rent, you don't have enough saving for unexpected events. It is hard to find another source of income during the pandemic. You are concerned about the future.
Imagine: You are suffering from sleeplessness for some reasons. Last week, you had your

annual physical exam done. Unexpectedly, one of the results was far out of normal range. Your doctor told you that she/he was concerned. And she/he suggested you to take some time to rest and have another check in one month.

Imagine: You don't get along with your superior due to poor communication. She/He usually is not satisfied with what you do. You are easygoing and hardworking. However, you usually can't exactly get what your superior want. You like your job, so you really want to work this out.

Empathic concern. As in the previous 3 studies, the measure of empathic concern used was the 7-item empathic concern subscale from the IRI (Davis, 1983; see Study 1 for details). Cronbach's alphas were 0.84 for the Japanese sample and 0.91 for the European American sample.

Repressive suffering construal. The endorsement of repressive suffering construal was assessed using a 5-item measure of RSC developed by Sullivan et al. (2012). These items measure an individual's predisposition to interpret suffering in a causal and teleological way. Sample items included "*By and large, the people who suffer severely in life are the people who break society's rule*" and "*In many cases, it is necessary for people to suffer so that they won't do harm to society as a whole.*" The participants rated their agreement with each statement using a 7-point scale (1 = Strongly disagree, 7 = Strongly agree). Cronbach's alphas were 0.77 for the Japanese sample and 0.89 for the European American sample.

Subjective SES. As in Study 2, subjective SES was assessed using the MacArthur scale of subjective SES (Adler et al., 2000; see Study 2 for details)

Results

Repressive suffering construal

The independent sample *t*-tests (Table 8) showed that, compared with the European American participants, Japanese participants reported higher endorsement of repressive suffering construal ($t(759) = 9.55$, $p < .001$, Cohen's $d = 0.68$) and lower empathic concern ($t(748) = -8.38$, $p < .001$, Cohen's $d = 0.60$).

Table 8 Means by culture in Study 4

	Japanese ($N = 398$)		European Americans ($N = 388$)					
	Mean	*SD*	Mean	*SD*	*t*	*df*	*p*	Cohen's *d*
Empathic concern	3.47	0.69	3.93	0.84	-8.38	748	<.001	0.60
Repressive suffering construal	2.69	0.94	1.99	1.10	9.55	759	<.001	0.68
Stressful scenarios								
Stressfulness	5.96	0.76	5.53	0.88	7.11	763	<.001	0.49
Others' willingness to support	3.71	0.96	4.30	1.11	-7.93	761	<.001	0.57
Instrumental support seeking	4.68	1.07	4.86	1.18	-2.18	784	.030	0.16
Emotional support seeking	4.26	1.19	4.66	1.41	-4.22	755	<.001	0.30

To test RSC as a mediator of culture and empathic concern, a mediation analysis was conducted using the SPSS macro PROCESS v 2.13 (Model 4) developed by Hayes's (2013). As the previous studies, in all regression analyses of this study, age, gender, and subjective SES

were included as covariates, and culture was coded with Japanese = 0 and European American = 1.

The result showed that the total effect of culture on empathic concern (b = 0.43, SE = 0.06, $t(781) = 7.66$, $p < .001$) decreased when RSC was included in the model (b = 0.32, SE = 0.06, $t(780) = 5.47$, $p < .001$). Also, the effect of culture on RSC was significant (b = -0.73, SE = 0.08, $t(781) = -9.61$, $p < .001$). And as expected, RSC was negatively associated with empathic concern (b = -0.15, SE = 0.03, $t(780) = -5.93$, $p < .001$). Importantly, the results showed that, with 95% bias corrected CI based on 10,000 bootstrapping samples, the indirect effect of RSC on the relation between culture and empathic concern was significant: Indirect effect = 0.11, SE = 0.02, 95% CI = [0.07, 0.16] (Figure 9).

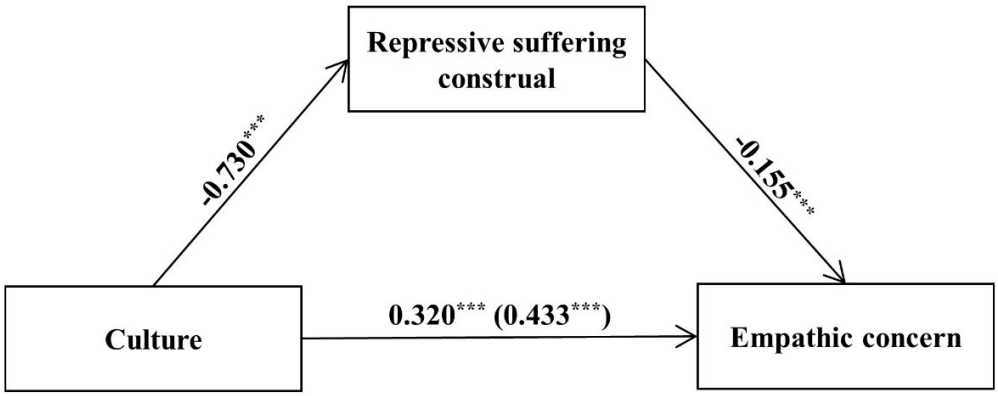


Figure 9 Mediation model of repressive suffering construal on cultural differences in empathic concern

Note. Culture was coded as Japanese = 0 and European American = 1.

Age, gender, and subjective SES were included as control variables.

Stressful scenarios

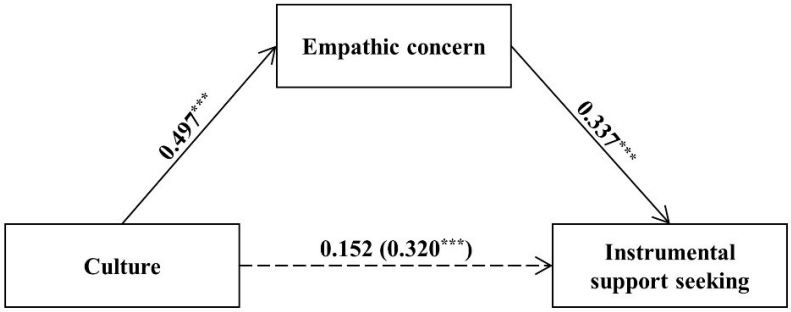
In general, the Japanese participants (vs. European American participants) perceived the scenarios more stressful ($t(763) = 7.11$, $p < .001$, Cohen's $d = 0.49$) and reported a lower likelihood of seeking instrumental support ($t(784) = -2.18$, $p = .030$, Cohen's $d = 0.16$) and emotional support ($t(755) = -4.22$, $p < .001$, Cohen's $d = 0.30$) in the situations (see Table 8). Additionally, the Japanese participants reported a lower expectation of others' willingness to support than European American participants ($t(761) = -7.93$, $p < .001$, Cohen's $d = 0.57$).

A series of mediation analyses then were conducted (PROCESS v 2.13 Model 4) to examine whether empathic concern would mediate the cultural difference in the likelihood of social support seeking. In addition to age, gender, and subjective SES, stressfulness of the events was also included in the model as a covariate, because the average stressfulness of the events differed by culture.

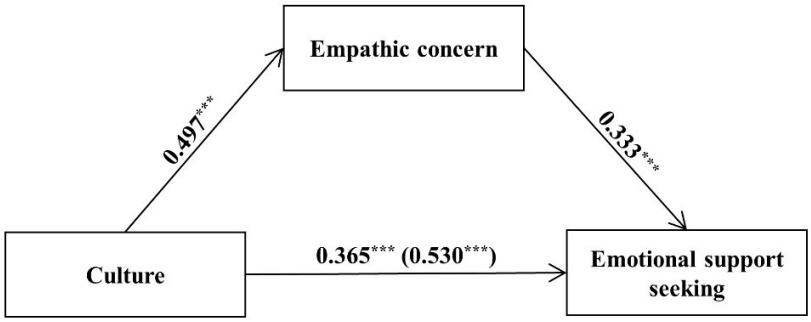
Instrumental support seeking. As expected, the likelihood of seeking instrumental support differed by culture ($b = 0.32$, $SE = 0.08$, $t(780) = 4.04$, $p < .001$). However, the direct effect of culture on instrumental support seeking was not significant ($b = 0.15$, $SE = 0.08$, $t(779) = 1.89$, $p = .059$) when empathic concern was included in the model. Empathic concern was significantly associated with instrumental support seeking ($b = 0.33$, $SE = 0.05$, $t(779) = 7.05$, $p < .001$). Furthermore, the bootstrapping results ($N = 10{,}000$) revealed a significant indirect effect of empathic concern on the association between culture and instrumental support seeking: Indirect effect = 0.17, $SE = 0.03$, 95% CI = [0.11, 0.24] (Figure 10a).

Emotional support seeking. The likelihood of seeking emotional support also differed by culture ($b = 0.53$, $SE = 0.09$, $t(780) = 4.04$, $p < .001$). And the total effect of culture on emotional support seeking was reduced ($b = 0.36$, $SE = 0.09$, $t(779) = 3.91$, $p < .001$) when empathic

concern was included in the model. Empathic concern positively predicted the likelihood of seeking emotional support (b = 0.33, SE = 0.06, t(779) = 5.98, p < .001). And the bootstrapping results (N = 10,000) showed that the indirect effect of empathic concern on the relation between culture and emotional support seeking was significant: Indirect effect = 0.17, SE = 0.03, 95% CI = [0.10, 0.24] (Figure 10b).



(Figure 10a)



(Figure 10b)

Figure 10 Mediation models of empathic concern on cultural differences in instrumental and emotional support seeking

Note. Culture was coded as Japanese = 0 and European Americans = 1.

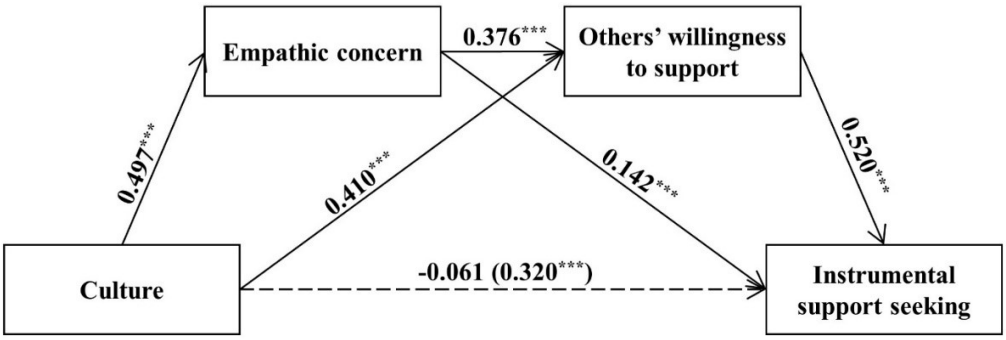
Age, gender, subjective SES, and stressfulness of the events were included as control variables.

Finally, serial mediation analyses (PROCESS v2.13 Model 6) were conducted to examine whether empathic concern would be positively associated with expectation of others' willingness to support, and whether this association would clarify the cultural differences in instrumental/emotional support seeking further. The results showed that the effect of culture (b = 0.41, SE = 0.08, $t(779) = 5.28$, $p < .001$) and empathic concern (b = 0.38, SE = 0.05, $t(779)$ = 8.13, $p < .001$) on expectation of others' willingness to support were both significant.

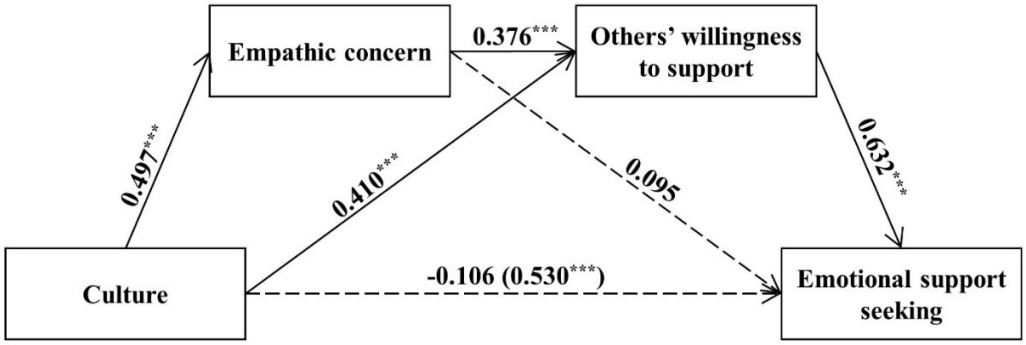
Instrumental support seeking. The total effect of culture (b = -0.06, SE = 0.07, $t(778)$ = -0.86, p = .389) and empathic concern (b = 0.14, SE = 0.04, $t(778) = 3.30$, p = .001) on instrumental support seeking decreased after adding expectation of others' willingness to support into the model. And expectation of others' willingness to support significantly predicted the likelihood of seeking instrumental support (b = 0.52, SE = 0.03, $t(778) = 16.18$, $p < .001$). As hypothesized, the indirect effect for culture → empathic concern → expectation of others' willingness to support → instrumental support seeking was significant: Indirect effect = 0.10, SE = 0.02, 95% CI = [0.07, 0.14] (Figure 11a).

Emotional support seeking. The total effect of culture (b = 0.11, SE = 0.08, $t(778) = 1.31$, p = .191) and empathic concern (b = 0.10, SE = 0.05, $t(778) = 1.93$, p = .054) on emotional support seeking was not significant when expectation of others' willingness to support was included in the model. Expectation of others' willingness to support was positively associated with the likelihood of seeking emotional support (b = 0.63, SE = 0.04, $t(778) = 17.23$, $p < .001$). Moreover, the results revealed a significant indirect effect for culture → empathic concern →

expectation of others' willingness to support → emotional support seeking: Indirect effect = 0.12, *SE* = 0.02, 95% CI = [0.08, 0.17] (Figure 11b).



(Figure 11a)



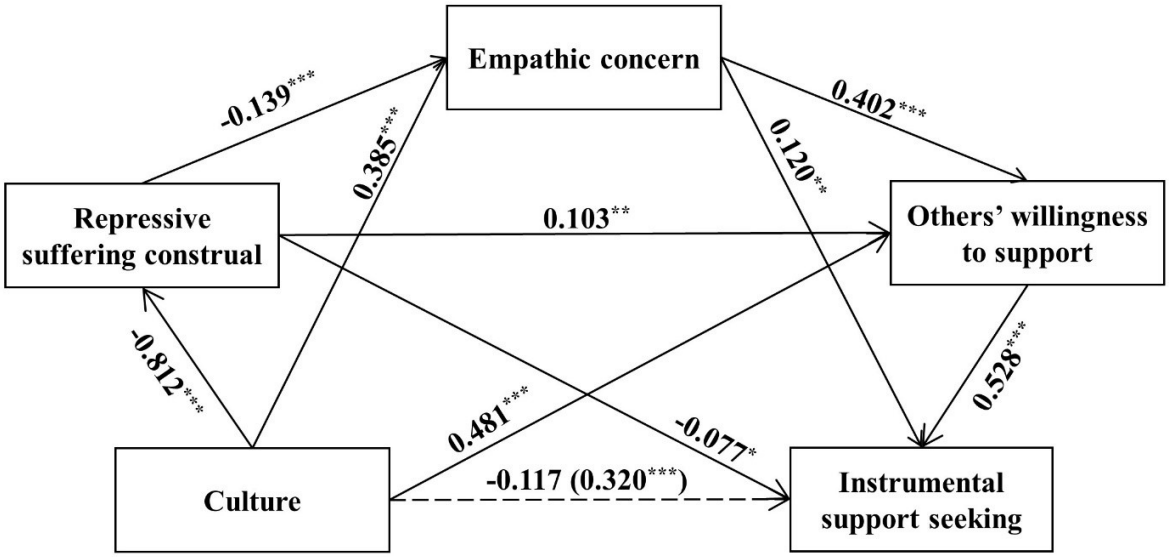
(Figure 11b)

Figure 11 Serial mediation models of empathic concern and others' willingness to support on cultural differences in instrumental and emotional support seeking

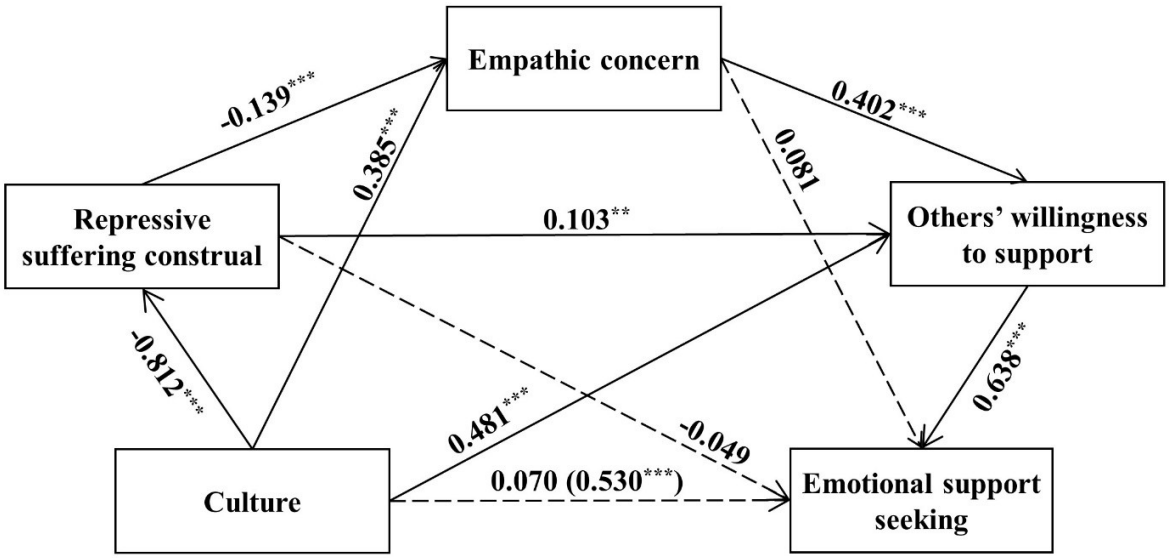
Note. Culture was coded as Japanese = 0 and European Americans = 1.

Age, gender, subjective SES, and stressfulness of the events were included as control variables.

The results remained when RSC was included in the models (Figure 12). Additionally, the indirect effect for culture → RSC → empathic concern → expectation of others' willingness to support → instrumental/emotional support seeking was significant (for instrumental support seeking: indirect effect = 0.02, *SE* = 0.01, 95% CI = [0.01, 0.04]; for emotional support seeking: indirect effect = 0.03, SE = 0.01, 95% CI = [0.02, 0.05]).



(Figure 12a)



(Figure 12b)

Figure 12 Full models in Study 4

Note. Culture was coded as Japanese = 0 and European Americans = 1.

Age, gender, subjective SES, and stressfulness of the events were included as control variables.

Summary and discussion

In sum, the results of Study 4 provide preliminary evidence for the mediating role of RSC in the cultural differences in empathic concern. Compared with European American participants, the Japanese participants reported lower empathic concern, which was due, in part, to their higher endorsement of RSC. Study 4 also provide additional evidence for the link between empathic concern and expectation of others' prosocial willingness. Across the five stressful scenarios, the European American participants reported higher expectation of others' willingness to provide support than Japanese participants. And consistent with the results of Study 3, this expectation explained the reason that the European American participants with higher empathic

concern reported more willingness to seek both instrumental and emotional support in the stressful scenarios.

General discussion

Although many researchers have explained the cultural differences in social support seeking tendencies based on cultural differences in relational concern, few researchers have investigated other factors to explain the cultural differences in social support seeking. Across four studies, I found evidence to suggest that, in addition to relational concern, empathic concern also explains cultural differences in social support seeking.

In the first 3 studies, I consistently found that European Canadians (Study 1) and European Americans (Studies 2 and 3) sought social support more frequently than Japanese individuals, when coping with stressful events in their lives, which was explained by cultural differences in the levels of empathic concern reported by the two groups. Specifically, compared with the Japanese, European Canadians/Americans were generally more concerned about unfortunate others and more willing to seek social support during stressful times. And, using a controlled set of stressful scenarios, this pattern of results was well replicated in Study 4. This cultural variation in empathic concern was partly explained by the higher endorsement of RSC among Japanese (Study 4). In Studies 3 and 4, I explored the reason underlying the positive link between empathic concern and support seeking and found that expectation of others' willingness to help accounted for this positive association. European Americans with higher empathic concern tended to have higher expectations of others' willingness to provide support, and this expectation promoted support seeking in response to stress. In addition, Study 2's findings revealed that Japanese participants exhibited higher loneliness than European Americans. The

cultural differences in loneliness can be attributed, in part, to cultural differences in social support seeking.

Individual differences in social support seeking

The current work is one of the few studies that examines the effect of empathic concern on social support seeking. Recent studies have shown that people with higher levels of empathic concern seek more social support for help in dealing with daily stress (Sun et al., 2019) and have more confidence about the likelihood of receiving the support they request (Bohns & Flynn, 2021). Using multicultural samples (Japanese, European Canadians, and European Americans), my research firstly demonstrates that the positive relation between empathic concern and social support seeking is partly explained by high expectation of others' prosocial willingness. These findings may imply that people with high empathic concern are willing to ask for support because they are more optimistic about the outcomes of enlisting support. In other words, highly empathic people may be concerned less about being rejected if they ask for support, which facilitates support seeking. These findings contribute to an understanding of individual differences in social support seeking tendencies. Social support helps people cope with daily stressful events, reduces the severity of mental and physical illness, and helps individuals adapt to new environments (Demes & Geeraert, 2015; House et al., 1988). Thus, it is important to understand why some people are reluctant to ask for help when they are in need. Based on the current findings, it appears that a pessimistic view of others' prosocial willingness prevents people with low empathic concern from asking for support. It would be rather useful for future work to further investigate these findings by manipulating expectation of others' prosocial willingness, to see whether increasing this expectation could promote lowly empathic people to seek support.

Cultural differences in empathic concern

The obtained findings provide the first evidence that the way people construe suffering partly accounts for the cultural variations in empathic concern. At first glance, the cultural mandates of interdependence in East Asia and independence in West might seem to suggest that East Asians would have a stronger feeling of sympathy for others' misfortune because their self is highly connected to others (Markus & Kitayama, 1991a). However, most of the previous evidence suggests the opposite pattern that East Asians have a lower empathic concern than Westerners (Atkins et al., 2016; Chopik et al., 2017; Xu et al., 2009). In line with prior studies, the present research demonstrates that, compared with people from Western countries (e.g., European Canadians and European Americans), individuals from Japan display less empathic concern for people in distress. Most previous studies interpreted this counterintuitive cultural pattern in empathic concern exclusively using self-construal theory. Specifically, Westerners exhibit higher empathic concern because they have a much clearer distinction between self and others, which is crucial for empathic processes (Decety & Lamm, 2006). A recent study, however, found that interdependent self-construal contributed to empathic concern as independent self-construal did (Zhao et al., 2019). Shifting the focus away from independent/interdependent self-construal, the present findings suggest that the higher proclivity to interpret suffering in a repressive way is one of the reasons that East Asians exhibit lower empathic concern for unfortunate others than Westerners. It suggests that East Asians are more likely to legitimate suffering by attributing it to social norm violations than Westerners. This finding supports the notion that collectivism predisposes people to interpret suffering as caused by social norm deviations (Sullivan et al., 2012), which ultimately contributes to the maintenance of social groups. However, this repressive suffering interpretation is likely to have East Asians

see unfortunates as more responsible for their own suffering (Goetz & Peng, 2019), and thus feel less sympathy for them. These findings help us understand why the counterintuitive culturally pattern in empathic concern emerges.

Empathic concern unpackaging cultural differences in social support seeking

In addition to the successful replication of the effect of relational concern (Study 2), the new findings of empathic concern mediating cultural differences in social support seeking in this research are noteworthy. Past research has suggested that, compared with Westerners, East Asians are more concerned with how explicitly enlisting support may detrimentally affect harmonious relationships and, thus, they are more reluctant to actively seek help from others (e.g., Taylor, Davis et al., 2004). Beyond that, the present findings suggests that lower level of sympathy for unfortunate others is another important reason that East Asians are more reluctant to seek social support than Westerners. Extending from the positive relation between empathic concern and expectation of others' prosocial willingness, this research further reveals that Westerners are more inclined than East Asians to think that people are willing to help others generally and, therefore, are more willing to seek support when in need. Interestingly, in both Studies3 and 4, empathic concern only partly explained the cultural differences in expectation of others' prosocial willingness, which may imply that there are other factors involved in these cultural variations. Why do East Asians (particularly Japanese) from interdependent cultures have a lower expectation of others' prosocial willingness than those form independent cultures? This may be an interesting area for future work.

Also, to clarify the mediating roles of empathic concern and relational concern, future works will need to address the possibility whether the underlying effects would depend on the

forms of social support seeking. Whereas this research demonstrated that empathic concern and relational concern mediated the cultural differences in explicit forms of social support seeking such as getting emotional support and advice from other people, it is unclear whether the mediating effects can be applied to more implicit forms of support seeking—defined as the emotional comfort experienced without disclosing one's problems and stress. Asians and Asian Americans likely benefit from implicit support seeking (Taylor et al., 2007). And those who tend to endorse adjustment goals are likely to emphasize relational concern as a motivating factor in deciding to seek implicit social support (Ishii et al., 2017). These previous findings imply a positive association between relational concern and implicit support seeking. In contrast, does empathic concern lead people to seek implicit support as well as explicit support when they have to cope with stressful events? Future work is necessary to address this question and expound upon our findings.

Implications of social support seeking

This research represents one of the first scholarly efforts to examine possible social-emotional outcomes of the cultural differences in social support seeking. The findings from Study 2 demonstrate that active social support seeking behaviors are effective in relieving loneliness (Larose et al., 2002), and that cultural differences in feelings of loneliness are partly due to cultural differences in social support seeking tendencies. Specifically, compared with European Americans, Japanese individuals with higher levels of relational concern but lower levels of empathic concern were more hesitant to seek social support in stressful times and, thus, suffered more loneliness. Accumulating evidence suggests that loneliness can trigger adverse outcomes on mental and physical health, such as depression (Matthews et al., 2016) and alcoholism (Åkerlind & Hörnquist, 1992). Moreover, both suicide ideation and incidents of

parasuicide increased with the levels of subjective loneliness (Ariel Stravynski & Richard Boyer, 2001). Loneliness is one of the highest risk factors for mortality (Holt-Lunstad et al., 2015). Given that unsolicited support is not always available, it is important to discuss how to encourage people seek social support actively when they are in need. For instance, it might be useful to encourage Japanese individuals who are motivated to maintain positive relationships—and thus have relationship maintenance concerns—to build a communal system where they can receive social support without any relational concerns. Additionally, according to my findings, encouraging people to express sympathy for unfortunate others and their prosocial willingness to build a more caring environment can help reduce people's hesitation to ask for social support.

Limitations

The findings of this research offer a new explanation for cultural differences in social support seeking. However, several limitations should be addressed. First, the present research used a cross-sectional design. Thus, it cannot exclude the possibility that higher levels of loneliness tend to cause Japanese people to cope with stress alone. Although the positive effect of support seeking on relieving loneliness have been proven repeatedly (Świtaj et al., 2015), longitudinal research is needed to further elucidate the association between support seeking and loneliness.

Second, because I only used Japanese participants, this may raise an issue regarding generalizability. There is no doubt that Japanese people cannot represent all East Asians. And it appears that social support of Japanese is kind of deviant from the typical idea of collectivism (Miller et al., 2017). On one hand, in many cases, Japanese people are expected/encouraged to observe others, infer their needs, and provide support voluntarily (i.e., unsolicited support), which is in accord with the value of benevolence and the interdependent culture mandate (e.g.,

Ishii et al., 2017; Mojaverian & Kim, 2013). On the other hand, unlike collectivism countries that extensively rely on communal norms (e.g., India), Japanese people tend to construe social support as reciprocal and follow exchange norms in non-family relationships (e.g., friends, strangers; Miller et al., 2017). In this sense, for Japanese people, receiving social support is a sort of debt and seeking support is like going into debt. Such sense of debt may distort the goodwill of social support (e.g., providers' prosocial willingness) and increase relational concern/pressure. The pattern of social support obtained from Japanese population may be only applied to a limited group of East Asians. Through comparisons among Indian, Japanese, and North American participants, Miller et al. (2017) effective demonstrated that Indians have a more positive outlook on social support seeking than Japanese, reflecting differences in the extent to which they rely on communal norms and exchange norms. To gain a more integrated understanding, future work is needed to further investigate this issue at various sites in Asian cultures. And the method of triangulation (Medin et al., 2007) to identify explanatory factors of cultures by comparing subgroups will enable researchers to provide an advanced view of how the mind is shaped by cultural content beyond the dichotomy of individualism and collectivism.

Finally, although the current findings provided relatively comprehensive evidence for the role of empathic concern in cross-cultural differences in support seeking, they were exclusively based on the self-reported data. Mean-level cross-cultural comparisons can be problematic for several reasons. For instance, the effects of culturally biased ideas participants rely on (Fiske, 2002) are inescapable regardless of the careful implementation of translation and back-translation. For example, when "my own opinion" and "directly" are used, there is no absolute standard about the concepts of these words across various cultures. Rather, participants interpret these words based on their own ideas acquired through their daily experiences in a given culture.

This suggests that participants' ratings for items reflect the ideas based on their experiences, which should vary across cultures and thus are not comparable cross-culturally (Peng et al., 1997). Additionally, ambiguity in the meaning of words used in an item often cause participants' evaluations relative to the feature of the group the participants belong to, which is called the reference group effect (Heine et al., 2002). Due to the relative judgment by participants who use the feature of their group as a standard, self-report Likert scales have little predictable validity. Furthermore, people often present themselves in a socially desirable way when being asked about themselves. The motive for social desirability causes a response bias. Previous research found that cultural orientations were associated with tendencies to respond to questions in a socially desirable way: individualism was associated with self-deceptive enhancement, whereas collectivism was associated with impression management based on normative response in a given culture (Lalwani et al., 2006). The previous finding suggests that Westerners' higher scores for social support seeking and empathic concern and their lower level of loneliness may result from their positive views of themselves. In contrast, Japanese' lower scores of support seeking may reflect their expected normative responses, not their actual attitudes. Although the cross-cultural differences in each variable we used have been examined repeatedly with various methods (Atkins et al., 2016; Taylor, Davis et al., 2004), the use of Likert-style questionnaires does not allow us to draw any strong inferences. Given the drawbacks of mean-level cross-cultural comparison on Likert scales, future research is necessary to further replicate these findings by using various measurements and experimental designs.

Conclusion

In short, with 4 studies, the present research provides consistent evidence for the mediating role of empathic concern in the cultural differences regarding social support seeking. Compared

with European Canadians/Americans, Japanese with lower empathic concern are inclined to have a lower expectation of others' prosocial willingness, and this lower expectation further discourages Japanese people from seeking social support to help cope with stress. And the reduced support seeking worsens Japanese's feelings of loneliness. In addition, this research also shows that higher endorsement of the repressive suffering construal explains that Japanese have lower empathic concern than European Americans.

Chapter 3: Gene × Childhood Interactions

In the previous chapter, the influence of culture in the use of social support seeking were examined. Across 4 studies, Chapter 2 convincingly demonstrated that, in addition to high relational concern, low empathic concern also accounted for the reluctance of Japanese (vs. European Canadians/Americans) to ask for social support in coping with stress.

As discussed in Chapter 1, apart from cultures, people's social behaviors are profoundly shaped by their childhood experience. Although the importance of childhood experience has been well-documented, most theoretical models in developmental psychology do not posit that people equally benefit or suffer from the same environmental factors. Research has sought to link this individual difference in response to environmental influences to the SNPs in certain genes, such as *DRD4*, *OXTR*, *5-HTT*, and so on. Following this approach, Chapter 3 examined how gene and childhood experience would interactively influence social support seeking in early adulthood.

Two studies were presented in this Chapter. As introduced in the first chapter, the impact of childhood experience on social behaviors is suggested to operate through working models of the self and others formed in childhood, conveying information on self-worth and how reliable others are. However, little research has directly examined the association between childhood experience and general trust. To bridge this gap, the first study of Chapter 3 investigated how early family environments would influence individuals' trust toward general others. Specifically, taking the differential susceptibility approach, Study 5 examined whether *OXTR* rs53576 polymorphisms and childhood adversity would interactively influence general trust in early adulthood. And Study 6 provided a direct examination of how perceived parental attention and *OPRM1* genotypes would interactively influence social support seeking in early adulthood.

Study 5: Oxytocin Receptor Gene (*OXTR*) and Childhood Adversity Influence Trust[2]

Introduction

Adverse childhood experiences can be defined as distressful events occurring in one's family or social context before late adolescence, and they are often chronic and vary in severity (Kalmakis & Chandler, 2014). Childhood experience has a significant influence on an individual's cognition and behaviors in late adolescence and adulthood. Individuals who have adverse childhood experiences, for example, engage less in prosocial behaviors in adolescence (Wu et al., 2020). Adverse childhood experiences also hinder the development of secure attachments (Afifi et al., 2011), which are extremely important for the lifelong development in trust (Bowlby, 1969). Trust is a belief that humans are benevolent in nature (Yamagishi & Yamagishi, 1994). Although little empirical research has examined the effect of childhood adversity on trusting behaviors directly, studies have indicated the negative association between disadvantaged environments and trust. Disadvantaged childhood environments are associated with faster life history strategies that are characterized by individual emphasis on immediate rewards and a lack of long-term orientation (Ellis et al., 2009; Griskevicius et al., 2011). And faster life history strategists display less trust in others (Wu et al., 2017). Additionally, socioeconomic disadvantage is also one of the important factors influencing trust. Specifically, people from families/communities of lower socioeconomic status are less trusting (Alesina & La

[2] This section is a slightly modified version of:

Zheng, S., Masuda, T., Matsunaga, M., Noguchi, Y., Ohtsubo, Y., Yamasue, H., & Ishii, K. (2020). Oxytocin receptor gene (OXTR) and childhood adversity influence trust. *Psychoneuroendocrinology*, *121*, 104840. https://doi.org/10.1016/j.psyneuen.2020.104840

Ferrara, 2002). Based on these findings, the current study aimed to further examine the influence of childhood experience on trust.

OXTR rs53576

As introduced in Chapter 1, although humans are developmentally plastic, there are significant individual differences in the susceptibility to early environments (Belsky, 1997). Evidence from G × E research suggests that individuals with particular genes are more susceptible to both positive and negative environments (Belsky et al., 2009; Belsky & Pluess, 2009). One of the most studied candidate gene is oxytocin receptor gene polymorphism (*OXTR* rs53576).

Extensive research has investigated the association between the single nucleotide polymorphisms (SNPs) in the *OXTR* gene rs53576 (*OXTR* rs53576; adenine [A] to guanine [G] change in the third intron) and human social behaviors. In general, the GG carriers exhibited more favorable social behaviors than the A-allele carriers (Kogan et al., 2011; Wu & Su, 2015). Evidence from this line of research also suggests that, when compared to men carrying the A-allele, men with GG exhibit more trust behaviors in trust games (Krueger et al., 2012) and report higher attitudinal trust (Nishina et al., 2015). However, we should be cautious in interpreting the main effect of the *OXTR* rs53576 polymorphism on human sociability. The significant relationship between the *OXTR* rs53576 and social behaviors has not been verified through meta-analysis (Bakermans-Kranenburg & van IJzendoorn, 2014).

The G × E interactions might be one explanation for the null effect of the *OXTR* rs53576 on sociability in the meta-analysis. Previous research established that *OXTR* rs53576 might influence individual sensitivity to the social environment (Meyer-Lindenberg et al., 2011). However, for the environmentally sensitive allelic subgroup, past research on G × E interactions

reported inconsistent findings. Some studies indicated that the A-allele carriers were more susceptible to the negative impacts of adversity (van Roekel et al., 2013). In contrast, others suggested that the A-allele carriers were more resilient to the negative effect of adversity than the G-allele carriers (Hostinar et al., 2014; McQuaid et al., 2013).

Little is known about how the interaction of childhood adversity and *OXTR* rs53576 influences the development of trust. Nevertheless, prior research has found that *OXTR* rs53576 moderates the effect of childhood maltreatment on an individual's social functioning (e.g., poor or high functioning in close friendships, see Thompson et al., 2014). Early family discord increased the A-allele carriers' risk for borderline personality disorder, whereas the association between early family quality and borderline symptoms was not significant for the GG carriers (Hammen et al., 2015). People with borderline personality disorder tend to exhibit less trust during interpersonal interactions (Unoka et al., 2009). Moreover, the positive association between childhood trauma and empathy for psychological pain was only significant among A-allele carriers (Flasbeck et al., 2018). Through a 4-year longitudinal study, Hygen et al. (2017) found that the AA carriers' relationships with their teachers were improved significantly with the enhancement of early parenting styles, whereas the student-teacher relationship was relatively stable for the G-allele carriers. The experience of harsh parenting in adolescence had a significant association with greater allostatic load during early adulthood only in A-allele carriers (Brody et al., 2017). Maternal postpartum depression predisposed children with AA genotype to developing externalizing problems (Choi et al., 2019). In summary, compared with G-allele carriers, AA carriers' social functioning was more susceptible to early family life. Moreover, trust is vital for social functioning. Therefore, I expected that childhood adversity could reduce

an individual's trust in early adulthood (Hypothesis 1), which might be notably stronger for AA carriers (Hypothesis 2).

The current study

To examine the influence of early family environments on trust in adulthood, in this study, a generalized trust scale developed by Yamagishi and Yamagishi (1994) was administered. The scale consists of two subscales: belief in honesty and trustworthiness of others in general (called "general trust") and cautious tendency in dealing with others (called "caution"). Caution represents people's prudence in terms of perceived risk of being exploited. Although distrustful people tend to be cautious in dealing with others (Chun & Campbell, 1974; Kaplan, 1973), because there may be cases in which even high trusters are prudent, trust and caution are not necessarily total opposites of a single dimension.

Previous evidence has suggested that collectivism was more likely to hinder general trust by comparison with individualism (Gheorghiu et al., 2009; Irwin & Berigan, 2013). Although the Japanese rated lower in general trust than the North Americans, the level of caution revealed no clear difference (Yamagishi & Yamagishi, 1994). Given the significant cross-cultural differences in general trust, the present study targeted people who differ in cultural orientation (i.e., Japanese people and Canadians), and included culture as a control variable.

Although I expected that childhood adversity would dent people's trust (H1), in line with the differential susceptibility hypothesis, I also expected that this association would be significantly moderated by *OXTR* rs53576: the influence of adversity in early family life would be notably stronger for *OXTR* rs53576 AA carriers compared to AG or GG carriers (H2). For an exploratory purpose, the present study also examined whether childhood adversity and the *OXTR* polymorphism would interact with caution.

Method

Ethic Statement

The ethics committees at Kobe University and the University of Alberta both approved this study. All of the participants gave a written informed consent at the beginning of the study.

Participants

Four hundred and three undergraduate students were recruited from Kobe University, Japan (98 males and 105 females, M_{age} = 19.70, SD = 1.42) and the University of Alberta, Canada (66 males, 132 females, and 2 missing, M_{age} = 19.43, SD = 2.42). According to a power analysis with the pwr package in R, at least 358 participants were needed to detect a small/medium effect size (f^2 = .04) with 80% power for an F-test with 4 numerator degrees of freedom, when the significant level was set to 0.025 (= 0.05 / 2 tested hypotheses) based on the Bonferroni correction. Data was excluded from 2 participants who did not complete the measurement of childhood adversity and 38 whose genotypes were undetermined; therefore, the final sample size was 363.

Self-Report Measures

Childhood adversity. Childhood adversity was assessed using the Risky Families Questionnaire (RFQ; Taylor, Lener et al., 2004). Respondents were asked to rate their early family environment in terms of 13 aspects on a 5-point Likert-scale (1 = not at all, 5 = very often). The items assess family conflict, abuse, neglect, and disorganized household in childhood

(ages 5 to 15). Sample items included "*How often did a parent or other adult in the household make you feel that you were loved, supported, and cared for?*" (a positively worded item), and "*How often did a parent or other adult in the household push, grab, shove, or slap you?*" Two Japanese-English bilinguals translated and back-translated the items between Japanese and English to ensure cross-cultural equivalence. The ratings for the items were averaged with positively worded items reverse coded. Higher scores represented more adverse childhood environments. For nonclinical samples, the scores of RFQ in previous work on the G × E interactions roughly ranged from 1.00 to 4.23 (Carver et al., 2011; Carver et al., 2016). The distributions of the current samples (Japanese: range = 0.85–3.62, Median = 1.92; Canadians: range = 1.00–4.31, Median = 2.00) were similar to those reported in prior work. The Cronbach's alpha coefficients for the current sample were .76 for the Japanese and .86 for the Canadians.

General trust and caution. General trust and caution were assessed using the 5-item General Trust Scale (GTS; Yamagishi et al., 2015) and the 5-item Caution Scale (CS), both originally developed by Yamagishi and Yamagishi (1994). Respondents were asked to rate their agreement with each item on a 7-point Likert-scale (1 = strongly disagree, 7 = strongly agree). Sample items included "*Most people are trustworthy*" (GTS), and "*There are many hypocrites in this society*" (CS). The Cronbach's alpha coefficients of the GTS were .74 for the Japanese and .80 for the Canadians. The Cronbach's alpha coefficients of the CS were .60 for the Japanese and .74 for the Canadians.

Genotyping

Genomic DNA was extracted from nail samples using ISOHAIR kits (NIPPON GENE CO., LTD, Tokyo, Japan). The SNP marker for *OXTR* rs53576 was genotyped in the same way as Ishii et al. (2020) did. Each SNP assay contained forward and reverse polymerase chain reaction

(PCR) primers and two allele specific probes conjugated with either the VIC or the FAM fluorescent marker. Each PCR mixture consisted of DNA templates, the SNP-specific Genotyping Assay, and the Taqman Genotype master mix (Thermo Fisher Scientific Inc.). All PCR and allelic discrimination reactions were performed on the StepOne Plus™ Real-Time PCR System (Thermo Fisher Scientific Inc.).

Results

Genotype distribution

Consistent with previous studies showing that A-allele carriers are relatively more frequent in Asians than in individuals of European ancestry (Luo & Han, 2014), the distribution of *OXTR* rs53576 genotypes was significantly different between the Canadians (18 AA, 84 AG, 76 GG, 22 undetermined) and the Japanese (70 AA, 77 AG, 40 GG, 16 undetermined), $\chi^2(2) = 42.01$, $p < .001$. The distribution of the allele frequencies for the Canadian sample fell in the Hardy-Weinberg equilibrium ($\chi^2 = 0.56$, $p = .507$). However, for the Japanese sample, the distribution deviated slightly from the Hardy-Weinberg equilibrium (the heterozygotes were less frequent than expected; $\chi^2 = 4.48$, $p = .035$).

Table 9 Descriptive statistics and correlations ($N = 363$)

Scale	Mean	*SD*	1	2	3
1. Risky families	2.04	0.63	1.00		
2. General trust	4.21	0.95	-.22**	1.00	
3. Caution	4.73	0.90	.10	-.43**	1.00

Note. ** $p < .001$.

The results of correlational analyses (Table 9) showed that risky families scores correlated with general trust negatively ($r(361) = -.22$, $p < .001$), while the correlation between childhood adversity and caution was not significant ($r(361) = .10$, $p = .067$). Additionally, general trust correlated with caution negatively ($r(361) = -.43$, $p < .001$). And the results of one-way ANOVAs indicated that participants with different *OXTR* genotypes did not differ significantly in risky families scores ($F(2, 360) = 2.97$, $p = .053$, $\eta^2 = .016$), general trust ($F(2, 360) = 0.15$, $p = .857$, $\eta^2 = .001$), or caution ($F(2, 360) = 0.35$, $p = .707$, $\eta^2 = .002$). The mean scores by *OXTR* genotype are summarized in Table 10.

Table 10 Means by *OXTR* rs53576 genotype

	AA ($N = 88$)		AG ($N = 159$)		GG ($N = 116$)			
Scale	Mean	*SD*	Mean	*SD*	Mean	*SD*	*F*	*p*
1. Risky families	1.91	0.55	2.05	0.66	2.13	0.64	2.97	.053
2. General trust	4.23	1.05	4.23	0.90	4.17	0.95	0.15	.857
3. Caution	4.71	0.83	4.69	0.92	4.78	0.95	0.35	.707

Gene x Childhood environment interaction

A series of multiple regression analyses was formulated to examine the moderating effect of the *OXTR* rs53576 polymorphism on the association of childhood adversity with general trust and caution. Before conducting the regression analyses, the *OXTR* genotypes were dummy coded: the AA genotype was used as the reference category and two dummy-coded variables were (0, 1, 0) and (0, 0, 1) for (AA, AG, GG), respectively. Risky families scores were mean-centered as the

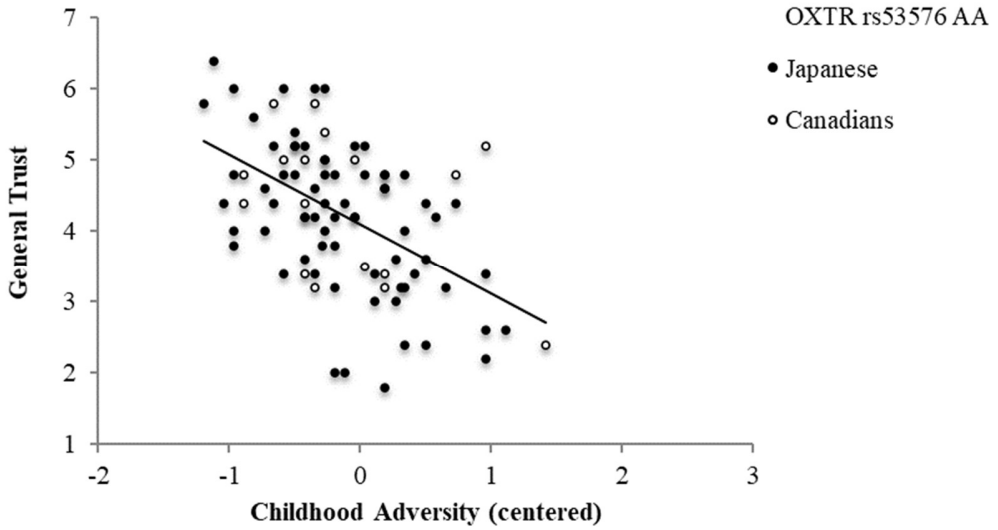
indicator of childhood adversity. In the hierarchical multiple regression analysis, the main effects of childhood adversity and the two *OXTR* dummy-coded variables were tested first. This model also included gender (man = 0, woman = 1) and culture (Japanese = 0, Canadian =1) as potential control variables (Step 1). Then, the interactions with the two *OXTR* dummy-coded variables and the risky families scores were entered in Step 2.

General Trust. The multiple regression analyses (Table 11) showed that there was no difference in general trust between the AA carriers and the AG/GG carriers (*p*s > .458). After controlling for the effect of culture and gender, the main effect of childhood adversity was significant in Step 1, $b = -0.34$, $SE = 0.08$, $t(356) = -4.36$, $p < .001$, which showed that childhood adversity reduced general trust significantly. However, the influence of childhood adversity on general trust was significantly different between the AA carriers and the AG carriers, $b = 0.81$, $SE = 0.21$, $t(354) = 3.87$, $p < .001$. Moreover, the influence of childhood adversity on trust was also significantly different between the AA carriers and the GG carriers, $b = 0.78$, $SE = 0.22$, $t(354) = 3.53$, $p < .001$. The childhood adversity and gene interactions were not qualified by culture (S Table 3). A simple slope analysis showed that childhood adversity reduced the AA carriers' trust ($b = -0.98$, $SE = 0.18$, $t(354) = -5.59$, $p < .001$; Figure 13a) significantly, whereas it did not significantly predict the AG ($b = -0.18$, $SE = 0.11$, $t(354) = -1.62$, $p = .106$; Figure 13b) or the GG carriers' trust ($b = -0.21$, $SE = 0.13$, $t(354) = -1.56$, $p = .119$; Figure 13c) in early adulthood.

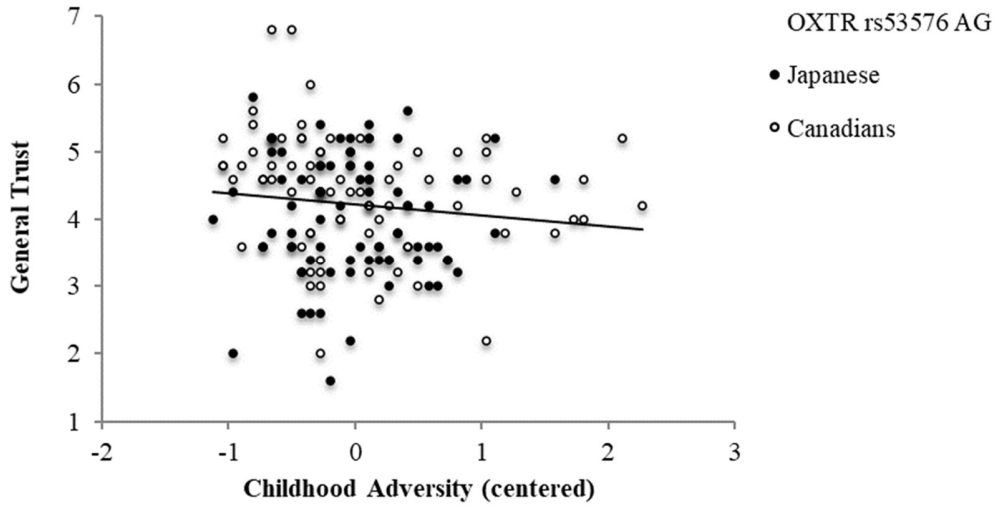
Table 11 Results of multiple regressions predicting general trust

	Step 1 (R^2 = .065, p < .001)				Step 2 (ΔR^2 = .042, p < .001)			
Predictors	*b*	*SE*	*t*(356)	*p*	*b*	*SE*	*t*(354)	*p*
Gender (0: M, 1: F)	-0.11	0.10	-1.08	.280	-0.10	0.10	-0.97	.332
Culture (0: Jpn, 1: Can)	0.26	0.10	2.45	.015	0.26	0.10	2.49	.013
Childhood adversity	-0.34	0.08	-4.36	<.001	-0.98	0.18	-5.59	<.001
*OXTR*1 (0: AA, 1: AG)	-0.04	0.13	-0.30	.766	0.04	0.13	0.34	.732
*OXTR*2 (0: AA, 1: GG)	-0.10	0.14	-0.74	.458	-0.03	0.14	-0.24	.813
Childhood adversity × *OXTR*1					0.81	0.21	3.87	<.001
Childhood adversity × *OXTR*2					0.78	0.22	3.53	<.001

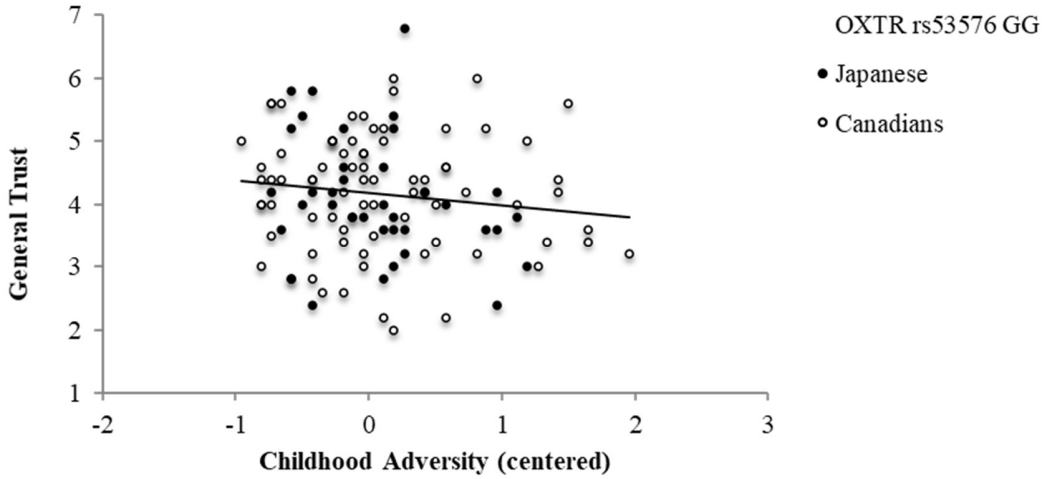
Note. Abbreviation: M, male; F, female; Jpn, Japanese; Can, Canadian; OXTR, oxytocin receptor gene (rs53576).



(Figure 13a)



(Figure 13b)



(Figure 13c)

Figure 13 General trust as a function of childhood adversity by *OXTR* rs53576 genotype

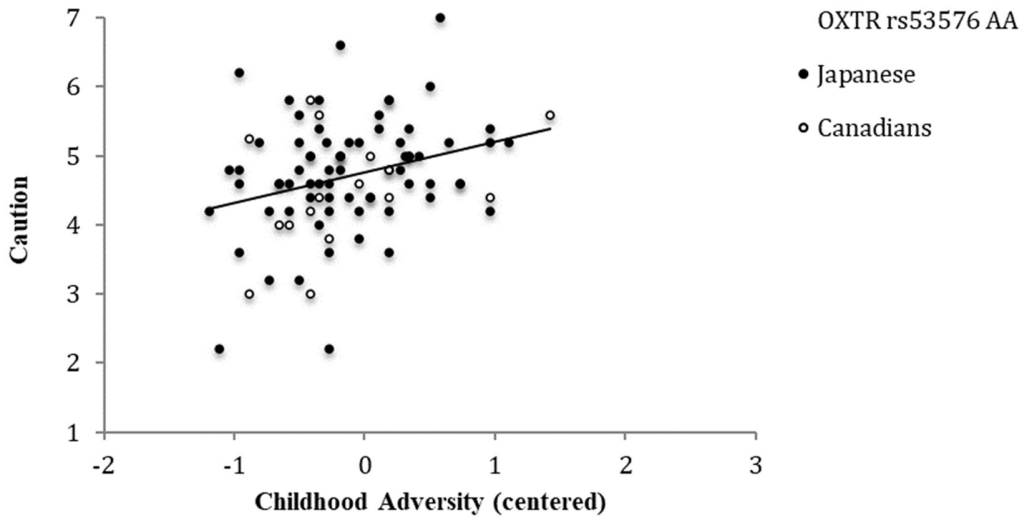
Caution. In the analyses of caution (Table 12), the main effect of childhood adversity was not significant in Step 1, $b = 0.14$, $SE = 0.08$, $t(356) = 1.91$, $p = .057$. There was not any significant difference in caution between the AA carriers and the AG/GG carriers (ps > .176). However, the

influence of childhood adversity on caution was somewhat different between the AA carriers and the AG carriers, b = -0.43, SE = 0.20, t(354) = -2.13, p = .034.The difference on the influence of childhood adversity between the AA and the AG carriers was not qualified by culture. The influence of childhood adversity on caution was not significantly different between the AA carriers and the GG carriers, b = -0.30, SE = 0.22, t(354) = -1.41, p = .160. Further analyses showed that childhood adversity increased the AA carriers' caution significantly (b = 0.45, SE = 0.17, t(354) = -2.62, p = .009; Figure 14a), while the association between childhood adversity and caution was not significant for the AG carriers (b = -0.02, SE = 0.11, t(354) = 0.17, p = .868; Figure 14b) or the GG carriers (b = -0.15, SE = 0.13, t(354) = -1.15, p = .251; Figure 14c).

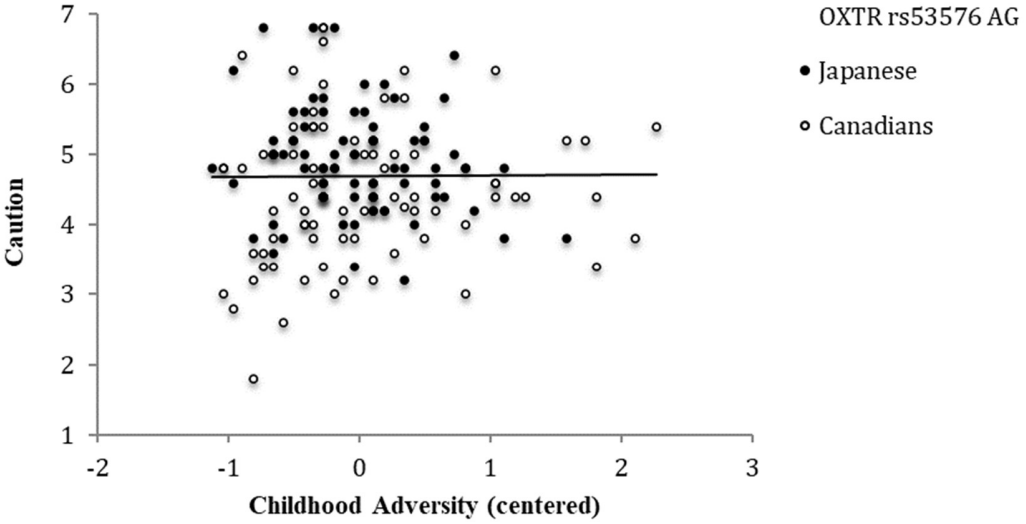
Table 12 Results of multiple regressions predicting caution

	Step 1 (R^2 = .047, p = .004)				Step 2 (ΔR^2 = .012, p = .104)			
Predictors	*b*	*SE*	*t*(356)	*p*	*b*	*SE*	*t*(354)	*p*
Gender (0: M, 1: F)	-0.13	0.10	-1.41	.161	-0.14	0.10	-1.50	.135
Culture (0: Jpn, 1: Can)	-0.32	0.10	-3.14	.002	-0.32	0.10	-3.14	.002
Childhood adversity	0.14	0.08	1.91	.057	0.45	0.17	2.62	.009
*OXTR*1 (0: AA, 1: AG)	0.07	0.12	0.55	.586	0.03	0.12	0.23	.819
*OXTR*2 (0: AA, 1: GG)	0.18	0.13	1.36	.176	0.14	0.14	1.05	.294
Childhood adversity × *OXTR*1					-0.43	0.20	-2.13	.034
Childhood adversity × *OXTR*2					-0.30	0.22	-1.41	.160

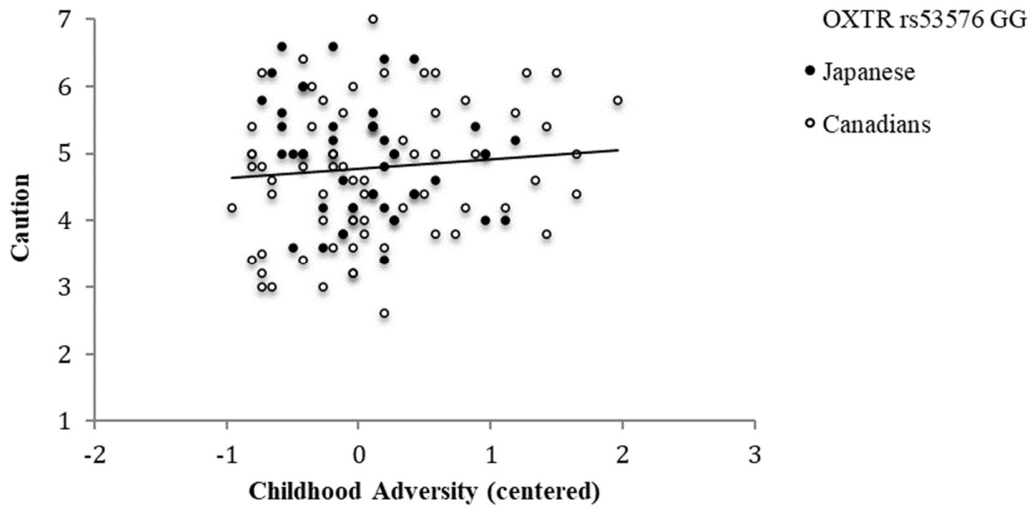
Note. Abbreviation: M, male; F, female; Jpn, Japanese; Can, Canadian; *OXTR*, oxytocin receptor gene (rs53576).



(Figure 14a)



(Figure 14b)



(Figure 14c)

Figure 14 Caution as a function of childhood adversity by *OXTR* rs53576 genotype

Discussion

The primary aim of the present study was to examine the influence of early family environments on people's trust in early adulthood. Specifically, this study examined whether childhood adversity would reduce trust. Based on studies demonstrating that the impact of early life experience on social functioning in late adolescence and adulthood varies across different genotypes on *OXTR* rs53576 (Flasbeck et al., 2018), the present study also aimed to test whether *OXTR* rs53576 would moderate the influence of childhood adversity on people's trust. Consistent with Wu et al.'s (2020) work, even after controlling for the effect of culture, a main effect of adverse childhood experience on general trust was found. More importantly, the moderation hypothesis was supported that the impact of childhood adversity on general trust in early adulthood was only significant for the *OXTR* rs53576 AA carriers, not for the G-allele carriers. Specifically, adverse childhood experience reduced the *OXTR* rs53576 AA carriers'

general trust significantly, whereas the negative impact of childhood adversity on general trust was not significant for the G-allele carriers.

The effect of childhood adversity and its interaction with *OXTR* rs53576 on caution was also examined exploratorily. The results demonstrated that neither the main effect of childhood adversity nor its interactions with *OXTR* rs53576 on caution were significant. Nevertheless, the influence of childhood adversity on caution among the AA carriers was slightly stronger than that among the AG carriers. Specifically, childhood adversity only increased the AA carriers' caution significantly in early adulthood. We also found a significant cross-cultural difference in caution. By comparison with the Canadians, the Japanese were more prudent in dealing with others.

These results extend previous work on the development of trust in several important ways. First, the current study is one of the first to directly examine the influence of childhood experiences on general trust. Faster life history strategies from disadvantaged childhood environments lead individuals to emphasize their immediate self-interests and to display a lack of long-term orientation. Moreover, such individuals are vulnerable to others' exploitative behaviors, specifically in scarce-resource environments. The vulnerability, then, would make it harder for them to trust others. Importantly, the current findings also provide evidence that positive interactions with caregivers during early life are particularly important for the development of general trust (Bowlby, 1969). Future studies could use longitudinal designs to examine the influence of early-life experience on trusting behaviors further. Additionally, as a positive bias in cognition, trust is an essential prerequisite for living in relationships with other people. Trust involves one's expectations for others' benevolent intentions; it boosts cooperation, particularly in situations that include conflict between self-interest and collective interest (Balliet

& Van Lange, 2013); and it relates to one's ability to discern cooperative partners from uncooperative ones (Yamagishi et al., 1999). If people cannot trust others, their uncertainty toward outside world would be especially high, which would make it hard for them to move out of familiar environment or build new relations with others. Future studies could also investigate how childhood experience influences prosocial behaviors and one's ability to detect trustworthiness – and how trust underlies the influences of childhood experience.

Second, the current findings add evidence for research suggesting that *OXTR* rs53576 moderates the effect of early-life experience on social functioning (Cicchetti et al., 2014; Senese et al., 2019). Our results suggest that the significant impact of childhood adversity on general trust is only limited to AA carriers. According to the gene-environment interaction (Obradović & Boyce, 2009), we speculate that, compared with the *OXTR* rs53576 G-allele carriers, the AA carriers are more susceptible to family environmental influence, at least in regard to trust. A recent study found an interaction of *OXTR* rs53576 and early emotional trauma on left hippocampal volumes (Malhi et al., 2020). Specifically, the left hippocampal volumes of adolescent girls suffering higher emotional trauma during childhood were smaller than those of others, which was only evident among AA carriers (Malhi et al., 2020). The hippocampus is an important region that contributes to reinforcement learning apart from the striatum (Davidow et al., 2016). The reinforcement learning circuitry was also part of the establishment of trust (Fareri et al., 2012). Prior work on faster life strategies suggested that people favoring immediate reward also were less trusting (Wu et al., 2017). Together with the current findings, we speculate that the increased sensitivity to childhood adversity in people with the AA genotype on hippocampal volumes might also explain the same effect on trust. For *OXTR* rs53576 AA carriers, childhood adversity might disrupt the function of reward circuits by influencing the left hippocampal

volumes, and thus impacting their trusting behaviors. Future studies could investigate this possibility further.

However, to date, the findings on the environmentally sensitive allelic subgroup of *OXTR* rs53576 are mixed. Some researchers have suggested that the association between childhood experiences and emotional function (e.g., emotional regulation) was much stronger among GG carriers than A-allele carriers (Bradley et al., 2011; Burkhouse et al., 2016). These discrepancies might be due to gender, ethnicity, types of adversity and outcome variables. By using a cross-cultural sample, the present study specifically focused on young adults, early family environments, and trust. Future studies could clarify whether the environmentally sensitive allelic subgroup of *OXTR* rs53576 varies in its outcomes in psychological domains (e.g., personality traits and socio-emotional processes). Besides *OXTR* rs53576, previous studies have found that other polymorphisms of the *OXTR* gene also moderated the effects of early experiences on people's cognitions and behaviors. For example, Yael Apter-Levy et al. (2013) found that *OXTR* rs2254298 moderated the association between the children's mental health and family environment. Thus, I speculate that the inconsistent results on the environmentally sensitive allelic subgroup of *OXTR* rs53576 might be explained by gene-gene interactions. Therefore, future work needs to investigate further whether other polymorphisms of the *OXTR* gene (e.g., *OXTR* rs2254298) is involved in the G × E interaction on general trust.

Another possible explanation for this G × E interaction on general trust is that, compared with AA homozygotes, the *OXTR* rs53576 G-allele carriers might be more capable of developing their general trust outside their own families. Previous studies have suggested that the G-allele was connected to higher levels of psychological resources (Saphire-Bernstein et al., 2011) and higher openness to social support (Chen et al., 2011). Therefore, when the family environment is

unfavorable, it might be much easier for the G-allele carriers to learn social skills from other social supports (e.g., friends, teachers, etc.). That might be the reason why the association between early family environments and general trust was weaker among the G-allele carriers than among AA carriers. In short, the current findings supported the idea that it is important to consider the influence of specific genes when examining the impact of early life experience on later social life.

Finally, the present study also contributed to the evidence on the cross-cultural differences in general trust and caution. Consistent with previous studies suggesting that individualist cultures fostered trust among people (Gheorghiu et al., 2009), the Canadians were more likely than the Japanese to trust others. Additionally, the current findings also suggested that the Japanese were more cautious in dealing with others than the Canadians. Although Yamagishi and Yamagishi (1994) neither expected nor found a clear cultural difference in caution between the Japanese and the North Americans, the current finding could be interpreted through cultural differences in vigilance to others' negative feelings (Adams, 2005; Hashimoto & Yamagishi, 2016; Ishii et al., 2011). In collectivistic cultures in which people exist in a network of strong ties, to avoid exclusion from the current network, it is crucial for individual survival to be sensitive to others' expectations and not offend them.

There are several limitations that should be noted in this study. First, the distribution of the *OXTR* rs53576 allele frequencies for the Japanese sample violated the Hardy-Weinberg equilibrium slightly. For some unknown reason, we sampled heterozygotes less than expected (77 observed heterozygotes vs. 91 expected sample size). Future studies need to follow the random sampling procedure more strictly to examine further the *OXTR* rs53576 polymorphism × childhood adversity interaction on trust. However, it is noteworthy that this study demonstrated a

significant main effect of childhood adversity and its significant interaction with *OXTR* rs53576 on trust across cultures. Second, the current study measured trust only through a self-report measurement. Therefore, it is still unclear whether the significant G × E interaction found is applicable to people's trust in practical situations.

In conclusion, the current study demonstrated that the *OXTR* rs53576 moderated the impact of childhood adversity on general trust. Overall, more childhood adversity predicted lower general trust. This effect was particularly true among carriers of AA homozygotes. These findings contribute to the understanding of the ways in which gene and early family environments influence people's trust interactively in later lives.

Study 6: Mu Opioid Receptor Gene (*OPRM1*) Moderates the Influence of Perceived Parental Attention on Social Support Seeking[3]

Introduction

Study 5 demonstrated that early family environment and *OXTR* rs53576 interactively influence individuals' general trust. The obtained findings supported the presumption that childhood experience, especially early family environment, is critical in the development of a "working model" of self and others, which served as the theoretical basis for the association between childhood experience and social support seeking. Additionally, the findings also underscore the importance of studying the genetic basis of individual differences in developmental plasticity.

As reviewed in Chapter 1, the evidence regarding the childhood–support seeking link is consistent and convincing: accepting, warm, and supportive family environment generally correlates with the increased use of social support seeking, whereas neglecting, rejecting, and violent experience usually leads to the reluctance to ask for support in response to stress (Allbaugh et al., 2018; Gaylord-Harden et al., 2010; Ruchkin et al., 1999; Seon et al., 2021). The present study aimed to extend these findings by examining whether μ-opioid receptor gene (*OPRM1*) would moderate the influence of perceived parental attention on social support seeking.

[3] This section is a slightly modified version of

Zheng, S., Ishii, K., Masuda, T., Matsunaga, M., Noguchi, Y., Yamasue, H., & Ohtsubo, Y. (2022). Mu opioid receptor gene (OPRM1) moderates the influence of perceived parental attention on social support seeking. *Adaptive Human Behavior and Physiology*. https://doi.org/10.1007/s40750-022-00192-w

Perceived parental attention

Perceived parental attention, which refers to individuals' perception of general attention from their parents in childhood, is also an important index of positive parenting contributing to the development of a positive "working model" of the self and others. Indeed, neglect is one of the most common types of childhood maltreatment (Romano et al., 2015). Children who perceive their own parents to be attentive are more likely to have a faith that their parents will be available and accessible whenever they are in need. Conversely, if children think their parents pay little attention to them, they are more likely to feel uncared for and be attached insecurely (Zietlow et al., 2017), and, thus, to be over sensitive to the possibilities of rejection or expect futility of enlisting support. These working models formed in response to the early interaction with parents would shape people's expectation of new persons and relationships (Bowlby, 1978). In this study, I examined whether retrospective-report of perceived parental attention in childhood would promote social support seeking in early adulthood.

OPRM1 A118G

OPRM1 A118G is a polymorphic site in the exon 1 of μ-opioid receptor gene, which results in an amino acid change at position 40 (N40D). Although the exact function of this polymorphism remains to be clarified, the G allele of *OPRM1* A118G has been associated with lower mRNA expression than the A allele (Zhang et al., 2005), and with decreased signaling efficiency of the μ-opioid receptor in several brain areas involved in the process of pain (Oertel et al., 2009; Ray et al., 2011) which might suggest that the G allele is a "loss-of-function" variant. This "loss-of-function" hypothesis is further supported by evidence of the increased pain sensitivity of G allele carriers (Bruehl et al., 2008; Sia et al., 2008). For example, patients with

the G allele of *OPRM1* were shown to experience stronger pain during surgery and to need higher doses of opiates to alleviate postsurgical pain than patients with the AA genotype (Klepstad et al., 2004).

Previous research suggests that, in addition to experiencing greater sensitivity to physical pain, carriers of the G allele of *OPRM1* exhibit greater susceptibility to social experiences (Slavich et al., 2014; Swann et al., 2014). For example, Way et al. (2009) found that G allele carriers not only reported higher dispositional sensitivity to social rejection but also exhibited greater reactivity in the brain areas involved in pain processing (i.e., the dorsal anterior cingulate cortex) when they were rejected in an online ball-tossing game. A further study by Slavich et al. (2014) revealed that, compared to AA carriers, G allele carriers were at a greater risk for depression after experiencing a targeted rejection event (e.g., getting fired, being divorced). Using a sample of cohabiting romantic couples, recent work by Tchalova et al. (2021) found that relative to AA carriers, G allele carriers' feelings of security declined more steeply with the increases in their partner's quarrelsome behaviors (e.g., impatience, criticism, etc.). In another study, Partington et al. (2018) reported that maternal overcontrol was associated with higher electrodermal activity during challenged tasks among children with the G allele, whereas AA carriers' electrodermal activity was not significantly influenced by maternal overcontrol. In a similar vein, Boparai et al. (2018) examined the influence of mother-child language style matching (LSM) in children's separation anxiety disorder (SAD). Results indicated that only among children with the G allele of *OPRM1* A118G did higher LSM significantly predict fewer SAD symptoms two years later. Finally, the influence of childhood adversity on personality (e.g., agreeableness, hostility et al.) and reward sensitivity in late adolescence has been shown to be

stronger among the G allele carriers than among AA carriers (Carver et al., 2016; Johnson et al., 2016).

Although most evidence supports the conclusion that the G allele of *OPRM1* is the most environmentally sensitive allelic subgroup, it should be noted that the findings on the interaction between the environment and *OPRM1* are inconsistent. Indeed, some research has suggested that A allele carriers have greater susceptibility to the influence of environments (Copeland et al., 2011; Noto et al., 2020). For example, Troisi, Frazzetto, Carola, Di Lorenzo, Coviello, Siracusano, et al. (2011) investigated the influence of maternal care on attachment among psychiatric patients. The results indicated that maternal care negatively predicted the fearful attachment among AA carriers, whereas G allele carriers exhibited high fearful attachment regardless of maternal care. Also, it is noteworthy that AG and GG carriers were collapsed into a single "G allele" group in most prior research due to the small sample sizes used and the relatively low proportion of G allele carriers in non-Asian populations, ranging from around 4% in African Americans to around 13% in Europeans and around 20% in Latin Americans (Phan et al., 2020). However, this approach omits the potential differences within the "G allele" group, which can sometimes be misleading. A meta-analysis of clinical studies linking the *OPRM1* polymorphism with the effectiveness of pain therapy, for example, revealed that the need for an increased opioid dosage was observed only in those with the GG homozygotes, whereas analyses of the AA versus G allele groups failed to detect this difference effectively (Walter & Lötsch, 2009). This finding highlights the importance of distinguishing between AG and GG carriers, suggesting that the GG homozygotes might be unique compared to the other two groups, at least in the context of pain therapy. Considering these findings, obtained with a relatively large sample size, the present study set the GG variant as a reference group and compared it with the AA and

AG variants separately to examine whether the GG carriers would be more susceptible to early parenting than AA/AG carriers.

The current study

As introduced in Chapter 1, there is a line of research suggesting that childhood experience, especially early parenting, influences individuals' support-seeking behaviors. However, no study has yet investigated whether the association between childhood experience and social support seeking is moderated by specific genes. The current study sought to fill this gap by examining whether *OPRM1* genotypes and perceived parental attention would interactively influence individuals' support seeking in early adulthood.

In the current study, Japanese undergraduate students' frequencies of seeking social support in coping with daily stressors and the amount of parental attention they subjectively perceived during childhood were assessed, and they were genotyped for the A118G polymorphism within *OPRM1*. Based on the prior findings on the link between early parenting and support seeking (Ruchkin et al., 1999), I expected the perception of parental attention during childhood to promote social support seeking in early adulthood. However, in line with the differential susceptibility hypothesis, I expected this association to be moderated by the *OPRM1* A118G genotype. Given the aforementioned findings related to the different susceptibility and function of the *OPRM1* genotypes, I expected the association between perceived parental attention and social support seeking to be significantly stronger for GG carriers than for AA/AG carriers.

Method

Ethics statement

This study was approved by the ethics committees at Kobe University and Nagoya University. Prior to data collection, all participants provided their written informed consent.

Participants

A total of 620 undergraduate students were recruited, including students from Kobe University, Japan (198 males, 217 females, and 1 unspecified, M_{age} = 19.47, SD = 1.24), and students from Nagoya University, Japan (94 males and 110 females, M_{age} = 19.82, SD = 1.36). I set the significance level to 0.025 (= 0.05/2 tested hypotheses). According to the results of the power analysis calculated with the R package "pwr," with 97% power, this sample size can detect a f^2 effect size = 0.04 (F test, numerator df = 5) at α = 0.025. However, sixteen participants' genotypes were undermined and four participants did not complete all the measurement. Therefore, the final sample size was 600.

Self-report measures

Perceived parental attention in childhood. Perceived parental attention in childhood was assessed using two questions: "*How much attention did your father pay to you in your childhood?*" and "*How much attention did your mother pay to you in your childhood?*" Participants were asked to rate the amount of attention they subjectively perceived from their father/mother on a 6-point Likert scale ranging from not at all (1) to very much (6). We averaged the scores of these two items as an integrative indicator of perceived parental attention in the following analyses.

In addition to these two items, 202 participants from Kobe University completed the RFQ (Taylor, Lener et al., 2004; see Study 5 for details), which has been repeated used in prior G × E interaction research as an indicator of early family environment characteristics (Carver et al., 2011; Taylor et al., 2006). Correlation analysis using these data confirmed that the lower perceived parental attention was correlated with more adverse family environments as assessed by the RFQ ($r(200) = -.46$, $p < .001$).

Social support seeking. Social support seeking was assessed using two subscales from the Brief-COPE questionnaire: the emotional support subscale and the instrumental support subscale (Carver, 1997; see Study 1 for details). The Cronbach's alpha coefficient was .91.

Genotyping

Samples of participants' fingernails were collected for genotyping. This study used ISOHAIR kits (Nippon Gene Co., Ltd., Tokyo, Japan) to extract participants' genomic DNA. By using TaqMan SNP Genotyping Assays (Thermo Fisher Scientific Inc., Waltham, Massachusetts), the *OPRM1* polymorphism (rs1799971) was genotyped. The distribution of *OPRM1* frequencies

was 29% AA, 50% AG, 21% GG, which was not significantly different from the Hardy-Weinberg equilibrium ($\chi^2(2) = 0.01$, $p = .870$).

Results

The results of bivariate correlation analyses indicated that perceived parental attention positively correlated with social support seeking ($r(598) = .13$, $p = .002$). In addition, the results of ANOVAs showed that participants with different *OPRM1* genotypes did not significantly differ in perceived parental attention ($F(2, 597) = 0.28$, $p = .759$, $\eta^2 = .001$) or social support seeking ($F(2, 597) = 1.56$, $p = .212$, $\eta^2 = .005$). The mean scores and standard deviations by *OPRM1* genotypes are shown in Table 13.

Table 13 Means by *OPRM1* genotypes.

	AA ($N = 177$)		AG ($N = 299$)		GG ($N = 124$)			
Scale	Mean	*SD*	Mean	*SD*	Mean	*SD*	*F*	*p*
Perceived parental attention	5.04	0.76	5.04	0.75	4.98	0.73	0.28	.759
Social support seeking	3.17	1.03	3.23	1.05	3.38	1.07	1.56	.212

Gene × Perceived parental attention interaction

To examine the interactive effect of *OPRM1* polymorphism and perceived parental attention on social support seeking, we formulated several multiple regression analyses. The score of perceived parental attention was mean centered before conducting the regression analyses. Additionally, we dummy coded the *OPRM1* genotypes to compare AA/AG carriers with GG

carriers. The two dummy-coded variables were: AA (1) versus GG (0) (*OPRM1*_1) and AG (1) versus GG (0) (*OPRM1*_2). Gender (male = 0, female = 1) was also included as a potential control variable in the hierarchical multiple regression analyses. First, we tested the main effects of perceived parental attention and the two *OPRM1* dummy-coded variables on social support seeking (Step 1). Then we entered the interaction with the perceived parental attention and the two *OPRM1* dummy-coded variables into the regression model (Step 2).

Table 14 Results of hierarchical regression analysis predicting social support seeking.

	Step 1 (R^2 = .052, p < .001)				Step 2 (ΔR^2 = .017, p = .005)			
Predictors	*B*	*SE*	*t*(595)	*p*	*B*	*SE*	*t*(593)	*p*
Gender (0: M, 1: F)	0.37	0.08	4.34	<.001	0.37	0.08	4.39	<.001
Perceived parental attention	0.15	0.06	2.69	.007	0.52	0.13	4.11	<.001
OPRM1_1 (0: GG, 1: AA)	-0.21	0.12	-1.72	.087	-0.22	0.12	-1.86	.064
OPRM1_2 (0: GG, 1: AG)	-0.16	0.11	-1.49	.136	-0.18	0.11	-1.64	.102
Parental attention × *OPRM1_1*					-0.42	0.16	-2.62	.009
Parental attention × *OPRM1_2*					-0.47	0.15	-3.20	.001

Note. Gender: M = Male, F = Female.

The results of multiple regression analyses showed that the main effect of perceived parental attention (b = 0.15, SE = 0.06, t(595) = 2.69, p = .007) on social support seeking was significant, whereas the main effect of two *OPRM1* dummy-coded variables was not significant (ps >= .087; Table 14) in Step 1. Importantly, there were significant interactive effects of perceived parental attention and *OPRM1* gene polymorphism on social support seeking (Step 2).

Specifically, the effects of perceived parental attention on social support seeking significantly differed between the AA and GG carriers (b = -0.42, SE = 0.16, t(593) = -2.62, p = .009). The effects of perceived parental attention on social support seeking also significantly differed between the AG and GG carriers (b = -0.47, SE = 0.15, t(593) = -3.20, p = .001). The results of simple slope analyses showed that perceived parental attention significantly increased only GG carriers' social support seeking (b = 0.52, SE = 0.13, t(593) = 4.11, p < .001), whereas the association between perceived parental attention and social support seeking was significant for neither the AA carriers (b = 0.09, SE = 0.10, t(593) = 0.94, p = .350) nor the AG carriers (b = 0.04, SE = 0.08, t(593) = -0.54, p = .585) (see Figure 15).

To interpret the interactive effects further, I evaluated the regions of significance using the Johnson-Neyman technique. Figure 15 depicts the regions of significance (gray areas). The results showed that relative to the AA genotype, the GG homozygote significantly increased carriers' social support seeking when perceived parental attention was greater than 5.06 (0.04 *SD* above the mean), and it significantly decreased social support seeking when perceived parental attention was less than 2.65 (3.17 *SD* below the mean). They also showed that relative to the AG genotype, the GG homozygote significantly increased carriers' social support seeking when perceived parental attention was greater than 5.11 (0.11 *SD* above the mean), and it significantly decreased social support seeking when perceived parental attention was less than 3.77 (1.68 *SD* below the mean). These patterns support the differential susceptibility hypothesis.

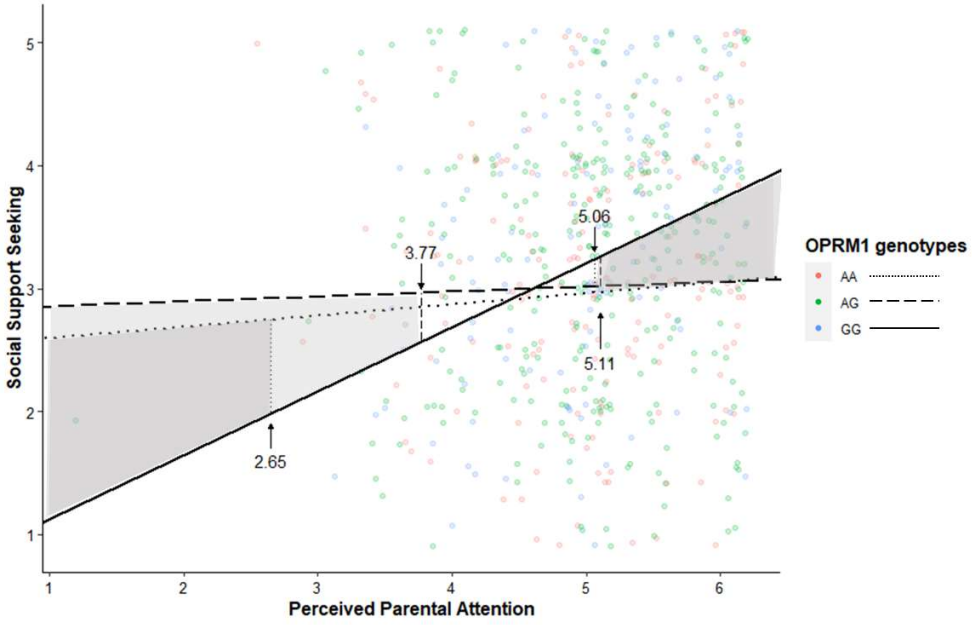


Figure 15 The interaction between perceived parental attention and *OPRM1* polymorphisms on social support seeking.

Note: Gray areas are the significant regions of each interaction terms using Johnson-Neyman 95% confidence bands.

Discussion

The aim of this study was to examine the roles of perceived parental attention and the *OPRM1* A118G polymorphism in predicting one's social support seeking in early adulthood. After controlling for the effect of gender, I found a positive effect of perceived parental attention on social support seeking (Step 1). Individuals who perceived themselves to have received more attention from their parents during childhood sought social support more frequently in coping with daily stress in early adulthood. However, as expected, the results revealed that there was a

significant interactive effect of perceived parental attention and *OPRM1* genotypes on social support seeking. Specifically, among carriers of GG homozygotes, the amount of parental attention subjectively perceived during childhood positively predicted social support seeking, whereas carriers of the AA and AG genotypes reported similar frequencies in social support seeking regardless of the parental attention they perceived.

There is a line of research documenting that parental rearing behaviours are related to one's support-seeking behaviours when dealing with stress (Gaylord-Harden et al., 2010). This connection may operate through the roles of early parenting in shaping children's internal working models of the self and others (Bowlby, 1969). The present study adds new evidence to this line of research by first demonstrating the positive effect of perceived parental attention on social support seeking. Like other positive parenting behaviours (i.e., acceptance), perceived parental attention may convey a sense of the availability of support and security and, thus, encourages support seeking when individuals are distressed (Kliewer et al., 1996). Future research is needed to examine whether this positive influence of perceived parental attention on support seeking is mediated by the perception of available support or affective security.

The present study extends previous work on social support seeking by identifying the role of genetic polymorphism in the association between perceived parental attention and social support seeking. The current findings support growing evidence that the G allele of the *OPRM1* gene confers a greater sensitivity to early family experiences (Johnson et al., 2016). The observed results showed that perceived parental attention in childhood significantly promoted social support seeking only among people who possess the GG homozygotes of *OPRM1*. It appears that, parental attention is more important for GG–carrying individuals than for A allele–carrying individuals, at least in regard to social support seeking. Prior research has suggested that

compared to AA carriers, *OPRM1* G allele carriers are more sensitive to social rejection (e.g., Slavich et al., 2014; however, see Persson et al., 2019), of which neglectful parenting is a kind. In this sense, the GG genotype may increase individuals' sensitivity to the amount of attention received from his/her parents, and thus amplify the influence of perceived parental attention on social support seeking. Another possible reason that perceived parental attention has a greater influence on GG carriers' support-seeking behaviors is that, compared with others, *OPRM1* GG-carrying individuals may have limited social resources outside their family. Perceived parental attention may in part determine the perception of support available from family members. *OPRM1* G allele-carriers have been shown to have a higher tendency to engage in social withdrawal (Bertoletti et al., 2012; Cimino et al., 2020). A lower ability to tolerate pain has also been associated with a smaller social network (Johnson & Dunbar, 2016). Such deficiencies in sociality may reinforce GG carriers' dependence on family for social support and therefore highlight the importance of perceived parental attention. Future studies could investigate this possibility by examining whether the *OPRM1* polymorphism correlates to social network size and whether the size of individual's social network moderates the influence of perceived parental attention on support seeking.

Importantly, this study extended prior *OPRM1* research by distinguishing the GG homozygotes from the AG genotypes. The observation of a significant impact of perceived parental attention on social support seeking in only the GG group might have implications for the existing heterogeneous evidence on the function of *OPRM1* genotypes. As mentioned earlier, to date, the findings on the main effect of *OPRM1* and the interactive effect of *OPRM1* and social environments are mixed. For example, Troisi et al. (2011) found that G allele-carrying individuals had a higher capacity to enjoy social life and reported lower avoidant attachment, in

contrast to findings that G allele carriers exhibited a higher tendency to withdraw from social interaction (Bertoletti et al., 2012). In some research, G allele carriers were also found to be less sensitive to early parenting (Copeland et al., 2011). Notably, most previous studies compared G allele carriers and AA carriers, rather than conducting pairwise comparison with carriers of each genotype (Carver et al., 2016), because the G allele is relatively uncommon in Western populations (Way & Lieberman, 2010). According to the current findings, however, among Japanese people, the differences between AG carriers and GG carriers seem even larger than those between AA carriers and GG carriers. Likewise, research on physical pain has shown that only *OPRM1* GG homozygous patients exhibited a greater need of opioid doses and stronger side effects after therapy (Margarit et al., 2019; Reyes-Gibby et al., 2007). Thus, combining AG carriers and GG carriers as a G allele group may obscure the differences between different genotypes or even lead to opposite conclusions. The obtained findings reinforce the importance of differentiating between the *OPRM1* GG homozygotes and the AG heterozygotes in future work. Of course, the discrepancies of previous findings could also be due to small sample sizes, population (i.e., clinical samples, ethnicity), categories of social events, measurements, or other factors. The inconsistency of the findings cautions against drawing strong conclusions about the function of the *OPRM1* A118G polymorphism.

By using a relatively large sample size and comparing carriers of all three genotypes, the present research demonstrated for the first time that the influence of perceived parental attention in childhood on support seeking is modified by *OPRM1* genotypes. However, there are also several limitations to this study. First, although the measures the present study used were used repeatedly in prior research (e.g., Kim et al., 2010; Ohtsubo et al., 2022), the self-report measure and cross-sectional design did not allow us to draw any causal conclusions about the obtained

findings. The measure of perceived parental attention, in particular, was based on only two retrospective items. Most participants reported relatively high levels of perceived parental attention (M = 5.03, SD = 0.75). The interaction terms plotted with relatively few low-level data points might not be sufficient to confirm a differential susceptibility model. Longitudinal studies with more sophisticated and objective measures of early parenting and support seeking are required to examine this issue in more depth. Second, although some possible explanations for the observed interactive effect of *OPRM1* polymorphism and perceived parental attention on social support seeking were provided, the underlying mechanisms of this effect remain unknown. It is important for future research to clarify the molecular function of the *OPRM1* polymorphism, which may help us understand the moderating effect of this gene in the responsiveness to social situations. Third, although I used a relatively large sample, the present study focused exclusively on Japanese. As discussed in the previous chapters, social support seeking is significantly influenced by culture (Taylor, Davis et al., 2004), so it is unclear whether the current findings are limited to Japanese or East Asians. Additional research is needed to study the roles of *OPRM1* polymorphism and perceived parental attention in support seeking among other ethnic groups.

In summary, the present study demonstrated that the *OPRM1* A118G polymorphism moderated the influence of perceived parental attention on social support seeking in early adulthood. Carriers of the GG homozygote who subjectively perceived themselves to have received more parental attention during childhood reported more social support seeking in response to stress. This study provided new insight into the influence of parenting on support seeking by introducing the effect of genetics into this process. Greater knowledge of the factors influencing willingness to seek support could help us develop more effective strategies for encouraging people to seek support when they are in need. If the results of this study are

replicated in further research, this could highlight the importance of parental attention in encouraging support seeking, particularly for people who possess the *OPRM1* GG genotype.

Chapter Conclusion

In conclusion, the findings of this Chapter provide more support for the differential susceptibility hypothesis demonstrating that, although childhood experience, particularly early family environments, is important in shaping individuals' trust and willingness to seek support in later life stages, the effect of childhood experience is modified by *OXTR* rs53576 and *OPRM1* respectively. It highlights the importance of considering the role of environmental susceptible genes when discussing the effect of environmental exposure on psychological or behavioural outcomes.

So far, this dissertation has separately investigated how culture and childhood experience shape individuals' general tendency to seek social support in response to stressful events. The next part of this dissertation investigated individuals' support seeking toward specific networks. This was done by examining the frequencies with which Chinese international students in Japan/U.S. seek social support from people in the host/home country.

Chapter 4: Acculturation Orientation, Social Support Seeking, and Cross-cultural Adaptation

As reviewed in Chapter 1, studies in the field of cross-cultural adaptation suggest that social support and acculturation orientation are two important predictors of cross-cultural adaptation. However, findings regarding the association between social support and cross-cultural adaptation were inconsistent. To clarify the effect of social support in cross-cultural adaptation, Demes and Geeraert (2015) proposed that it is necessary to distinguish between support from people in home country and support from people in host country.

Unlike students a few decades ago, the popularization of online communication now enables international students to access their established networks from home country as easy as their local networks. Although online communication offers an effective way for international students to acquire extra social support from their home country, prior research found that reliance on the networks in home country could be detrimental to psychological adaptation (Lee et al., 2011). Demes and Geeraert (2015) also found that, although sojourners' stress was negatively associated with close support seeking, it was positively associated with distant support seeking. The distinct effect of these two types of support seeking raises an interesting question: what influence the frequency with which international students draw on these two support networks for support?

Another issue remains unclear in cross-cultural adaptation research is mechanisms underlying the association between acculturation orientation and adaptation. Using samples of Chinese international students in Japan (Study 7) and U.S. (Study 8), the studies reported in this chapter sought to address these questions by examining whether acculturation orientation would

influence the use of distant and close support seeking, and whether social support seeking would mediate the association between acculturation orientation and cross-cultural adaptation.

To address the first question, students' acculturation orientation toward host and home culture were assessed separately. Host culture orientation refers to the desire to adopt or engage with the host culture, whereas home culture orientation refers to the desire to maintain the home culture (Berry, 1997, 2005). Although these two dimensions are related, researchers argued that they should be considered as two relatively independent antecedents/outcomes of the acculturation process (e.g., Demes & Geeraert, 2014; Ryder et al., 2000; Ward & Geeraert, 2016). Based on the previous findings that host culture orientations promote more contacts/interactions with people (particularly locals and internationals) in the host country (e.g., Doucerain et al., 2017; Kashima & Loh, 2006; Szabó et al., 2020; Zhang & Goodson, 2011a), I expected that *host culture orientation would be positively associated with close support seeking* (Prediction 1). And considering the potential benefits of contact with people back home country in maintaining the continuity of home culture identity, I expected that *home culture orientation would be positively associated distant support seeking* (Prediction 2).

To address the second question, students' psychological adaption in host country (Japan or U.S.) were assessed. First, based on the distinct effect of close and distant support on psychological adaptation and acculturative stress (e.g., Demes & Geeraert, 2015; Kashima & Loh, 2006; Lee et al., 2011), I expected that *close support seeking would be positively associated with psychological adaptation* (Prediction 3), whereas *distant support seeking would be negatively associated with psychological adaptation* (Prediction 4). Second, given the connections among acculturation orientation, social support, and adaptation, I expected that host/home culture orientation would promote support seeking from the corresponding networks,

which would influence adaptation ultimately. Specifically, I expected that *close support seeking would mediate the association between host culture orientation and psychological adaptation* (Prediction 5), whereas *distant support seeking would mediate the association between home culture orientation and psychological adaptation* (Prediction 6).

In addition to psychological adaptation, participants in Study 7 were also asked to report their sociocultural adaptation. As reviewed in Chapter 1, although psychological adaptation and sociocultural adaptation were related, they are determined by different antecedents (e.g., Demes & Geeraert, 2014; Ward & Rana-Deuba, 1999). I did not make any specific predictions regarding the relation between distant/close support seeking and sociocultural adaptation. Just for an exploratory purpose, Study 7 investigated the role of distant/close support seeking in international students' sociocultural adaptation.

To understand the effect of distant/close support seeking in cross-cultural adaptation more comprehensively, Study 8 added the measure of loneliness as an additional indicator of adaptation. As is known, loneliness is one of the most common problems faced by international students who leave behind their well-established network to study abroad (e.g., Alharbi & Smith, 2018; Chataway & Berry, 1989; Sawir et al., 2008; Wawera & McCamley, 2020). Although it has been found that reliance on distant support hindered adaptation (Demes & Geeraert, 2015; Lee et al., 2011) because it might hamper international students from social engagement in the host country (e.g., establishing new social networks), distant support might alleviate international students' loneliness because it reminds them that they are loved and cared for by someone back home country even though they are alone now. In Chapter 2 (Study 2), I also found that social support seeking effectively alleviated support seekers' loneliness. Therefore, I expected that *both distant and close support seeking would be negatively associated with loneliness* (Prediction 7).

Study 7

Method

Ethics statement

Studies 7 and 8 were reviewed and approved by the ethics committee at Nagoya University. All responses were kept confidential.

Participants and procedure

A total of 202 Chinese international students in Japan were recruited through a Chinese social network site “WECHAT”. However, 35 participants failed in the attention check questions, 6 participants did not complete the full questionnaire. Therefore, the final sample of this study was 131 (84 females and 47 males, M_{age} = 25.04, *SD* = 2.70). This sample consisted of 116 graduate students, 8 undergraduates, and 7 students from other educational institutions (e.g., Japanese language school). The average length of residence in Japan was 29.19 months (*SD* = 23.27). All participants are Chinese born in China.

After consenting, the participants completed a questionnaire designed with Qualtrics including the measurements of stressful events, support seeking, acculturation orientation, psychological adaptation, and sociocultural adaptation. In the end, they were asked to provide their demographic information. Students took part in this survey in exchanged for a 400-yen Amazon gift card.

Measures

Using the standard forward-backward translation procedure, all measurements used in this study were translated into simplified Chinese from English.

Stressful events. In order to clarify the sources of stress that Chinese international students in Japan are facing, all participants were asked to briefly describe the biggest stressor they had come across within the previous three months first. And then, participants were asked to choose the most relevant type for their own stressors from 9 options (e.g., friend relationship, health, future, et al.; see Study 2 for details).

Social support seeking. Following Demes and Geeraert's (2015) research, using 8 items revised from the 2-item emotional support subscale and the 2-item instrumental support subscale from Brief COPE (Carver, 1997), social support seeking was assessed by support seeking from people locally in Japan (*close support seeking*) separately from support seeking remotely from people in China (*distant support seeking*). For instance, one of emotional support seeking item was altered into "*I try to get emotional support from people I've met in Japan*" for close emotional support seeking and "*I try to get emotional support from people back in China*" for distant emotional support seeking. The sample items for instrumental support seeking were "*I try to get help and advice from people I've met in Japan*" for close instrumental support seeking, and "*I try to get help and advice from people back in China*" for distant instrumental support seeking. Participants were asked to rate how often they tried to cope with their stressors using the strategies described by the items on a 5-point scale ranging from *not at all* (1) to *very much* (5). Cronbach's alpha coefficients were 0.88 for close emotional support seeking, 0.93 for close instrumental support seeking, 0.89 for distant emotional support seeking, and 0.94 for distant instrumental support seeking.

Acculturation orientation. Acculturation orientation was assessed using 8 items revised from the Brief Acculturation Orientation Scale (BAOS; Demes & Geeraert, 2014). Based on the existing scales (Ryder et al., 2000), Demes and Geeraert (2014) identified 4 main indicators of acculturation orientation: the value of building social circles, taking part in traditions, developing cultural characteristics, and obeying norms. Each indicator is presented twice (one for the home country and one for the host country). Participants were asked to rate their agreement with each statement using a 7-point scale ranging from *strongly disagree* (1) to *strongly agree* (7). Sample items include "*It is important for me to develop my Japanese characteristics*" (Japanese culture orientation) and "*It is important for me to hold on my Chinese characteristics*" (Chinese culture orientation). The Cronbach's alpha coefficients were 0.80 for Chinese culture orientation and 0.78 for Japanese culture orientation.

Psychological adaptation. Psychological adaptation was measured using the Brief Psychological Adaptation Scale (BPAS; Demes & Geeraert, 2014). The BPAS was developed to measure the stress of culture relocation (e.g., homesickness, social withdraw et al.). It consists of 10 items covering positive and negative feelings related to cultural adaptation. Participants were asked to rate the frequency of experiencing the feeling described in each item in the last 2 weeks using a 7-point scale ranging from *never* (1) to *always* (7). Sample items include "*Out of place, like you don't fit into Japanese culture*" (reversed item) and "*Happy with your day-to-day life in Japan.*" The Cronbach's alpha coefficient for the current sample was 0.80.

Sociocultural adaptation. Sociocultural adaptation was assessed using the Brief Sociocultural Adaptation Scale (BSAS; Demes & Geeraert, 2014). The BSAS was developed to evaluate ease of adaptation to the social and cultural environment in the host country. Through examining the existing scales and a list of responses got from a structural interview with people

living abroad, Demes and Geeraert (2014) identified 12 key elements in sociocultural adaptation to the host country, such as social norms, making friends, and living. Participants were asked to rate how easy is it for them to adapt to each sociocultural element in Japan using a 7-point scale ranging from *very difficult* (1) to *very easy* (7). Sample items include "*Social norms (how to behave in public, style of clothes, what people think is funny)*" and "*Values and beliefs (what people think about religion and politics, what people think is right or wrong).*" The Cronbach's alpha coefficient was 0.83 for the present sample.

Demographics. Participants were asked to provide their demographic information including (1) age, (2) gender, (3) current educational level (graduate, undergraduate, or other), (4) length of residence in Japan (months), (5) size of social network in Japan, and (6) subjective fluency of Japanese.

Size of social network in Japan was assessed by one single question: "*How many friends do you have in Japan?*". And the exact number of friends participants reported were re-coded into a 7-point scale[4]: (0) no friends; (1) equal to or more than 1 but less than or equal to 5 friends; (2) equal to or more than 6 but less than or equal to 10; (3) equal to or more than 11 but less than or equal to 15; (4) equal to or more than 16 but less than or equal to 20; (5) equal to or more than 21 but less than or equal to 25; (6) equal to or more than 26.

Subjective fluency of Japanese was assessed using the 3 following questions: (1) "*What is your present level of Japanese fluency?*" (2) "*How comfortable are you communicating in Japanese?*" (3) "*How often do you communicate in Japanese?*" This method of assessing subjective language fluency has been widely used in prior research (e.g., Sullivan & Kashubeck-

[4] Even if the exact number of friends is used, the significant results of the following regression analyses remain.

West, 2015; Yeh & Inose, 2003). Participants were asked to answer these 3 questions with a 5-point scale. The Cronbach's alpha coefficient for the present sample was 0.88.

Results

Stressful events

As shown in Figure 16, the major stressors that participants faced within the previous 3 months were related to their academic life (57.40%) and future (14.50%).

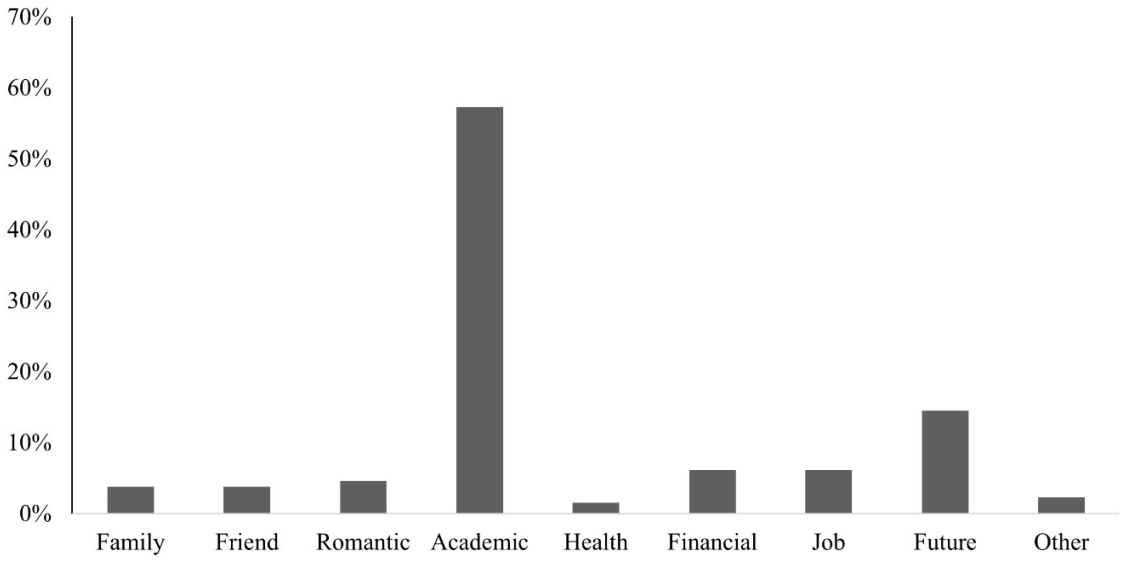


Figure 16 The types of stressors among Chinese international students in Japan

Correlational analyses

Chinese culture orientation was positively correlated to distant support seeking (for emotional support: $r(129) = 0.29$, $p = .001$; for instrumental support: $r(129) = 0.26$, $p = .003$), whereas Japanese culture orientation was positively correlated to close support seeking (for emotional support: $r(129) = 0.29$, $p = .001$; for instrumental support: $r(129) = 0.26$, $p = .002$).

Interestingly, Chinese culture orientation also significantly correlated to close emotional support seeking ($r(129) = 0.25$, $p = .004$).

Social support seeking only significantly correlated to psychological adaptation. Specifically, close support seeking, as expected, positively correlated to psychological adaptation (for emotional support: $r(129) = 0.19$, $p = .027$; for instrumental support: $r(129) = 0.19$, $p = .032$). Regarding distant support seeking, however, only distant emotional support seeking significantly correlated to psychological adaptation ($r(129) = –0.28$, $p = .001$; Table 15). Moreover, cultural adaptation positively correlated to Japanese culture orientation (for psychological adaptation: $r(129) = 0.35$, $p < .001$; for sociocultural adaptation: $r(129) = 0.36$, $p < .001$), but negatively correlated to Chinese culture orientation (for psychological adaptation: $r(129) = -0.22$, $p = .012$; for sociocultural adaptation: $r(129) = -0.20$, $p = .019$).

Table 15 Means, standard deviations, and Pearson's correlations of all variables in Study 7.

	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12
Demographics														
1 Age	25.04	2.70												
2 Gender (1 = male; 0 = female)	-	-	.11											
3 Length of residence in Japan	29.19	23.27	.52***	.04										
4 Social network in Japan	2.48	1.47	.06	.19*	-.15									
5 Language ability	3.14	1.09	.13	.05	.34***	.08								
Acculturation orientation														
6 Chinese orientation	5.19	1.23	-.14	-.13	.02	.00	.08							
7 Japanese orientation	4.40	1.16	-.03	-.01	.05	.23**	.23**	.10						
Social support seeking														
8 Distant emotional support	3.32	1.06	-.22*	-.32***	-.20*	-.04	-.14	.29**	.04					
9 Distant instrumental support	3.00	1.08	-.22*	-.25**	-.17	-.03	-.13	.26**	.10	.70***				
10 Close emotional support	2.96	1.07	.07	-.15	.04	.09	.02	.25**	.29**	.16	.07			
11 Close instrumental support	3.09	1.03	.00	-.10	-.01	.06	.08	.11	.26**	.03	.11	.68***		
Cultural adaptation														
12 Psychological adaptation	4.34	1.05	.09	.13	.07	.17	.06	-.22*	.35***	-.28**	-.13	.19*	.19*	
13 Sociocultural adaptation	4.88	0.97	.078	.19*	.14	.18*	.28**	-.20*	.36***	-.17	-.09	.10	.06	.55***

Note. $N = 131$; $^{*}p < .05$, $^{**}p < .01$, $^{***}p < .001$

Social support seeking

Distant support seeking. After controlling the effect of gender and length of residence in Japan, the results of multiple regression analyses showed that Chinese culture orientation significantly predicted increased distant emotional support seeking (b = 0.22, SE = 0.07, t(127) = 3.25, p = .001) and distant instrumental support seeking (b = 0.21, SE = 0.07, t(127) = 2.82, p = .006).

Close support seeking. The results of multiple regression analyses revealed that, after controlling the effect of gender, size of social network in Japan, subjective fluency of Japanese, Japanese culture orientation significantly predicted increased close emotional support seeking (b = 0.25, SE = 0.08, t(125) = 2.73, p = .002) and close instrumental support seeking (b = 0.22, SE = 0.08, t(125) = 2.72, p = .007). Unexpectedly, Chinese culture orientation also significantly predicted increased emotional support seeking locally from people in Japan (b = 0.19, SE = 0.07, t(125) = 2.56, p = .012).

Cultural adaptation

Psychological adaptation. As shown in Table 16 (Step 2), the results of regression analyses showed that Chinese culture orientation significantly predicted decreased psychological adaptation (b = -0.22, SE = 0.07, t(127) = -3.21, p = .002), whereas Japanese culture orientation significantly predicted increased psychological adaptation (b = 0.34, SE = 0.07, t(127) = 4.65, p < .001). After adding four types of social support seeking in the regression model (Table 16, Step 3), the regression coefficients of Chinese culture orientation (b = -0.20, SE = 0.07, t(123) = -2.88, p = .005) and Japanese culture orientation (b = 0.29, SE = 0.07, t(123) = 3.92, p < .001) decreased. Regarding the association between social support seeking and psychological

adaptation, only two indicators of emotional support seeking were positively associated with psychological adaptation. Specifically, more distant emotional support seeking was significantly associated with lower psychological adaptation (b = -0.37, SE = 0.11, t(123) = -3.25, p = .002). In contrast, more close emotional support seeking was significantly associated with higher psychological adaptation (b = 0.24, SE = 0.11, t(132) = 2.10, p = .038).

To test the possible mediating effect of distant emotional support seeking on the association between Chinese culture orientation and psychological adaptation in Japan, using Model 4 of PROCESS, a mediation analysis with Chinese culture orientation as the independent variable, distant emotional support seeking as the mediator, psychological adaptation as the dependent variable, and including gender and length of residence in Japan as covariates in the predicting model of the mediator was performed. The bootstrapping results (N = 10,000) showed that as predicted, the negative effect of Chinese culture orientation on psychological adaptation was significantly mediated by distant emotional support seeking (indirect effect = -0.05, SE = 0.03, 95% CI = [-0.12, -0.01]; Figure 17). However, the indirect effect of Japanese culture orientation on psychological adaptation via close emotional support seeking was not significant (indirect effect = 0.03, SE = 0.03, 95% CI = [-0.01, 0.11]).

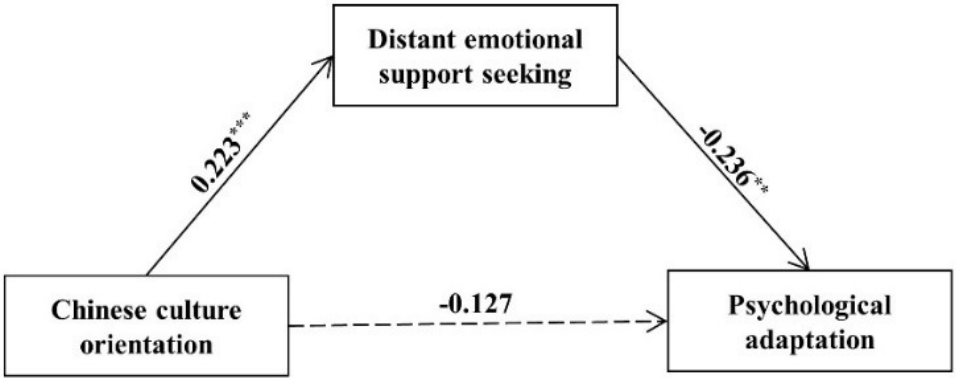


Figure 17 Mediation path between Chinese culture orientation and psychological adaptation in Japan via distant emotional support seeking.

Note: Gender and length of residence in Japan are included as covariates for the model of the mediator.

Sociocultural adaptation. According to the results of correlation analyses, no indicator of social support seeking appeared to correlate with sociocultural adaptation significantly. In this section, therefore, only the predicting effect of acculturation orientation on sociocultural adaptation was examined. The results of regression analyses showed that, after controlling the effect of length of residence in Japan and subjective fluency of Japanese, Japanese culture orientation positively predicted sociocultural adaptation (b = 0.28, SE = 0.07, $t(126)$ = 4.12, p < .001), whereas Chinese culture orientation negatively predicted sociocultural adaptation significantly (b = -0.20, SE = 0.06, $t(126)$ = -3.25, p = .001).

Table 16 Results of hierarchical linear regression predicting psychological adaptation in Japan.

	Step 1 (R^2 = .005, p = .431)				Step 2 (ΔR^2 = .186, p < .001)				Step 3 (ΔR^2 = .096, p = .004)			
Predictors	*B*	*SE*	*t*	*p*	*B*	*SE*	*t*	*p*	*B*	*SE*	*t*	*p*
(Constant)	4.253	.147	28.854	<.001	3.928	.468	8.390	<.001	4.358	.506	8.614	<.001
Length of residence in Japan	.003	.004	.790	.431	.002	.004	.673	.502	.000	.004	-.027	.961
Chinese orientation					-.220	.068	-3.208	.002	-.203	.070	-2.878	.005
Japanese orientation					.337	.072	4.654	<.001	.285	.073	3.915	<.001
Distant emotional support									-.369	.114	-3.246	.002
Distant instrumental support									.148	.109	1.360	.176
Close emotional support									.235	.112	2.097	.038
Close instrumental support									-.041	.112	-.370	.712

Note: Unstandardized regression coefficients are presented.

Summary and discussion

Study 7 preliminarily demonstrated the predicted links among acculturation orientation, social support seeking, and cross-cultural adaptation by conducting a survey among Chinese students in Japan. First, Chinese culture orientation and Japanese culture orientation respectively influenced Chinese international students' distant support seeking and close support seeking in Japan. When coping with daily stresses in Japan, Chinese students high in Chinese culture orientation exhibited a high tendency to seek support from people back in China, whereas those high in Japanese culture orientation had a high tendency to seek support locally from people in Japan.

Second, only emotional support seeking had a significant effect on psychological adaptation. Specifically, consistent with our second prediction, seeking emotional support from people back in China worsened psychological adaptation, whereas seeking emotional support from people in Japan improved psychological adaptation. In addition, consistent with prior research (Demes & Geeraert, 2014), home (Chinese) culture orientation was associated with lower adaptation, whereas host (Japanese) culture orientation was associated with higher adaptation.

Third, evidence was firstly found that the detrimental effect of Chinese culture orientation on psychological adaptation occurred through an indirect effect on distant emotional support seeking. However, the indirect effect of Japanese culture orientation on psychological adaptation via close support seeking was not supported.

These results provided initial support for the hypothesis that distant/close support seeking of international students, to some extent, depends on their acculturation orientation. And the negative effect of home culture orientation on psychological adaptation in the host country was explained by the heavy reliance on emotional support provided by people in the home country.

However, due to the exploratory nature and limited sample of Study 7, it is necessary to replicate these findings with another sample and obtain more evidence for our proposed explanations.

Study 8

Study 8 aimed to establish confidence in the main findings from Study 7 by replicating them with a sample of Chinese international students in United States. To unfold the effect of acculturation orientation on distant support seeking, Study 8 also examined whether home culture orientation would increase motivation to maintain networks in home country and whether this motivation would explain the association between home culture orientation and distant support seeking. Additionally, students' loneliness was assessed to test *Prediction 7* whether social support seeking would alleviate students' loneliness.

Method

Participants and procedure

One-hundred and eighteen Chinese international students in U.S. were recruited through "WECHAT". Eighteen participants did not pass the attention check items and 2 participants did not complete the full questionnaire, leaving a final total of 98 participants (64 females and 34 males, M_{age} = 23.89, *SD* = 3.09). The sample consisted of 63 graduate students, 33 undergraduate students, and 2 who did not indicate their current academic status. Participants reported the average length of residence in U.S. was 51.86 months (*SD* = 45.01). All participants were born in China.

A survey designed with Qualtrics was distributed in several international students WeChat groups. After giving consent, the participants were asked to complete a questionnaire containing three sections: describing the most stressful events encountered within the past 3 months, a series of self-evaluating scales (e.g., social support seeking), and a demographics section (e.g., current academic status). Participants were paid $5.0 (Amazon gift card) for their participation.

Measure

Stressful events. As Study 7, at the beginning of the survey, participants were asked to describe the most stressful event they had encountered within the past 3 months very briefly. Subsequently, they were asked to identify which is more relevant to the stressful event they described from 9 different stressors (e.g., family relationship, academic, financial et al.; see Study 2 for details).

Social support seeking. Social support seeking was assessed using 8 items that is revised from the emotional support subscale and the instrumental support subscale of the Brief COPE (Carver, 1997) in the same way as Study 7 did. In other word, there were 4 types of social support seeking assessed: (1) close emotional support seeking; (2) close instrumental support seeking; (3) distant emotional support seeking; (4) distant instrumental support seeking. Each subscale consisted of 2 items. Sample items include "*I try to get help and advice from people I've met in U.S.*" (close instrumental support seeking), and "*I try to get emotional support from people I've met in U.S.*" (close emotional support seeking). Participants rated their frequency of using the strategies described in each item to cope with their daily stress on a 5-point scale (1 = not at all, 5 = very much). Cronbach's alpha coefficients for these 4 subscales were good: 0.86 for close emotional support seeking, 0.92 for close instrumental support seeking, 0.91 for distant emotional support seeking, and 0.87 for distant instrumental support seeking.

Acculturation orientation. Acculturation orientation was assessed using the BAOS (Demes & Geeraert, 2014) as Study 7. Sample items include: *"It is important for me to do things the way Chinese people do*" (Chinese culture orientation), and *"It is important for me to do things the way American people do"* (American culture orientation). Participants rated their agreement with the description of each item on a 7-point scale (1 = strongly disagree, 7 = strongly agree). The Cronbach's alpha coefficients were 0.85 for American culture orientation and 0.85 for Chinese culture orientation.

Maintaining network in China. Maintaining network in China was assessed using the 4 following items: (1) "*My social network in China is very important to me*" (2) "*It is very important for me to maintain my social circle in China*" (3) "*My social circle is mainly in China*" (4) "*My circle in China is not important to me anymore*" (reversed item). Participants rated their agreement with each item on a 5-point scale (1 = not at all, 5 = very much). Cronbach's alpha coefficient for these 4 items was 0.88. The items were averaged to form a composite indicator of maintaining network in China, with higher scores indicating more emphasis on maintaining circle in China.

Psychological adaptation. The measure of psychological adaptation was also the same as Study 7, using the BPAS (Demes & Geeraert, 2014). The BPAS is a 10-item scales. Participants rated how frequently they felt the way described by each item on a 7-point scale (1 = never, 7 = always). Sample items include: "*Nervous about how to behave in certain situations*" (reversed item), and "*Frustrated by difficulties adapting to America*" (reversed item). Cronbach's alpha coefficient for the current sample was 0.72.

Loneliness. Loneliness was assessed using the same 20 items used in Study 2 (R-UCLA; Russell et al., 1980). Sample items include: "*People are around me but not with me*" and "*I feel*

left out." Participants rated the frequency that they felt the way described by the statements on a 4-point scale (1 = never, 4= often). The Cronbach's alpha coefficient for the present sample was 0.89.

Demographics. Participants self-reported their (1) current educational level, (2) length of residence in U.S. (months), (3) size of social network in U.S., (4) subjective fluency of English, (5) age, (6) gender, and (7) SES.

Size of social network in U.S. was assessed by one item: "*How many friends do you have in U.S.?*" with a 6-point scale anchored by "*0 = no friends*" and "*6 = equal to or more than 26*" as in Study 1.

Subjective fluency of English was assessed using the same 3 items used in Study 7: (1) "*What is your present level of English fluency?*" (2) "*How comfortable are you communicating in English?*" (3) "*How often do you communicate in English?*" with a 5-point scale. The Cronbach's alpha coefficient of these 3 items was 0.92.

SES was assessed by the same measure used in Study 2 (Adler et al., 2000).

Results

Stressful events

As shown in Figure 18, 50.00% participants reported that the biggest stressors they encountered within the past 3 three months originated from their academic life. And the other two common stressors are related to (part-time) job (15.30%) and future (12.20%).

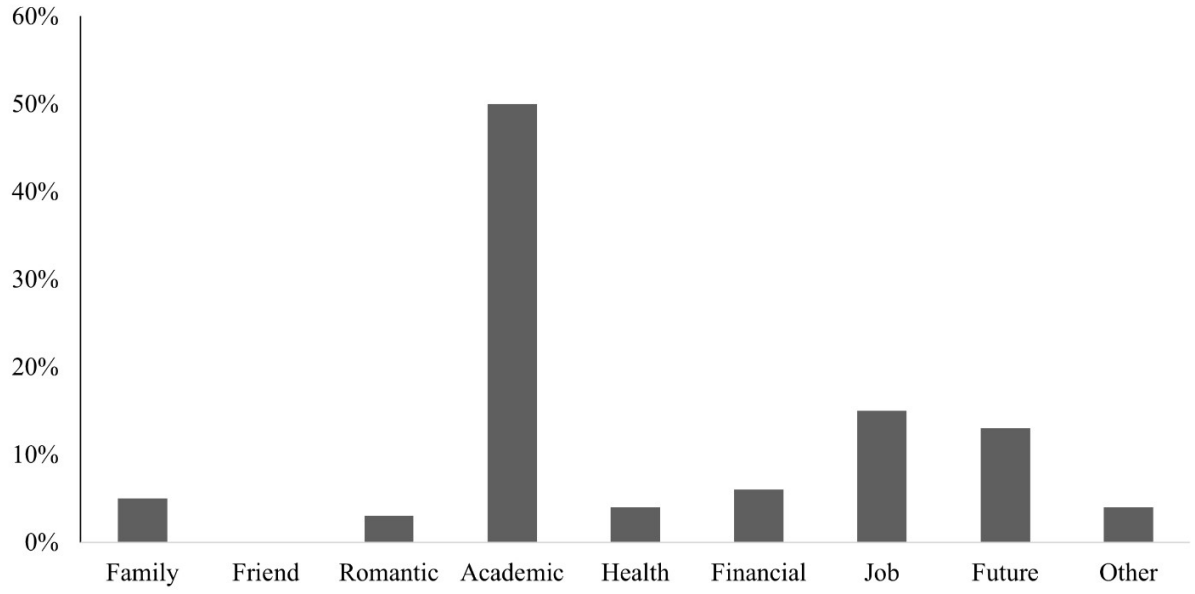


Figure 18 The types of stressors among Chinese international students in U.S.

Correlational analyses

As shown in Table 17, distant support seeking was positively correlated to Chinese culture orientation (for emotional support: $r(96) = 0.40$, $p < .001$; for instrumental support: $r(96) = 0.38$, $p < .001$) and motivation to maintain network in China (for emotional support: $r(96) = 0.39$, $p < .001$; for instrumental support: $r(96) = 0.38$, $p < .001$). In addition, the positive correlation of American culture orientation and close support seeking was also found (for emotional support: $r(96) = 0.32$, $p = .001$; for instrumental support: $r(96) = 0.21$, $p = .036$)

Chinese culture orientation ($r(96) = -0.28$, $p = .006$), motivation to maintain network in China ($r(96) = -0.35$, $p < .001$), and distant support seeking (for emotional support: $r(96) = -0.34$, $p = .001$; for instrumental support: $r(96) = -0.23$, $p = .026$) all significantly correlated to psychological adaptation. However, neither American culture orientation nor close support seeking significantly correlated to psychological adaptation (ps >= .223).

Further, as expected, emotional support seeking significantly correlated to loneliness (for distant emotional support: $r(96) = -0.25$, $p = .014$; for close emotional support: $r(96) = -0.40$, $p < .001$). Interestingly, close instrumental support seeking also significantly correlated to loneliness ($r(96) = -0.25$, $p = .014$). Additionally, loneliness significantly correlated to Chinese culture orientation ($r(96) = -0.27$, $p = .008$) and motivation to network in China ($r(96) = -0.28$, $p = .005$).

Table 17 Means, standard deviations, and Pearson's correlations of all variables in Study 8.

	Mean	*SD*	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Demographics																
1 Age	23.89	3.09														
2 Gender (1 = male; 0 = female)	-	-	-.16													
3 SES	5.94	1.61	-.04	.01												
4 Length of residence in US	51.86	45.01	.31**	.08	-.15											
5 Social network in US	3.24	1.60	-.01	.16	.28**	.07										
6 Language ability	3.67	0.97	.18	-.03	.30**	.39***	.40***									
Acculturation orientation																
7 Chinese culture orientation	5.53	1.29	-.09	.02	-.13	-.21*	-.06	-.09								
8 American culture orientation	4.56	1.29	-.04	-.13	.03	.09	-.09	.20*	.18							
9 Maintain network in China	3.40	1.12	-.09	.05	.02	-.45***	.06	-.21*	.57***	-.00						
Social support seeking																
10 Distant emotional support	3.05	1.14	-.03	-.23*	.00	-.19	-.06	-.08	.40***	.09	.39***					
11 Distant instrumental support	2.84	1.01	-.21*	-.04	-.01	-.15	.05	-.02	.38***	.03	.38***	.76***				
12 Close emotional support	3.15	1.02	-.05	-.18	.13	.21*	.09	.40***	.09	.32**	-.03	.31**	.26**			
13 Close instrumental support	3.20	1.07	-.08	-.07	.11	.16	.16	.31**	-.04	.21*	-.03	.28**	.29**	.76***		
Adaptation																
14 Psychological adaptations	4.50	0.90	-.03	-.02	.30**	.13	.26*	.32**	-.28**	.12	-.35***	-.34**	-.22*	.07	.08	
15 Loneliness	2.04	0.48	-.09	.10	-.36***	.07	-.33**	-.39***	-.27**	-.16	-.28**	-.25*	-.13	-.41***	-.25*	-.21*

Note. $N = 98$; $^{*}p < .05$, $^{**}p < .01$, $^{***}p < .001$.

Social support seeking

Distant support seeking. To test the predicted effect of Chinese culture orientation and motivation to maintain network in China on distant support seeking, a hierarchical linear regression analysis was performed. With distant emotional support seeking as the dependent variable, in Step 1, the main predictor of Chinese culture orientation was entered with gender and length of residence in U.S. included as covariates. And motivation to maintain network in China were entered in Step 2. As shown in Table 18, in Step 1, the significant predicting effect of Chinese culture orientation on distant emotional support seeking was found (b = 0.34, SE = 0.08, $t(94) = 4.12$, $p < .001$). Further, the inclusion of motivation to maintain network in China in Step 2 significantly contributed to the explained variance in distant emotional support seeking ($\Delta R^2 = .04$, $F(1,93) = 4.52$, $p = .036$). As hypothesized, motivation to maintain network in China significantly predicted increased distant emotional support seeking (b = 0.26, SE = 0.12, $t(93) = 2.13$, $p = .036$).

Table 18 Results of hierarchical linear regression predicting distant emotional support seeking.

	Step 1 ($R^2 = .221$, $p < .001$)				Step 2 ($\Delta R^2 = .036$, $p = .036$)			
Predictors	*B*	*SE*	*t(94)*	*p*	*B*	*SE*	*t(93)*	*p*
(Constant)	1.475	.506	2.914	.004	1.105	.527	2.098	.039
Gender	-.547	.217	-2.522	.013	-.591	.527	-2.761	.007
Length of residence in U.S.	-.002	.002	-.923	.358	.000	.003	.050	.961
Chinese culture orientation	.339	.082	4.123	.000	.229	.096	2.391	.019
Maintain network in China					.257	.121	2.126	.036

Note. $N = 98$; Gender: female = 0, male = 1.

Distant instrumental support seeking was submitted to the same hierarchical linear regression analysis (Table 19). In Step 1, as expected, Chinese culture orientation significantly predicted increased distant instrumental support seeking (b = 0.29, SE = 0.08, t(94) = 3.76, p < .001), when gender and length of residence in U.S. were entered simultaneously as covariates. Also, in Step 2, motivation to maintain network in China was significantly associated with distant instrumental support seeking (b = 0.23, SE = 0.11, t(93) = 2.00, p = .048).

Table 19 Results of hierarchical linear regression predicting distant instrumental support seeking.

	Step 1 (R^2 = .151, p = .001)				Step 2 (ΔR^2 = .035, p = .048)			
Predictors	*B*	*SE*	*t(94)*	*p*	*B*	*SE*	*t(93)*	*p*
(Constant)	1.358	.473	2.873	.005	1.031	.493	2.093	.039
Gender	-.093	.202	-.461	.646	-.132	.200	-.658	.512
Length of residence in U.S.	-.002	.002	-.719	.474	.000	.002	.187	.852
Chinese culture orientation	.288	.077	3.758	< .001	.191	.090	2.137	.035
Maintain network in China					.227	.113	2.003	.048

Note. N = 98; Gender: female = 0, male = 1.

Using Hayes's SPSS PROCCESS macro (2013; Model 4), the indirect effect of motivation to maintain network in China on the association between Chinese culture orientation and distant support seeking was estimated with 10,000 bootstrapping resamples performed. The result of mediation analysis showed that the positive association between Chinese culture orientation and distant emotional support seeking was significantly mediated by motivation to maintain network

in China (indirect effect = 0.11, *SE* = 0.06, 95% CI = [0.01, 0.24]; Figure 19). However, the indirect effect of motivation to maintain network in China was not significant for the link between Chinese orientation and distant instrumental support seeking (indirect effect = 0.10, *SE* = 0.05, 95% CI = [-0.01, 0.21]).

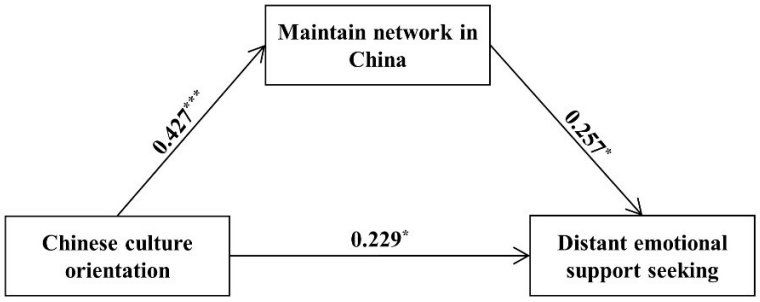


Figure 19 Mediation path between Chinese culture orientation and distant emotional support seeking via motivation to maintain network in China.

Note. Gender and length of residence in U.S. are included as covariates.

Close support seeking. Consistent with Study 7, the significant predicting effect of American culture orientation on close emotional support seeking (b = 0.19, SE = 0.08, $t(94)$ = 2.50, p = .014) was found, with gender, subjective fluency of English, length of residence in U.S., and size of social network in U.S. as covariates. However, American culture orientation was not significantly associated with close instrumental support seeking (b = 0.14, SE = 0.08, $t(94)$ = 1.62, p = .109), when the same covariates were entered simultaneously.

Adaptation

Psychological adaptation. As in Study 7, the possible effect of acculturation orientation and social support seeking was tested using hierarchical linear regression analysis. Psychological adaptation was regressed on two acculturation orientation (Chinese culture orientation and American culture orientation) in Step 2, and 4 types of social support seeking (distant emotional support seeking, distant instrumental support seeking, close emotional support seeking, and close instrumental support seeking) in Step 3, with SES and length of residence in U.S. as covariates in Step 1. As hypothesized, the significant predicting effect of Chinese culture orientation on psychological adaptation in U.S. was observed in Step 2 (b = -0.17, SE = 0.07, t(95) = -2.48, p = .015). Unexpectedly, American culture orientation was not significantly associated with psychological adaptation (b = 0.11, SE = 0.07, t(95) = 1.57, p = .121). As for the predicting effect of social support seeking, only distant emotional support seeking was significantly associated with psychological adaptation (b = -0.31, SE = 0.12, t(95) = -2.70, p = .008). After entering indictors of social support seeking, in Step 3, the coefficient of Chinese culture orientation decreased and was not significant (b = -0.10, SE = 0.08, t(95) = -1.35, p = .179). Although it is not the focus of this research, subjective socioeconomic statue significantly predicted increased psychological adaptation in U.S. (ps <= .004; Table 20).

Table 20 Results of hierarchical regression analysis predicting psychological adaptation in U.S.

	Step 1 (R^2 = .124, p = .002)				Step 2 (ΔR^2 = .063, p = .031)				Step 3 (ΔR^2 = .077, p = .062)			
Predictors	*B*	*SE*	*t(95)*	*p*	*B*	*SE*	*t(93)*	*p*	*B*	*SE*	*t(89)*	*p*
(Constant)	3.220	.361	8.912	<.001	3.925	.598	6.567	<.001	4.358	.608	6.656	<.001
SES	.184	.054	3.403	.001	.157	.054	2.936	.004	.157	.053	2.952	.004
Length of residence in Japan	.004	.002	1.883	.063	.002	.002	1.134	.260	.001	.002	0.607	.545
Chinese culture orientation					-.171	.069	-2.477	.015	-.102	.075	-1.354	.179
American culture orientation					.105	.067	1.565	.121	.100	.068	1.470	.145
Distant emotional support									-.312	.116	-2.699	.008
Distant instrumental support									.103	.128	0.804	.423
Close emotional support									.041	.131	0.311	.757
Close instrumental support									.032	.121	0.262	.794

Note. N = 98.

To test the indirect effect of motivation to maintain network in China and distant emotional support seeking on the association between Chinese culture orientation and psychological adaptation, a serial mediation analysis was conducted using Model 6 of Hayes's SPSS PROCESS macro (2013) with psychological adaptation as the outcome variable, motivation to maintain network in China as the first mediator, distant emotional support seeking as the second mediator, Chinese culture orientation as the independent variable, and including gender, SES, and length of residence in U.S. (months) as covariates in all regression models (Figure 20). The 95% bias-corrected confidence interval based on 10,000 bootstrapping samples showed a non-zero serial indirect effect of Chinese culture orientation on psychological adaptation in U.S. via motivation to maintain network in China and distant emotional support seeking, [-0.07, -0.01] (indirect effect = -0.02, *SE* = 0.02). And consistent with Study 7, a significant indirect effect of Chinese culture orientation on psychological adaptation through distant emotional support seeking was observed (indirect effect = -0.05, *SE* = 0.03, 95% CI = [-0.12, -0.01]).

Reversing the role of psychological adaptation and distant emotional support seeking to test an alternative model, the indirect effect of Chinese culture orientation on distant emotional support seeking through psychological adaptation was not significant (indirect effect = 0.01, *SE* = 0.03, 95% CI = [-0.03, 0.09]).

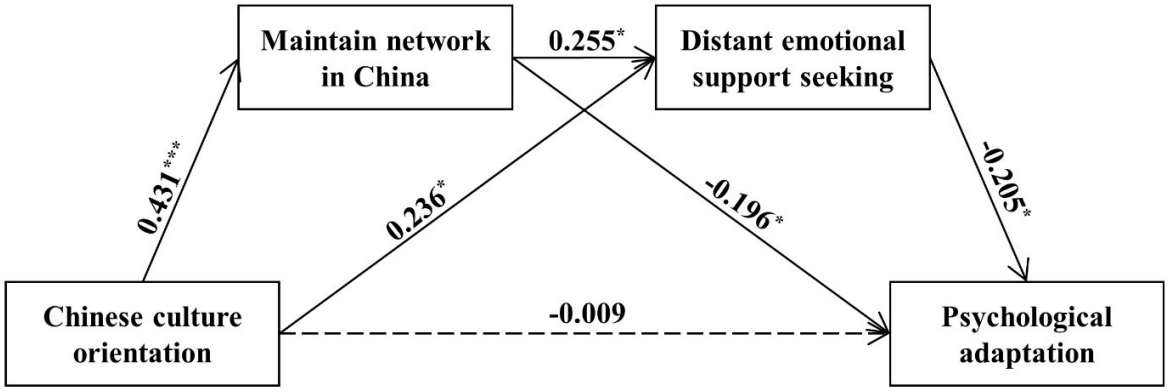


Figure 20 Mediation paths between Chinese culture orientation and psychological adaptation to U.S. via motivation to maintain network in China and distant emotional support seeking

Note. Gender, SES, and length of residence in U.S. are included as covariates.

Loneliness. Likewise, to examine the possible effect of social support seeking on loneliness, a hierarchical linear regression analysis was conducted. First, size of social network in U.S. was entered as a covariate in Step 1. Then, the primary predictors of acculturation orientation (Chinese/American culture orientation) and social support seeking (distant/close emotional/instrumental support seeking) were entered in Step 2 and Step 3 respectively. The result of regression analysis showed that Chinese culture orientation was significantly associated with loneliness (b = -0.10, SE = 0.04, t(94) = -2.79, p = .006), whereas the association between American culture orientation and loneliness was not significant (b = -0.05, SE = 0.04, t(94) = -1.51, p = .134) (Step 2, Table 21). Importantly, as expected, emotional support seeking significantly predicted decreased loneliness (for distant emotional support seeking: b = -0.13, SE

= 0.06, $t(90) = -2.15$, $p = .034$; for close emotional support seeking: $b = -0.20$, $SE = 0.06$, $t(90) = -3.06$, $p = .003$). Interestingly, distant instrumental support seeking was also significantly associated with loneliness ($b = 0.13$, $SE = 0.07$, $t(90) = 2.01$, $p = .047$).

To test whether the effect of Chinese culture orientation on loneliness emerges via distant support seeking, a parallel mediation analysis using Model 4 of SPSS PROCESS macro was conducted with loneliness as the outcome variable, distant emotional support seeking and distant instrumental support seeking as simultaneous mediators, Chinese culture orientation as the independent variable, and including size of social network in U.S. as a covariate in the models of the outcome variable. The bootstrapping results ($N = 10{,}000$) indicated that distant emotional support seeking significantly mediated the effect of Chinese culture orientation on loneliness (indirect effect = -0.06, $SE = 0.03$, 95% CI = [-0.12, -0.01]; Figure 21).

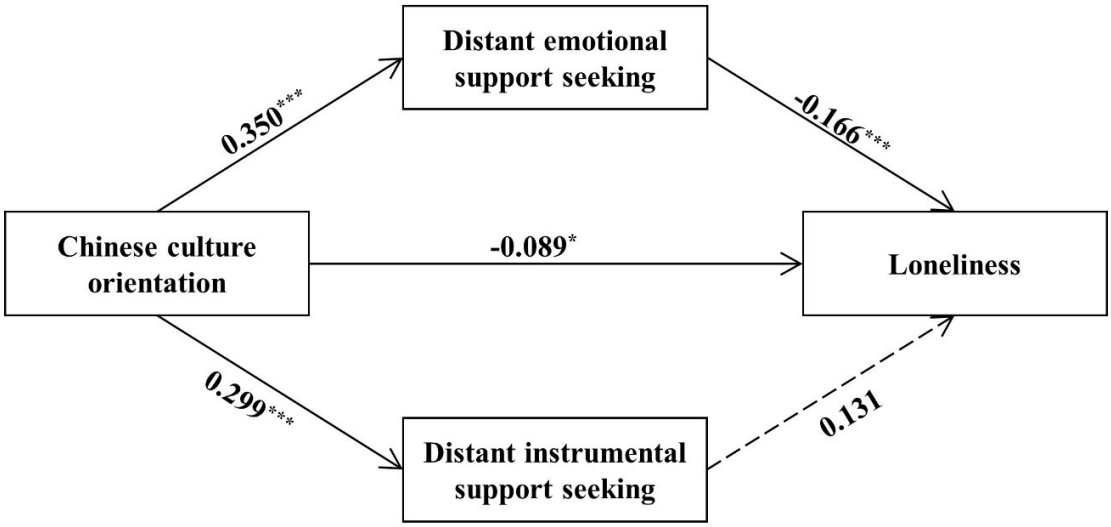


Figure 21 Mediation paths between Chinese culture orientation and loneliness in U.S. via distant emotional support seeking and distant instrumental support seeking simultaneously.

Note. Size of social network in U.S. is included as a covariate in the model of loneliness.

Table 21 Results of hierarchical regression analysis predicting loneliness in U.S.

	Step 1 (R^2 = .111, p = .001)				Step 2 (ΔR^2 = .101, p = .004)				Step 3 (ΔR^2 = .147, p = .001)			
Predictors	*B*	*SE*	*t*(96)	*p*	*B*	*SE*	*t*(94)	*p*	*B*	*SE*	*t*(90)	*p*
(Constant)	2.362	.105	22.473	<.001	3.169	.256	12.388	<.001	3.354	.253	13.261	<.001
Size of network in U.S.	-.101	.029	-3.464	.001	-.109	.028	-3.920	<.001	-.109	.026	-4.131	<.001
Chinese culture orientation					-.098	.035	-2.785	.006	-.085	.037	-2.330	.022
American culture orientation					-.053	.035	-1.513	.134	-.008	.034	-0.241	.810
Distant emotional support									-.125	.058	-2.153	.034
Distant instrumental support									.130	.065	2.011	.047
Close emotional support									-.196	.064	-3.062	.003
Close instrumental support									.055	.061	0.897	.372

Note. N = 98.

Summary and discussion

The results of Study 8 confirmed the positive association between home culture orientation and distant support seeking among Chinese students in U.S., showing that Chinese culture orientation promoted (emotional and instrumental) support seeking from people back in China, and distant emotional support seeking mediated the association between Chinese culture orientation and psychological adaptation. Importantly, the results of Study 8 also showed that the positive association between Chinese culture orientation and distant emotional support was significantly mediated by students' motivation to maintain their networks in China. In U.S., Chinese international students high in Chinese orientation were more likely to seek emotional support from people back in China because they had a high motivation to maintain their networks in their home country. American culture orientation, however, only promoted emotional support seeking from people in United States.

In addition to psychological adaptation, Study 8 also investigated the effect of social support seeking on loneliness of Chinese international students in United States. As expected, emotional support seeking from people in U.S. and back in China both effectively alleviated Chinese international students' loneliness. Interestingly, Chinese culture orientation was also associated with a decrease in loneliness, which was partly accounted for the increased frequency of distant emotional support seeking.

In sum, Study 8 replicated and extended the previous findings of the relation among home culture orientation, distant emotional support seeking and psychological adaptation, demonstrating that the emphasis on maintaining home culture motivated international students to maintain social networks in their home country, and this motivation promotes them to seek

emotional support remotely from these networks. Distant emotional support is detrimental to psychological adaptation but helps relieve loneliness.

General Discussion

The aim of the present research was to investigate the association between acculturation orientation and social support seeking and how they relate to cross-cultural adaptation. By conducting two studies among Chinese international students in Japan and U.S., I sought to understand the implication of support from networks in host country and home country on psychological adaptation separately. Extending previous studies (e.g., Demes & Geeraert, 2015; Hendrickson et al., 2011; Hofhuis et al., 2019; Lee et al., 2011), the present research made a distinction between emotional support and instrumental support to understand the effect of support seeking more comprehensively.

The results revealed that the more Chinese international students sought emotional support from people back in their home country, the worse they psychologically adapted to Japan or United States. With regard to the implication of close support seeking, however, the findings of these two studies were inconsistent. In line with previous findings (Demes & Geeraert, 2015; Lee et al., 2011), among Chinese international students in Japan, seeking emotional support from people living in the host country enhanced psychological adaptation. However, this positive association was not found among Chinese international students in United States. Additionally, Study 8 found that both distant and close emotional support seeking reduced international students' loneliness. Regarding instrumental support seeking, however, the results showed that neither close instrumental support seeking nor distant instrumental support seeking had significant effect on psychological adaptation.

Another major finding of the present research was that Chinese international students' distant/close support seeking was influenced by their acculturation orientation. In line with previous studies (Doucerain et al., 2017; Zhang & Goodson, 2011a), host culture orientation promoted support seeking from people living in the host country, though, in Study 8, American culture orientation only significantly promoted close emotional support seeking of Chinese international students in United States. Correspondingly, home culture orientation promoted seeking support from people living in the home country. Finally, distant emotional support seeking was found to mediate the effect of home culture orientation on psychological adaptation and loneliness, whereas the association between host culture orientation and psychological adaptation was not mediated by any type of close support seeking.

Implications of distant support seeking

The current findings were consistent with the previous studies that international students staying in frequent contact with their home networks experienced higher acculturative stress and were emotionally worse adjusted, whereas those interacted with people living locally more exhibited higher psychological adaptation in the host country (Demes & Geeraert, 2015; Lee et al., 2011). These distinct implications of interactions with distant and close support networks are understandable. More interactions with people living locally offers international students more opportunity to learn about the host culture and increase their social connectedness with the host society, which will contribute their adaptation to a new culture. Over reliance on social networks in home country, by contrast, may hamper the development of social networks in the host country and the two reinforce each other in a vicious circle, which consequently increase the sense of alienation from the host society and hinders adaptation. However, the comfort and understanding that international students received from people back in their home country still

could enhance their beliefs that they are valued and cared for by someone in the world and meet their emotional needs. This notion was affirmed by Study 8 in which I found that, as close emotional support seeking, distant emotional support seeking helped relieved international students' loneliness. The complicated effect of distant emotional support on psychological outcomes of cross-cultural adaptation underlines the importance of using multiple indicators to comprehensively understand the implications of support from certain networks.

Implications of close support seeking

In contrast to distant support seeking, the effect of close support seeking in psychological adaptation seems relatively erratic. Acculturation researchers argued that the inconsistent findings might result from variations in social network diversity (e.g., Geeraert et al., 2014; Hendrickson et al., 2011; Kashima & Loh, 2006; Shu et al., 2020; Wang et al., 2012). Compared with home networks, international students' social networks in the host country are more complex, which is consisted of co-nationals, host nationals, and other internationals (Bochner et al., 1977). The composition of international students' close networks varies from individual to individual. Some students proportionately have more co-nationals in their close networks, whereas some students' close networks have a higher ratio of host nationals. As mentioned in Chapter 1, previous studies into acculturation suggested that close support acquired from these three groups had different implications on students' adaptation to the host country (e.g., Geeraert et al., 2014; Hendrickson et al., 2011; Kashima & Loh, 2006; Ng et al., 2017), though the exact effect of each support group remains inconclusive. Therefore, the implications of close support seeking might vary in the composition of international students' close networks. The discrepant results regarding close support seeking may be because close support seeking was assessed as a

single construct in this research. To clarify further the effect of close support seeking in cross-cultural adaptation, research needs to differential the sources of close support.

Emotional support and instrumental support

In addition, the present research was the first to investigate the implications of emotional support and instrumental support in psychological adaptation separately. Unexpectedly, instrumental support seeking was not related to psychological adaptation, and in Study 8 distant instrumental support seeking was even related to higher loneliness. This contradicts earlier literatures in social support which suggest that, as emotional support, instrumental support increases perceived support, which in turn contributes to psychological health or well-being (Taylor, 2011). Instrumental support requires the providers to offer both social and material resources. Thus, it is far more complicated than emotional support. Compared with emotional support seeking, whether international students seek instrumental support or which networks they turn into for instrumental support may depend more on the objective conditions like the availability of resources. For example, international students are more likely to turn into their families for financial support if available and ask people living locally for suggestions about life in the host society. Therefore, in order to clarify the role of instrumental support in cross-cultural adaptation, future studies may be better to use specific situations like “please describe or imagine events that make you feel financial stress”.

Acculturation orientation

The obtained findings also add more evidence for studies suggesting that acculturation orientation promotes international students’ social participations in corresponding social networks (Doucerain et al., 2017; Szabó et al., 2020; Zhang & Goodson, 2011a). Acculturation literatures have suggested that a higher orientation toward host culture is related to frequent

contact or interaction with host nationals, whereas higher culture orientation is associated with frequent contact or interaction with co-nationals living locally (Doucerain, 2018; Szabó et al., 2020; Zhang & Goodson, 2011a). Extending the existing studies exclusively focusing on the effect of acculturation orientation on social interaction with different national groups of close networks, the present research examined the role of acculturation orientation in international students' support seeking toward distant and close networks. It appears that the frequency with which international students to enlist support from social networks in home or host country increased with their orientation toward the corresponding culture. This association may be explained by the motivation to develop close networks or maintain distant networks. As developing networks in host country benefits host culture learning, keeping in touch with networks formed in home country contributes to maintaining characteristics or identity of home culture (Hofhuis et al., 2019). Thus, the emphasize on maintaining home culture or adopting host culture is likely to increase international students' motivation to engage with the corresponding networks. And social support seeking is one of the effective ways to develop or maintain these networks. This speculation was supported by the findings of Study 8 that motivation to maintain social networks in home country partly mediated the relationship between home culture orientation and distant emotional support seeking. These findings suggested that, beyond the availability of support, whether people seek support, particularly emotional support, toward specific networks depends on their social motivations, which is worth more attention in future research.

Finally, the findings of the current research also contributed to the understanding of the mechanisms underlying the association between acculturation orientation and psychological adaptation. Previous studies have indicated that host culture orientation benefited psychological

adaptation through increasing social interactions and connectedness with host national/mainstream networks (Yoon et al., 2008; Zhang & Goodson, 2011a). Extending these findings, the finding of this research indicated that over reliance on emotional support provided by people living in the home country explained the detrimental effect of home culture orientation on psychological adaptation. Regarding host culture orientation, however, neither type of close support seeking mediated its association with psychological adaptation, which might also be due to the complex composition of close networks international students had as discussed before. Together with the earlier findings, the present results suggested that acculturation orientation or strategies would profoundly influence international students' attitudes and behaviors toward their social networks in home and host country, which in turn would affect their adaption to the host culture.

Limitations

Despite its novel contributions, there are several limitations of this research. First, although the findings were examined with two independent samples, the sample sizes used was relatively small. Future studies with larger samples are needed to replicate these results. Second, the participants were limited to Chinese international students in Japan and United States. As discussed in Chapter 1 and Chapter 2, social support seeking is profoundly influenced by culture (e.g., Ishii et al., 2017; Kim et al., 2008; Taylor, Davis et al., 2004). East Asians are less willing than Westerners to seek social support in general (Kim et al., 2006; Mojaverian et al., 2013; Taylor, Davis et al., 2004). International students from Western countries (vs. East Asia) may be more willing and able to develop a new social network in the host country and favor close support seeking more. Recent research also found that the loneliness of student migrants in Netherland is associated with the relational mobility of their heritage culture (Heu et al., 2020).

Therefore, it is possible that these results are not generalizable to international students from other countries, particularly those from Westerner countries.

Third, the present results were exclusively based on cross-sectional data, which did not permit us to draw any causal conclusions. Although the length of residence in the host country was controlled, acculturation orientation, social support seeking, and psychological adaptation are likely to change over time and influence each other. Earlier studies have demonstrated that the very initial host culture orientation of international students could predict their social engagement during their stay (Doucerain et al., 2017). Based on these findings, although acculturation orientation is reasonable to be considered as an antecedent of social interactions and adaptation, the reciprocal relationships among variables still cannot be ruled out with the cross-sectional design used. Longitudinal studies are required to confirm the casual relationships further.

Finally, close support, in this research, generally referred to support from people living in host country. But in practice, close support is far more complicated than what was defined in this research. Unlike distant support is mostly provided by co-national people in a remote way, close support incorporates support provided by host nationals, co-nationals, and other internationals either remotely or face-to-face. Prior literature in social support and acculturation have suggested that the ways in which people seek support and which national groups people turn into both would potentially affect the effect of social support in psychological outcomes (Geeraert et al., 2014; Huber et al., 2018; Kashima & Loh, 2006; Lee et al., 2011). Therefore, I recommend future studies to distinguish the types of close support based on these two factors simultaneously to provide more robust and convincing evidence for the effect of close support seeking.

Conclusion

In conclusion, the present research found that emotional support seeking helped ease the loneliness of Chinese international students in U.S. regardless of whether it is provided by distant or close networks. Nevertheless, overuse of distant support seeking hindered psychological adaptation in host country overall. Importantly, this research found Chinese international students' preference for distant/close support networks to be significantly predicted by their acculturation orientation. Home/host culture orientation increased the frequency with which Chinese international students to ask support for the corresponding networks in response to stress. Also, the negative association between home culture orientation and psychological outcomes of cross-cultural adaptation was found to be accounted for the increased use of emotional support from people back in home country.

Chapter 5: General Discussion

Summary of Key Findings

This dissertation primarily concerns the questions of what influences peoples' willingness to seek social support from general others and from certain networks. Regarding the first question, this dissertation focused on how culture and childhood experience influence support seeking and examined or suggested possible mechanisms underlying the effect of these two factors. And regarding the second question, this dissertation focused on the two distinct support networks that international students have: close support networks and distant support networks and explored the predictors of the frequency with which students seek support from these two networks.

Chapter 1 presented a broad introduction on: (1) cultural differences in social support seeking; (2) the potential interaction of gene and childhood experience on support seeking; and (3) social support seeking of international students. I reviewed the representative works on the related topics (though the number is limited) and raised several unresolved issues: (1) aside from relational concern, whether there are any other potential explanations for cultural differences in support seeking; (2) whether the impact of childhood experience on social support seeking would be moderated by specified genes; (3) whether international students' utilization of distant/close support would depend on their acculturation orientation. And the studies presented in the following chapters aimed to address these issues.

On cultural differences in social support seeking

To address the first issue, the studies presented in Chapter 2 investigated the potential explanation in empathic concern for cultural differences in social support seeking. For one thing,

empathic concern has been found to be positively associated with the use of social support (Sun et al., 2019; Williams et al., 2018). For another thing, there is evidence for cultural differences in empathic concern suggesting that East Asians have lower empathic concern than Westerners (e.g., Atkins et al., 2016; Chopik et al., 2017; Chung et al., 2010).

The results of Studies 1 and 2 in Chapter 2 provide some preliminary evidence for the mediating effect of empathic concern in the relation between culture and support seeking in response to daily stress. Consistent with past studies, the cultural differences in empathic concern, relational concern and support seeking emerged. The Japanese participants reported lower empathic concern, higher relational concern and lower willingness to seek support than European Americans/Canadians. And in both culture groups, empathic concern was positively related to the use of social support in response to daily stress. Importantly, empathic concern and relational concern simultaneously mediated the cultural differences in support seeking (Study 2).

Studies 3 and 4 further clarify that empathic concern promotes support seeking via the indirect effect of expectation of others' willingness to help. Dispositional empathic concern was found to be positively correlated to both beliefs about others' prosocial willingness in general and expectations of others' willingness to provide support in hypothetical scenarios. These positive links may be explained by social projection (Krueger, 2007). Empathic concern entails a great motivation to help unfortunate others (e.g., Levy et al., 2002; Sze et al., 2012; Unger & Thumuluri, 1997), which may positively bias people's estimation of others' prosocial willingness. Correspondingly, the European American participants with higher empathic concern was found to be more optimistic about others' prosocial willingness than the Japanese participants, which in turn promoted them to seek support in response to stressful situations.

Lastly, Study 4 uncovers that RSC contributes to the cultural differences in empathic concern. The Japanese participants were more likely to endorse that people suffer because of their past deviation from social norms and suffering is necessary for maintaining the whole society, which led them to have less compassion for those who suffer than the European American participants. These findings enlighten us on cultural differences in empathic concern suggesting that East Asians feel less sympathy for unfortunates because they tend to justify suffering in a repressive way.

Taken together, the studies in Chapter 2 revolve around the role of empathic concern in cultural differences in support seeking and reveal that, in addition to concern about the adverse effect on relationships, culture also influences peoples' willingness to seek support by shaping their expectation of others' prosocial willingness. The obtained findings suggest that, compared with Westerners, East Asians with lower empathic concern tend to have a lower expectation of others' willingness to provide support, and thus are more reluctant to ask for support. These findings contribute to the literature by suggesting empathic concern as another explanation for cultural differences in support seeking. In addition, the results of Study 4 also complement the work on cultural differences in empathic concern by demonstrating that the more prevalence of RSC explains why East Asians have lower empathic concern than Westerners.

On Gene × Childhood interactions

The two studies presented in Chapter 3 attempted to address the second issue. Using a sample of Japanese and European Canadian students, Study 5 showed that the more adverse environments students grew up, the lower general trust they reported. This finding suggests that childhood experiences do shape people's trust toward general others which is one of the important arguments for the relation between childhood experience and support seeking.

However, the negative association between childhood adversity and general trust was found only among the students carrying AA homozygotes of *OXTR* rs53576. This finding contributes to evidence for the moderating role of *OXTR* rs53576 in early-life experience and developmental outcomes (e.g., Choi et al., 2019; Hammen et al., 2015; Hygen et al., 2017). Also, it increased confidence in the speculation of gene × childhood experience on support seeking. To test this speculation, using a sample of Japanese students, Study 6 investigated whether *OPRM1* genotypes moderated the effect of perceived parental attention on students' willingness to seek support. The results showed that the students' willingness to enlist support did increase with the amount of attention they subjectively perceived from their parents during childhood, but only for those carrying GG homozygotes of *OPRM1*. These finding contribute to research into the association between early parenting and support seeking by identifying the moderating role of *OPRM1* polymorphisms.

Taken together, Studies 5 and 6 in Chapter 3 reveal that the impact of childhood experiences on general trust and support seeking are respectively modified by *OXTR* rs53576 and *OPRM1*. These findings lend support to differential susceptibility hypothesis that the effect of environmental exposures varies on people with different genotypes of environmentally susceptible genes (Belsky & Pluess, 2009). Exploring G × E interactions is important for us to understand the genetic basis of individual variations in developmental plasticity.

On social support seeking of international students

In Chapter 4, I attempted to address the third issue by investigating support seeking of Chinese international students in Japan (Study 7) and United States (Study 8). First, the findings of Studies 7 and 8 consistently showed that, as home culture orientation, the frequency with the Chinese international students ask emotional support for people back in China was negatively

associated with their psychological adaptation in general. Meanwhile, both distant and close emotional support seeking were found to effectively relieve students' loneliness (Study 8). However, the positive association between close emotional support seeking and psychological adaptation was only found in Study 7. These findings support the argument that it is necessary to differentiate between distant support and close support when investigating the effect of social support on cross-cultural adaptation (Demes & Geeraert, 2015).

Second, the results showed that the more the Chinese students emphasized maintaining their home culture, the more they were likely to seek emotional support from people back in China in response to stress. And this association was explained by motivation to maintain networks in China (Study 8). By contrast, the desire to engage with host cultures (Japanese or American) motivated Chinese students to seek emotional support from people living in the host countries. Third, distant emotional support seeking was found to mediate the effect of home culture orientation and psychological adaptation in the two studies. It suggests that international students who are more oriented toward their own heritage value their distant networks more and are more likely to turn to these networks for emotional comfort in response to stress, which, in turn, prevents them from adapting to the host society. These findings contribute to the understanding of relations among acculturation orientation, support seeking, and cross-cultural adaptation. Speaking more broadly, the work in Chapter 4 provides initial support for the idea that motivation to develop/maintain relationships may encourage people to approach certain support providers/networks when seeking support.

Limitations and Future Directions

There are several limitations of this dissertation worth to mention. First, although East Asian and Western cultures in this dissertation were roughly framed as collectivism and

individualism, it should be noted that collectivism and individualism does not manifest uniformly between and within cultural groups. For example, although Japan and India are both identified as collectivist cultures, the Miller et al. (2017) study found that they did not rely on communal norms to the same extent. Even within a single country, regional variations based on the history of voluntary settlement (Kitayama et al., 2006) and socio-ecological variations based on relational mobility (Yuki & Schug, 2012) and residential mobility (Oishi et al., 2009) can lead to differences in the extent to which individuals adhere to the dominant cultural value (independence or interdependence). As many researchers have pointed out the construct of individualism and collectivism (or independence and interdependence) are worth rethinking, the reliance on this dichotomic framework might be an important theoretical flaw of this work.

Second, as discussed in the previous chapters, another important issue is the generalizability of these findings. The studies in Chapter 2 attempted to elucidate the East-West differences in empathic concern and support seeking. Although these cultural differences also have been found with other East Asian groups, like Chinese and Koreans, the East Asian samples used in this work were restricted to Japanese. Given potential variations within collectivism (or East Asian) groups discussed above, future studies are needed to test whether the findings in Chapter 2 are applicable to other national groups.

Also, the issue of generalizability existed in the studies on support seeking of international students (Chapter 4). Although the findings presented in Chapter 4 were replicated with two independent samples in two countries with distinctly different cultures, the participants were limited to Chinese international students. As discussed in Chapter 1, culture plays an important role in people's social behaviors and cognition including support seeking. Thus, the findings

drawn from Chinese international students may not be generalizable to the general population of international students.

Third, the findings regarding the association between childhood adversity and general trust contribute to the theoretical basis for the effect of childhood experiences on support seeking, but this research did not directly investigate whether childhood experiences influence support seeking via an indirect effect of trust. Also, the G × E interactions on trust and support seeking were examined separately with different indexes of childhood experiences (though they are highly correlated: $r = -.46$, $p < .001$) and different genes, which raises more interesting questions that remain to be known. For example, the differential-susceptibility framework provides us a useful tool to interpret these G × E interactions, but one interesting question is what mechanisms account for differential susceptibility, more specifically how *OXTR* rs53576 and *OPRM1* work on individuals' susceptibility to environmental exposure. Although the function of these candidate genes has not been clear yet, one potential mechanism underlying differential susceptibility may be differences in reward/pain sensitivity. As mentioned in Chapter 3, the G allele of *OPRM1* contribute to the increased sensitivity to physical and social pain (Klepstad et al., 2004; Slavich et al., 2014; Way et al., 2009). Likewise, *OXTR* rs53576 is related to both the structures and functional activation of the reward circuit (Tost et al., 2010). Thus, it is likely that *OXTR* rs53576 and *OPRM1* variants contribute to developmental plasticity by modulating the responsivity of the reward/pain pathway such as the threshold, duration, and strength of arousal. Future studies are needed to investigate further whether the function or structure of the reward circuit or pain pathway would be involved in these G × E interactions.

Another more interesting question is whether the effect of culture on support seeking is also modified by these candidate genes. In nature, culture is also a kind of environmental input whose

influence is supposed to be moderated by certain genes based on differential susceptibility hypothesis (Kim & Sasaki, 2014). Indeed, the gene × culture interaction on support seeking has been observed in Kim et al. (2010). Using a sample of Koreans and Americans, Kim et al. (2010) found that, in high distress condition, the cultural differences in emotional support seeking was only observed among those with the G allele of *OXTR* rs53576. Although the exact function of *OXTR* rs53576 remains unknown, *OXTR* rs53576 has been suggested as a candidate gene for empathy (Huetter et al., 2016; Smith et al., 2014). A recent meta-analysis showed that, compared with those with AA genotype, people carrying the G allele of *OXTR* rs53576 exhibited higher empathic ability (including empathic concern) in both Asians and Europeans (Gong et al., 2017). Furthermore, focusing on interdependent self-construal, Luo et al. (2015) found that the effect of cultural values on empathy was more pronounced among those carrying the G allele of *OXTR* rs53576. Together with the relation among culture, empathic concern, and support seeking found in Chapter 2, I speculate that empathic concern may be involved in the *OXTR* rs53576 × culture interaction that Kim et al. (2010) observed. It is likely that the *OXTR* rs53576 × culture interaction on support seeking emerge because the effect of culture on empathic concern is conditional on *OXTR* rs53576. To test this speculation, future studies are required to investigate whether *OXTR* rs53576 would moderate the mediating effect of empathic concern on cultural differences in support seeking. And it might be noteworthy that the G-allele of *OXTR* rs53576 is more prevalent in European population (67.42% in Europeans, 41.90% in East Asians; Phan et al., 2020). Large sample sizes might be necessary for future research into gene × culture interactions because allele frequencies of SNPs vary among different ethnic groups.

Likewise, environmentally sensitive genes are likely to play a role in support seeking and cross-cultural adaptation. The serotonin transporter polymorphism (*5-HTTLPR*), for example,

has been found to be associated with life satisfactions of migrants in Australia (Kashima et al., 2014). Through a longitudinal study, Kashima and her colleagues (2014) found that migrants from countries with higher prevalence of the l allele of *5-HTTLPR* (vs. lower prevalence) were more satisfied with their life in Australia, and such genetic effect increased over time. In follow-up research, they further found that international students with l/l homozygotes of *5-HTTLPR* (vs. those with s allele) reported higher relational openness and had more diverse locally networks (Kashima et al., 2021). Thus, it is likely that the distant/close support seeking of international students is moderated by *5-HTTLPR* polymorphism. Specifically, students carrying l/l homozygotes (vs. those with s allele) may seek more close support because they tend to be not only more skillful but also more willing to interact with culturally dissimilar people. And more close support seeking may in turn diversify their local networks and enhance adaptation. Future studies are needed to further clarify the genetic influences on support seeking and acculturation.

Maybe the most interesting question is how these three factors – culture, childhood experiences and genes – work together. Although many parenting practices are likely to be universal across cultures, there are cultural variations on parenting styles and the functions of specific parenting practices (Bornstein, 2012). For example, authoritative parenting (high responsiveness, high control) is found to be more beneficial in European populations, whereas authoritarian parenting (low responsiveness, high control) brings more positive outcomes in Asian populations (Leung et al., 1998). Thus, the gene × childhood interactions observed are likely to be modified by culture. In Study 5, however, I did not find any significant three-way interactions of *OXTR* rs53576 × childhood adversity × culture on general trust. Future studies might further investigate whether there are any gene × childhood × culture interactions on support seeking.

Lastly, cross-sectional designs of all eight studies do not allow me to draw any strong casual conclusions from the obtained findings, particularly regarding the consequences of support seeking. Take the relation between distant support seeking and psychological adaptation for example. In this dissertation, I assumed that the heavy reliance on emotional support provided by the distant networks may prevent international students from developing new networks in host country, and thus worsens their adaptation to the host culture. However, it could be the other way round. International students who have adapted successfully tend to have well-established support networks in the host country (though in both Studies 7 and 8, the size of close network did not correlate to psychological adaptation and the length of residence was also included in the models as a covariate), and thus do not have a need of distant support any longer. Although previous longitudinal study has demonstrated that distant support seeking contributes to acculturative stress (Demes & Geeraert, 2015), the ambiguous association between support seeking and adaptation cannot be clarified based on cross-sectional data. Therefore, further longitudinal research is needed to clarify the effect of support seeking on cross-cultural adaptation.

Conclusion

Despite the methodology limitations, the findings of this dissertation provide some new insights into how social support seeking is shaped by culture and childhood experience. The studies within this dissertation provide evidence that: (1) aside from high relational concern, low empathic concern also discourages East Asians (vs. Westerners) to seek social support when they are in need; (2) *OXTR* rs53576 polymorphisms moderate the negative effect of childhood adversity on general trust; (3) likewise, attentive parenting contributes to people's willingness to ask for support in early adulthood, but the effect is moderated by *OPRM1* polymorphisms; (4)

host/home culture orientation is positively associated with the frequencies with which international students turn to the corresponding networks for emotional comfort. These findings point to the importance of creating caring and responsive (culture and family) environments in encouraging those in need to seek support explicitly. Also, it underscores the importance of considering gene to understand the effect of environmental exposure on psychological or behavioral outcomes, like early family environments. Moreover, the findings regarding support seeking of international students imply that people's decision of whom to seek support from is influenced by their social motivation or attitude. Experimental and longitudinal research is needed to replicate these findings.

Appendixes

Appendix A.1 Scales Used in Chapter 2

Empathic concern

English version.

Instruction: The following statements inquire about your thoughts and feelings in a variety of situations. For each item, indicate how well it describes you. When you have decided on your answer, fill in the letter next to the item number. READ EACH ITEM CAREFULLY BEFORE RESPONDING. Answer as honestly as you can. Circle the number which best describe you.

	1: Does Not Describe Me Well	2	3	4	5: Describe Me Very Well
I often have tender concerned feelings for people less fortunate than me.	1	2	3	4	5
Sometimes I don't feel very sorry for other people when they are having problems.	1	2	3	4	5
When I see someone being taken advantage of, I feel kind of protective towards them.	1	2	3	4	5
Other people's misfortune does not usually disturb me a great deal.	1	2	3	4	5

When I see someone being treated unfairly, I sometimes don't feel very much pity for them	1	2	3	4	5
I am often quite touched by things that I see happen	1	2	3	4	5
I would describe myself as a pretty soft-hearted person.	1	2	3	4	5

Japanese version.

Instruction: 以下の文は、様々な状況におけるあなたの考えや気持ちについて尋ねるものです。各項目について、どのくらいその内容が自分にあてはまると思うか『1: 全く当てはまらない』から『5: 非常によく当てはまる』の 5 段階で回答してください。回答する前に各項目をしっかりと読んでください。この質問に正解・不正解はありません。あなたの考えに近い数字の選択肢を選んでください。

	1: 全くあてはまらない	2	3	4	5: 非常によく当てはまる
自分より不運な人たちを心配し、気にかけることが多い。	1	2	3	4	5
他の人たちが困っているのを見て、気の毒に思わないことがある。	1	2	3	4	5
誰かがいいように利用されているのをみると、その人を守ってあげたいような気持ちになる。	1	2	3	4	5

他の人たちが不運な目にあっているのは、たいてい、それほど気にならない。	1	2	3	4	5
誰かが不公平な扱いをされているのをみたときに、そんなにかわいそうだと思わないことがある。	1	2	3	4	5
自分が見聞きした出来事に、心を強く動かされることが多い。	1	2	3	4	5
自分は思いやりの気持ちが強い人だと思う。	1	2	3	4	5

Social support seeking

English version:

Instruction: (These items deal with ways you've been coping with the stress you described just now.) These items ask what you did to cope with this stressor. Obviously, different people deal with things in different ways, but we are interested in how you've tried to deal with it. Don't answer on the basis of whether it seems to be working or not—just whether or not you're doing it. Please use these response choices and make your answers as true FOR YOU as you can.

	1: Not at all	2	3	4	5: Very much
I try to get emotional support from others.	1	2	3	4	5
I try to get advice or help from other people about what to do.	1	2	3	4	5
I get comfort and understanding from someone.	1	2	3	4	5
I get help and advice from other people.	1	2	3	4	5

Japanese version.

Instruction:（これから、あなたが先程書いたストレスをどのように対処したかについてお尋ねします。）当然のことながら人によって対処方法は異なりますが、ここではあなたがどういった方法をとったのかについて関心があります。その方法がどの程度効果的かどうかという観点からではなく、あなたが使用したか（使用しているか）どうかという観点からお答え下さい。回答にあたっては、以下の各項目について、選択肢の中からもっともよくあてはまるものを選んでください。そしてできる限り「あなた」にとって正しい回答をして下さい。

	1: 全くあてはまらない	2	3	4	5: よくあてはまる
他者から感情的なサポート（支え）を得ようとする。	1	2	3	4	5
何をするべきか，他者からアドバイスを得ようとする。	1	2	3	4	5
他者からの慰めや理解を得ようとする。	1	2	3	4	5
他者からの助けやアドバイスを得ようとする。	1	2	3	4	5

Relational concern

English version.

Instruction: People often consider many factors in deciding how to cope with a social stressor. Some people seek social support and help from their family and friends when they are trying to cope with a stressor, whereas others choose not to seek social support and help. Please rate how

important each of the following concerns would be for you in deciding whether or not to seek social support or help from others for dealing with a stressor like the one you just described.

	1: Not at all	2	3	4	5: Very much
I'm concerned that if I tell the people I am close to about my problems, they would be hurt or worried for me.	1	2	3	4	5
If something were bothering me, I would not want to disrupt my social group by sharing it.	1	2	3	4	5
I wouldn't seek help because I think that others who are close to me will take care of my needs without me having to ask.	1	2	3	4	5
I can save face by solving my problems myself.	1	2	3	4	5
If I discuss my problems with the people I am close to, it makes it a bigger problem than if I keep it to myself.	1	2	3	4	5
I would rather not tell the people I am close to my problems because they would blow them out of proportion.	1	2	3	4	5
I would not need to ask for help because others will probably offer help without me asking.	1	2	3	4	5
To preserve the happiness of my peer group, I try to keep my problems to myself.	1	2	3	4	5
The people I am close to would be ashamed if I made my problems known to others.	1	2	3	4	5
I don't want to ask for support for my problems	1	2	3	4	5

because people might judge me negatively because of my problems.					
I would be embarrassed to share my problems with the people I am close to.	1	2	3	4	5
I wouldn't want to make the people I am close to feel stressed about my problems.	1	2	3	4	5
I would rather keep my problems to myself than risk criticism from the people I am close to.	1	2	3	4	5

Japanese version.

Instruction: ストレスの対処方法を決める際に人はよくさまざまな要因について考えます。ストレスに対処しようとするとき、社会的な支えや家族や友達からの助けを求める人もいれば、社会的な支えや助けを求めない人もいます。先程あなたが書いたようなストレスに対処する際、社会的な支えや家族や友達からの助けを求めるかどうか決める上で、あなたにとって以下のような事柄はどの程度重要ですか。以下の尺度から 1 つ数字を選び回答して下さい。

	1: 全く重要ではない	2	3	4	5: とても重要である
自分が抱えている問題を親しい人々に話すと、そのことでその人たちが傷ついたり、私のことを心配してくれたりすることが気になる。	1	2	3	4	5
私が困っていたとしても、それをみんなに知ってもらうことで所属しているグループの輪	1	2	3	4	5

を乱すことはしたくない。					
私の親しい人たちは、何も言わなくても私に何が必要か気にかけてくれるので、こちらからそういった助けを求めることはしない。	1	2	3	4	5
私は自分で自分の問題を解決することでメンツを保てる。	1	2	3	4	5
親しい人たちにその問題を打ち明けてしまうと、それを誰にも言わない場合と比べ、問題が大きくなってしまう。	1	2	3	4	5
親しい人たちに自分の問題を話すと、彼らがそれを大げさに騒ぎ立てるので、彼らには問題を打ち明けたくない。	1	2	3	4	5
周囲の人たちは、たぶんこちらから頼まなくても助けてくれるので、私の方からそういった助けを求めなくてもいい。	1	2	3	4	5
仲間のグループ内の幸せを維持するために、自分の問題は自分の中に留めておくようにする。	1	2	3	4	5
もし私が親しい人たちに自分の問題を知らせたとしたら、彼らは恥ずかしい思いをするだろう。	1	2	3	4	5
私の問題のせいで、人は私のことを悪く判断するかもしれないので、助けを求めることはしたくない。	1	2	3	4	5
親しい人たちに自分の問題を打ち明けるのが恥ずかしい。	1	2	3	4	5
私の問題のせいで、親しい人たちにストレスを与えたくない。	1	2	3	4	5
親しい人たちから批判される危険を負うのだったら、むしろその問題については自分の中で留めておくほうがいい。	1	2	3	4	5

Loneliness

English version.

Instruction: Indicate how often each of the statements below is descriptive of you.

	1: Never	2: Rarely	3: Sometimes	4: Often
I feel in tune with the people around me.	1	2	3	4
I lack companionship.	1	2	3	4
There is no one I can turn to.	1	2	3	4
I do not feel alone.	1	2	3	4
I feel part of a group of friends.	1	2	3	4
I have a lot in common with the people around me.	1	2	3	4
I am no longer close to anyone.	1	2	3	4
My interests and ideas are not shared by those around me.	1	2	3	4
I am an outgoing person.	1	2	3	4
There are people I feel close to.	1	2	3	4
I feel left out.	1	2	3	4
My social relationships are superficial.	1	2	3	4
No one really knows me well.	1	2	3	4
I feel isolated from others.	1	2	3	4
I can find companionship when I want it.	1	2	3	4
There are people who really understand me.	1	2	3	4

I am unhappy being so withdrawn.	1	2	3	4
People are around me but not with me.	1	2	3	4
There are people I can talk to.	1	2	3	4
There are people I can turn to.	1	2	3	4

Japanese version.

Instruction: あなたは、以下の文章のようなことをどれくらい感じますか。それぞれの項目について選択肢を 1 つ選んで回答してください。

	1: 決して感じない	2: どちらかと言えば感じない	3: どちらかと言えば感じる	4: たびたび感じる
私は、自分の周囲の人たちと調子よくいっている	1	2	3	4
私は、人とのつきあいがない	1	2	3	4
私には、頼りにできる人がだれもいない	1	2	3	4
私は、ひとりぼっちではない	1	2	3	4
私は、親しい仲間たちのなかで欠くことのできない存在である	1	2	3	4
私は、自分の周囲の人たちと共通点が多い	1	2	3	4
私は、今、だれとも親しくしていない	1	2	3	4
私の興味や考えは、私の周囲の人たちとはちがう	1	2	3	4
私は、外出好きの人間である	1	2	3	4
私には、親密感のもてる人たちがいる	1	2	3	4

私は、無視されている	1	2	3	4
私の社会的なつながりはうわべだけのものである	1	2	3	4
私をよく知っている人はだれもいない	1	2	3	4
私は、他の人たちから孤立している	1	2	3	4
私は、望むときにはいつでも、人とつきあうことができる	1	2	3	4
私には、私を本当に理解してくれる人たちがいる	1	2	3	4
私は、たいへん引っ込み思案なのでみじめである	1	2	3	4
私には、知人はいるが、私と同じ考えの人はいない	1	2	3	4
私には、話しかけることのできる人たちがいる	1	2	3	4
私には、頼りにできる人たちがいる	1	2	3	4

Appendix A.2 Supplementary Materials for Chapter 2

S Table 1 Results of emotional support seeking and instrumental support seeking

	Indirect effect	*SE*	95% CI
Study1			
culture → empathic concern → emotional support seeking	0.126	0.027	[0.079, 0.189]
culture → empathic concern → instrumental support seeking	0.108	0.026	[0.066, 0.168]
Study 2			
culture → empathic concern → emotional support seeking → loneliness	-0.016	0.004	[-0.025, -0.009]
culture → relational concern → emotional support seeking → loneliness	-0.005	0.002	[-0.009, -0.002]
culture → empathic concern → instrumental support seeking → loneliness	-0.012	0.004	[-0.020, -0.006]
culture → relational concern → instrumental support seeking → loneliness	-0.006	0.002	[-0.011, -0.002]

Note. In Study 1, age and gender were included as control variables, whereas in Study 2, besides gender and age, SES and 5 related feelings for the stressful events were also included as control variables.

S1 Text. Results using the whole scale of relational concern (13 items).

The scale of relational concern that previous studies used were 13 items including two factors: relational concern about seeking social support actively (11 items) and expectation of unsolicited social support (2 items) (e.g., Kim et al., 2006). Our research only focused on relational concern. Therefore, we excluded the items assessing the expectation of unsolicited social support in the main analyses. Here, we presented the results of using all 13 items.

First, the internal consistency of the full scale (13 items) was good. Cronbach's alphas were 0.83 for the Japanese and 0.91 for the European Americans. The results of Independent T-tests showed that compared to the Japanese participants (M = 2.86, SD = 0.62), European American participants (M = 2.45, SD = 0.84) reported less relational concern ($t(844) = 8.35$, $p < .001$, Cohen's d = 0.55). And relational concern correlated with support seeking negatively (Japan: r = -0.09, p = .050; America: r = -0.17, $p < .001$).

As for the results of Mediation analyses (Bootstrapping N = 10,000), both empathic concern and relational concern mediated the cultural differences in support seeking significantly: Indirect effect = 0.12, SE = 0.03, 95% CI = [0.07, 0.17] for empathic concern; Indirect effect = 0.04, SE = 0.02, 95% CI = [0.02, 0.08] for relational concern. And the indirect effect of empathic concern was stronger than that of relational concern d = 0.08, SE = 0.03, 95% CI = [0.02, 0.14]. Furthermore, the serial mediating effects were also supported: Indirect effect = -0.02, SE = 0.00, 95% CI = [-0.03, -0.01] for culture → empathic concern → support seeking → loneliness; Indirect effect = -0.01, SE = 0.00, 95% CI = [-0.01, -0.00] for culture → relational concern → support seeking → loneliness. Besides, the indirect effect of culture differences in loneliness through support seeking was also significant, Indirect effect = -0.03, SE = 0.01, 95% CI = [-0.05,

-0.01].

S2. Text. The potential influence of COVID-19 in Study 2

The data of Study 2 were collected during the outbreak of COVID-19. According to whether participants mentioned COVID-19 in their description of the stressful event, we categorized participants into two groups (None vs. COVID-19) to examine whether COVID-19 would influence participants' support seeking behaviors and loneliness.

The results of Independent T-tests showed that although European American (40.8%) mentioned COVID-19 more than Japanese (22.6%), mentioning COVID-19 did not impact support seeking and loneliness among both samples (*p*s > .08; S1 Table). Therefore, we did not include COVID-19 in the main analyses.

S Table 2 Means of support seeking and loneliness by COVID-19 in Study 2

		None		COVID-19					
		Mean	*SD*	Mean	*SD*	*t*	*df*	*p*	Cohen's *d*
Japan		(*N* = 383)		(*N* = 112)					
	Support seeking	2.53	0.95	2.52	0.88	0.04	493	.970	0.004
	Loneliness	2.47	0.62	2.38	0.60	1.32	493	.188	0.141
U.S.		(*N* = 273)		(*N* = 188)					
	Support seeking	2.91	1.08	3.01	0.95	-1.08	432.10	.282	-0.100
	Loneliness	2.08	0.66	1.97	0.61	1.75	459	.081	0.166

Appendix A.3 Supplementary Materials for Chapter 3

OXTR rs53576 × Childhood adversity

The main effect of culture was also significant in the multiple regression models, which might raise another interesting question. That is whether culture moderates the interaction between *OXTR* rs53576 gene and childhood adversity. To further clarify the effect of culture, based on the previous models, I added the interaction between culture and childhood adversity, the interaction with culture and two OXTR dummy codes, and the three-way interactions in step 3. However, the results showed that any effect including culture was not significant (*p*s > .153). And the changes in R-square from Step 2 to Step 3 were not significant (*p*s > .098). More importantly, the significant interaction between *OXTR* and childhood adversity remained (*p*s < .046). The results of multiple regressions are summarized in S Table 3 and S Table 4.

S Table 3 Results of interactions including culture predicting general trust

	Step 3 (ΔR^2 = .008, p = .683)			
Predictors	*b*	*SE*	*t*(349)	*p*
Gender (0: M, 1: F)	-0.09	0.10	-0.93	.353
Culture (0: Jpn, 1: Can)	0.33	0.24	1.36	.173
Childhood adversity	-1.11	0.20	-5.45	<.001
*OXTR*1 (0: AA, 1: AG)	0.05	0.15	0.31	.755
*OXTR*2 (0: AA, 1: GG)	0.05	0.18	0.28	.777
Childhood adversity × *OXTR*1	1.04	0.29	3.66	<.001
Childhood adversity × *OXTR*2	0.69	0.34	2.00	.046
Culture × Childhood adversity × *OXTR*1	-0.67	0.47	-1.42	.158
Culture × Childhood adversity × *OXTR*2	-0.22	0.51	-0.43	.668
Culture × Childhood adversity	0.51	0.41	1.25	.212
Culture × *OXTR*1	-0.04	0.28	-0.14	.890
Culture × *OXTR*2	-0.17	0.30	-0.57	.570

S Table 4 Results of interactions including culture predicting caution

	Step 3 (ΔR^2 = .025, p = .098)			
Predictors	*b*	*SE*	*t*(349)	*p*
Gender (0: M, 1: F)	-0.17	0.10	-1.80	.073
Culture (0: Jpn, 1: Can)	-0.25	0.24	-1.05	.294
Childhood adversity	0.45	0.20	2.28	.023
*OXTR*1 (0: AA, 1: AG)	0.07	0.15	0.44	.657
*OXTR*2 (0: AA, 1: GG)	0.15	0.18	0.86	.388
Childhood adversity × *OXTR*1	-0.74	0.28	-2.66	.008
Childhood adversity × *OXTR*2	-0.85	0.33	2.56	.011
Culture × Childhood adversity × *OXTR*1	0.44	0.46	0.96	.336
Culture × Childhood adversity × *OXTR*2	0.72	0.50	1.43	.153
Culture × Childhood adversity	0.00	0.40	0.00	.999
Culture × *OXTR*1	-0.12	0.27	-0.42	.672
Culture × *OXTR*2	-0.06	0.29	-0.21	.835

OPRM1 × Perceived parental attention

In addition to the main results reported in Chapter 3, I conducted a series of regression analyses to examine the effect of perceived parental attention and *OPRM1* polymorphism on emotional support seeking (S Table 5) and instrumental support seeking (S Table 6) respectively.

Emotional support seeking. The results of multiple regression analyses showed that the main effect of perceived parental attention on emotional support seeking was significant (*b* =

0.14, *SE* = 0.06, *t*(595) = 4.20, *p* = .025), whereas the main effect of two *OPRM1* dummy-coded variables was not significant (*p*s >= .159; S Table 5). There were significant interactive effects of perceived parental attention and *OPRM1* gene polymorphism on emotional support seeking (Step 2). Specifically, the effects of perceived parental attention on emotional support seeking significantly differed between the AA and GG carriers (*b* = -0.45, *SE* = 0.17, *t*(593) = -2.59, *p* = .010). And the effects of perceived parental attention on emotional support seeking also significantly differed between the AG and GG carriers (*b* = -0.40, *SE* = 0.16, *t*(593) = -2.53, *p* = .012). The results of simple slope analyses showed that perceived parental attention only significantly increased GG carriers' emotional support seeking (*b* = 0.47, *SE* = 0.14, *t*(593) = 3.50, *p* < .001), whereas the association between perceived parental attention and emotional support seeking was neither significant for the AA carriers (*b* = 0.03, *SE* = 0.11, *t*(593) = 0.23, *p* = .815) nor the AG carriers (*b* = 0.07, *SE* = 0.09, *t*(593) = 0.83, *p* = .405).

S Table 5 Results of multiple regressions predicting emotional support seeking

	Step 1 (R^2 = .044, p < .001)				Step 2 (ΔR^2 = .013, p = .020)			
Predictors	*B*	*SE*	*t*(595)	*p*	*B*	*SE*	*t*(593)	*p*
Gender (0: M, 1: F)	0.38	0.09	4.20	<.001	0.38	0.09	4.19	<.001
Perceived parental attention	0.14	0.06	2.25	.025	0.48	0.14	3.50	<.001
OPRM1_1 (0: GG, 1: AA)	-0.18	0.13	-1.41	.159	-0.20	0.13	-1.52	.128
OPRM1_2 (0: GG, 1: AG)	-0.13	0.12	-1.10	.273	-0.14	0.12	-1.22	.223
Parental attention × *OPRM1_1*					-0.45	0.17	-2.59	.010
Parental attention × *OPRM1_2*					-0.40	0.16	-2.53	.012

Instrumental support seeking. As the results of emotional support seeking, the main effect of perceived parental attention on instrumental support seeking was significant (b = 0.17, SE = 0.06, t(595) = 2.75, p = .006), whereas the main effect of *OPRM1* genotypes was not significant (ps >= .075; S Table 6) (Step 1). Importantly, the influence of perceived parental attention on instrumental support was significantly different between the GG carriers and AA carriers (b = -0.39, SE = 0.17, t(593) = -2.28, p = .023). Moreover, the differences in the influence of perceived parental attention on instrumental support seeking were also significant between GG carriers and AG carriers (b = -0.54, SE = 0.16, t(593) = -3.41, p < .001). Further analyses indicated that perceived parental attention significantly increased GG carriers' instrumental support seeking (b = 0.56, SE = 0.13, t(593) = 4.13, p < .001), whereas it did not significantly predict the AA (b = 0.16, SE = 0.11, t(593) = 1.51, p = .132) or the AG carriers' instrumental support seeking (b = 0.02, SE = 0.08, t(593) = 0.18, p = .857)

S Table 6 Results of multiple regressions predicting instrumental support seeking

	Step 1 (R^2 = .047, p < .001)				Step 2 (ΔR^2 = .018, p = .003)			
Predictors	*B*	*SE*	*t*(595)	*p*	*B*	*SE*	*t*(593)	*p*
Gender (0: M, 1: W)	0.35	0.09	3.88	<.001	0.36	0.09	3.96	<.001
Perceived parental attention	0.17	0.06	2.75	.006	0.56	0.13	4.13	<.001
OPRM1_1 (0: GG, 1: AA)	-0.23	0.13	-1.78	.075	-0.25	0.13	-1.93	.054
OPRM1_2 (0: GG, 1: AG)	-0.20	0.12	-1.68	.093	-0.21	0.12	-1.82	.069
Parental attention × *OPRM1_1*					-0.39	0.17	-2.28	.023
Parental attention × *OPRM1_2*					-0.54	0.16	-3.41	<.001

References

Adams, G. (2005). The Cultural Grounding of Personal Relationship: Enemyship in North American and West African Worlds. *Journal of Personality and Social Psychology*, *88*(6), 948-968. https://doi.org/10.1037/0022-3514.88.6.948

Adams, G., & Plaut, V. C. (2003). The cultural grounding of personal relationship: Friendship in North American and West African worlds. *Personal Relationships*, *10*(3), 333-347. https://doi.org/https://doi.org/10.1111/1475-6811.00053

Adler, N. E., Epel, E. S., Castellazzo, G., & Ickovics, J. R. (2000). Relationship of subjective and objective social status with psychological and physiological functioning: Preliminary data in healthy, White women. *Health Psychology*, *19*(6), 586-592. https://doi.org/0.1037/0278-6133.19.6.586

Afifi, T. O., Mather, A., Boman, J., Fleisher, W., Enns, M. W., MacMillan, H., & Sareen, J. (2011). Childhood adversity and personality disorders: Results from a nationally representative population-based study. *Journal of Psychiatric Research*, *45*(6), 814-822. https://doi.org/https://doi.org/10.1016/j.jpsychires.2010.11.008

Ainsworth, M., & Crittenden, P. (1989). Child maltreatment and attachment theory. *Child maltreatment: Theory and research on the causes and consequences of child abuse and neglect*, 432-463.

Åkerlind, I., & Hörnquist, J. O. (1992). Loneliness and alcohol abuse: A review of evidences of an interplay. *Social Science and Medicine*, *34*(4), 405-414. https://doi.org/10.1016/0277-9536(92)90300-F

Aldwin, C. M., & Revenson, T. A. (1987). Does coping help? A reexamination of the relation between coping and mental health. *Journal of Personality and Social Psychology*, *53*(2), 337-348. https://doi.org/10.1037/0022-3514.53.2.337

Alesina, A., & La Ferrara, E. (2002). Who trusts others? *Journal of Public Economics*, *85*(2), 207-234. https://doi.org/https://doi.org/10.1016/S0047-2727(01)00084-6

Alharbi, E., & Smith, A. (2018). A review of the literature on stress and wellbeing among international students in English-speaking countries. *International Education Studies*, *11*(5), 22-44.

Allbaugh, L. J., Mack, S. A., Culmone, H. D., Hosey, A. M., Dunn, S. E., & Kaslow, N. J. (2018). Relational factors critical in the link between childhood emotional abuse and suicidal ideation. *Psychological Services*, *15*(3), 298-304. https://doi.org/10.1037/ser0000214

Anderson, C. A. (1999). Attributional Style, Depression, and Loneliness: A Cross-Cultural Comparison of American and Chinese Students. *Personality and Social Psychology Bulletin*, *25*(4), 482-499. https://doi.org/10.1177/0146167299025004007

Ando, S., Kuwabara, H., Araki, T., Kanehara, A., Tanaka, S., Morishima, R., Kondo, S., & Kasai, K. (2017). Mental Health Problems in a Community After the Great East Japan Earthquake in 2011: A Systematic Review. *Harvard Review of Psychiatry*, *25*(1), 15-28. https://doi.org/10.1097/hrp.0000000000000124

Ang, J. B., Madsen, J. B., & Wang, W. (2021). Rice farming, culture and democracy. European *Economic Review, 136*, 103778. https://doi.org/https://doi.org/10.1016/j.euroecorev.2021.103778

Arends-Tóth, J., & Van de Vijver, F. J. R. (2007). Acculturation Attitudes: A Comparison of Measurement Methods1 [https://doi.org/10.1111/j.1559-1816.2007.00222.x]. *Journal of Applied Social Psychology*, *37*(7), 1462-1488. https://doi.org/https://doi.org/10.1111/j.1559-1816.2007.00222.x

Ariel Stravynski, & Richard Boyer. (2001). Loneliness in Relation to Suicide Ideation and Parasuicide: A Population-Wide Study. *Suicide and Life-Threatening Behavior*, *31*(1), 32-40. https://doi.org/10.1521/suli.31.1.32.21312

Atkins, D., Uskul, A. K., & Cooper, N. R. (2016). Culture shapes empathic responses to physical and social pain. *Emotion*, *16*(5), 587-601. https://doi.org/10.1037/emo0000162

Bai, J. (2016). Perceived Support as a Predictor of Acculturative Stress Among International Students in the United States. *Journal of International Students*, *6*(1), 93-106. https://doi.org/10.32674/jis.v6i1.483

Bakermans-Kranenburg, M. J., & van IJzendoorn, M. H. (2014). A sociability gene? Meta-analysis of oxytocin receptor genotype effects in humans. *Psychiatric Genetics*, *24*(2), 45-51. https://doi.org/10.1097/YPG.0b013e3283643684

Balliet, D., & Van Lange, P. A. M. (2013). Trust, conflict, and cooperation: A meta-analysis. *Psychological Bulletin*, *139*(5), 1090-1112. https://doi.org/10.1037/a0030939

Barreto, M., Victor, C., Hammond, C., Eccles, A., Richins, M. T., & Qualter, P. (2021). Loneliness around the world: Age, gender, and cultural differences in loneliness. *Personality and Individual Differences*, *169*(1), 1-6. https://doi.org/10.1016/j.paid.2020.110066

Barth, J., Schneider, S., & von Känel, R. (2010). Lack of Social Support in the Etiology and the Prognosis of Coronary Heart Disease: A Systematic Review and Meta-Analysis.

Psychosomatic Medicine, *72*(3), 229-238. https://doi.org/10.1097/PSY.0b013e3181d01611

Batson, C. D. (2010). Empathy-induced altruistic motivation. In *Prosocial motives, emotions, and behavior: The better angels of our nature.* (pp. 15-34). American Psychological Association. https://doi.org/10.1037/12061-001

Batson, C. D., Fultz, J., & Schoenrade, P. A. (1987). Distress and Empathy: Two Qualitatively Distinct Vicarious Emotions with Different Motivational Consequences. *Journal of Personality*, *55*(1), 19-39. https://doi.org/https://doi.org/10.1111/j.1467-6494.1987.tb00426.x

Baumeister, R. F., & Leary, M. R. (1995). The need to belong: Desire for interpersonal attachments as a fundamental human motivation. *Psychological Bulletin*, *117*(3), 497-529. https://doi.org/10.1037/0033-2909.117.3.497

Belsky, J. (1997). Variation in Susceptibility to Environmental Influence: An Evolutionary Argument. *Psychological Inquiry*, *8*(3), 182-186. https://doi.org/10.1207/s15327965pli0803_3

Belsky, J., Jonassaint, C., Pluess, M., Stanton, M., Brummett, B., & Williams, R. (2009). Vulnerability genes or plasticity genes? *Molecular Psychiatry*, *14*(8), 746-754. https://doi.org/10.1038/mp.2009.44

Belsky, J., & Pluess, M. (2009). Beyond diathesis stress: Differential susceptibility to environmental influences. *Psychological Bulletin*, *135*(6), 885-908. https://doi.org/10.1037/a0017376

Bender, M., van Osch, Y., Sleegers, W., & Ye, M. (2019). Social Support Benefits Psychological Adjustment of International Students: Evidence From a Meta-Analysis. *Journal of Cross-Cultural Psychology*, *50*(7), 827-847. https://doi.org/10.1177/0022022119861151

Berry, J. W. (1997). Immigration, Acculturation, and Adaptation. *Applied Psychology*, *46*(1), 5-34. https://doi.org/https://doi.org/10.1111/j.1464-0597.1997.tb01087.x

Berry, J. W. (2005). Acculturation: Living successfully in two cultures. *International Journal of Intercultural Relations*, *29*(6), 697-712. https://doi.org/https://doi.org/10.1016/j.ijintrel.2005.07.013

Bertoletti, E., Zanoni, A., Giorda, R., & Battaglia, M. (2012). Influence of the OPRM1 gene polymorphism upon children's degree of withdrawal and brain activation in response to facial expressions. *Developmental Cognitive Neuroscience*, *2*(1), 103-109. https://doi.org/10.1016/j.dcn.2011.05.001

Bifulco, A., Kwon, J., Jacobs, C., Moran, P. M., Bunn, A., & Beer, N. (2006). Adult attachment style as mediator between childhood neglect/abuse and adult depression and anxiety. *Social Psychiatry and Psychiatric Epidemiology*, *41*(10), 796-805. https://doi.org/10.1007/s00127-006-0101-z

Bochner, S., McLeod, B. M., & Lin, A. (1977). Friendship patterns of overseas students: A functional model1. *International Journal of Psychology*, *12*(4), 277-294. https://doi.org/https://doi.org/10.1080/00207597708247396

Bohns, V. K., & Flynn, F. J. (2021). Empathy and expectations of others' willingness to help. *Personality and Individual Differences*, *168*, 110368. https://doi.org/https://doi.org/10.1016/j.paid.2020.110368

Bohns, V. K., Handgraaf, M. J. J., Sun, J., Aaldering, H., Mao, C., & Logg, J. (2011). Are social prediction errors universal? Predicting compliance with a direct request across cultures. *Journal of Experimental Social Psychology*, *47*(3), 676-680. https://doi.org/https://doi.org/10.1016/j.jesp.2011.01.001

Boparai, S., Borelli, J. L., Partington, L., Smiley, P., Jarvik, E., Rasmussen, H. F., Seaman, L. C., & Nurmi, E. L. (2018). Interaction between the opioid receptor OPRM1 gene and mother-child language style matching prospectively predicts children's separation anxiety disorder symptoms. *Research in Developmental Disabilities*, *82*, 120-131. https://doi.org/10.1016/j.ridd.2018.03.002

Bornstein, M. H. (2012). Cultural Approaches to Parenting. *Parenting*, *12*(2-3), 212-221. https://doi.org/10.1080/15295192.2012.683359

Bowlby, J. (1969). *Attachment and Loss, Vol. 1: Attachment*. New York: Basic Books.

Bowlby, J. (1978). *Attachment and loss. Vol. 2. Separation: anxiety and anger*. Penguin books.

Bowlby, J. (2008). *A secure base: Parent-child attachment and healthy human development*. Basic books.

Bradley, B., Westen, D., Mercer, K. B., Binder, E. B., Jovanovic, T., Crain, D., Wingo, A., & Heim, C. (2011). Association between childhood maltreatment and adult emotional dysregulation in a low-income, urban, African American sample: Moderation by oxytocin receptor gene. *Development and Psychopathology*, *23*(2), 439-452. https://doi.org/10.1017/S0954579411000162

Brody, G. H., Yu, T., Barton, A. W., Miller, G. E., & Chen, E. (2017). Youth temperament, harsh parenting, and variation in the oxytocin receptor gene forecast allostatic load during

emerging adulthood. *Development and Psychopathology*, *29*(3), 791-803. https://doi.org/10.1017/S095457941600047X

Bruehl, S., Chung, O. Y., & Burns, J. W. (2008). The mu opioid receptor A118G gene polymorphism moderates effects of trait anger-out on acute pain sensitivity. *Pain*, *139*(2), 406-415. https://doi.org/10.1016/j.pain.2008.05.014

Brunsting, N. C., Zachry, C., & Takeuchi, R. (2018). Predictors of undergraduate international student psychosocial adjustment to US universities: A systematic review from 2009-2018. *International Journal of Intercultural Relations*, *66*, 22-33. https://doi.org/https://doi.org/10.1016/j.ijintrel.2018.06.002

Buchmann, A. F., Zohsel, K., Blomeyer, D., Hohm, E., Hohmann, S., Jennen-Steinmetz, C., Treutlein, J., Becker, K., Banaschewski, T., Schmidt, M. H., Esser, G., Brandeis, D., Poustka, L., Zimmermann, U. S., & Laucht, M. (2014). Interaction between prenatal stress and dopamine D4 receptor genotype in predicting aggression and cortisol levels in young adults. *Psychopharmacology*, *231*(16), 3089-3097. https://doi.org/10.1007/s00213-014-3484-7

Burkhouse, K. L., Woody, M. L., Owens, M., McGeary, J. E., Knopik, V. S., & Gibb, B. E. (2016). Sensitivity in detecting facial displays of emotion: Impact of maternal depression and oxytocin receptor genotype. *Cognition and Emotion*, *30*(2), 275-287. https://doi.org/10.1080/02699931.2014.996531

Cadinu, M. R., & Rothbart, M. (1996). Self-anchoring and differentiation processes in the minimal group setting. *Journal of Personality and Social Psychology*, *70*(4), 661-677. https://doi.org/10.1037/0022-3514.70.4.661

Carver, C. S. (1997). You want to measure coping but your protocol' too long: Consider the brief cope. *International Journal of Behavioral Medicine*, *4*(1), 92-100. https://doi.org/10.1207/s15327558ijbm0401_6

Carver, C. S., & Connor-Smith, J. (2010). Personality and Coping. *Annual Review of Psychology*, *61*(1), 679-704. https://doi.org/10.1146/annurev.psych.093008.100352

Carver, C. S., Johnson, S. L., Joormann, J., Kim, Y., & Nam, J. Y. (2011). Serotonin Transporter Polymorphism Interacts With Childhood Adversity to Predict Aspects of Impulsivity. *Psychological Science*, *22*(5), 589-595. https://doi.org/10.1177/0956797611404085

Carver, C. S., Johnson, S. L., & Kim, Y. (2016). Mu opioid receptor polymorphism, early social adversity, and social traits. *Social Neuroscience*, *11*(5), 515-524. https://doi.org/10.1080/17470919.2015.1114965

Carver, C. S., Scheier, M. F., & Weintraub, J. K. (1989). Assessing coping strategies: a theoretically based approach. *Journal of Personality and Social Psychology*, *56*(2), 267-283. https://doi.org/10.1037//0022-3514.56.2.267

Caspi, A., Sugden, K., Moffitt, T. E., Taylor, A., Craig, I. W., Harrington, H., McClay, J., Mill, J., Martin, J., Braithwaite, A., & Poulton, R. (2003). Influence of Life Stress on Depression: Moderation by a Polymorphism in the 5-HTT Gene. *Science*, *301*(5631), 386-389. https://doi.org/doi:10.1126/science.1083968

Cemalcilar, Z., Falbo, T., & Stapleton, L. M. (2005). Cyber communication: A new opportunity for international students' adaptation? *International Journal of Intercultural Relations*, *29*(1), 91-110. https://doi.org/https://doi.org/10.1016/j.ijintrel.2005.04.002

Chang, J., Wang, S.-w., Mancini, C., McGrath-Mahrer, B., & Orama de Jesus, S. (2020). The complexity of cultural mismatch in higher education: Norms affecting first-generation

college students' coping and help-seeking behaviors. *Cultural Diversity and Ethnic Minority Psychology*, *26*(3), 280-294. https://doi.org/10.1037/cdp0000311

Charuvastra, A., & Cloitre, M. (2008). Social Bonds and Posttraumatic Stress Disorder. *Annual Review of Psychology*, *59*(1), 301-328. https://doi.org/10.1146/annurev.psych.58.110405.085650

Chataway, C. J., & Berry, J. (1989). Acculturation experiences, appraisal, coping, and adaptation: A comparison of Hong Kong Chinese, French, and English students in Canada. *Canadian Journal of Behavioural Science/Revue canadienne des sciences du comportement*, *21*(3), 295.

Chen, F. S., Kumsta, R., Dawans, B. v., Monakhov, M., Ebstein, R. P., & Heinrichs, M. (2011). Common oxytocin receptor gene (OXTR) polymorphism and social support interact to reduce stress in humans. *Proceedings of the National Academy of Sciences*, *108*(50), 19937-19942. https://doi.org/doi:10.1073/pnas.1113079108

Chen, L., Alston, M., & Guo, W. (2019). The influence of social support on loneliness and depression among older elderly people in China: Coping styles as mediators. *Journal of Community Psychology*, *47*(5), 1235-1245. https://doi.org/https://doi.org/10.1002/jcop.22185

Chida, Y., Hamer, M., Wardle, J., & Steptoe, A. (2008). Do stress-related psychosocial factors contribute to cancer incidence and survival? *Nature Clinical Practice Oncology*, *5*(8), 466-475. https://doi.org/10.1038/ncponc1134

Choi, D., Tsuchiya, K. J., & Takei, N. (2019). Interaction effect of oxytocin receptor (OXTR) rs53576 genotype and maternal postpartum depression on child behavioural problems. *Scientific Reports*, *9*(1), 7685. https://doi.org/10.1038/s41598-019-44175-6

Chopik, W. J., O'Brien, E., & Konrath, S. H. (2017). Differences in Empathic Concern and Perspective Taking Across 63 Countries. *Journal of Cross-Cultural Psychology*, *48*(1), 23-38. https://doi.org/10.1177/0022022116673910

Chu, P. S., Saucier, D. A., & Hafner, E. (2010). Meta-Analysis of the Relationships Between Social Support and Well-Being in Children and Adolescents. *Journal of Social and Clinical Psychology*, *29*(6), 624-645. https://doi.org/10.1521/jscp.2010.29.6.624

Chun, K.-T., & Campbell, J. B. (1974). Dimensionality of the Rotter Interpersonal Trust Scale. *Psychological Reports*, *35*(3), 1059-1070. https://doi.org/10.2466/pr0.1974.35.3.1059

Chung, W., Chan, S., & Cassels, T. G. (2010). The Role of Culture in Affective Empathy: Cultural and Bicultural Differences. *Journal of Cognition and Culture*, *10*(3-4), 309-326. https://doi.org/10.1163/156853710X531203

Cicchetti, D., Rogosch, F. A., Hecht, K. F., Crick, N. R., & Hetzel, S. (2014). Moderation of maltreatment effects on childhood borderline personality symptoms by gender and oxytocin receptor and FK506 binding protein 5 genes. *Development and Psychopathology*, *26*(3), 831-849. https://doi.org/10.1017/S095457941400042X

Cimino, S., Carola, V., Cerniglia, L., Bussone, S., Bevilacqua, A., & Tambelli, R. (2020). The μ-opioid receptor gene A118G polymorphism is associated with insecure attachment in children with disruptive mood regulation disorder and their mothers. *Brain and Behavior*, *10*(7), 1-12. https://doi.org/10.1002/brb3.1659

Cobb, S. (1976). Social support as a moderator of life stress. *Psychosomatic Medicine*, *38*(5), 300-314. https://doi.org/10.1097/00006842-197609000-00003

Connor-Smith, J. K., & Flachsbart, C. (2007). Relations between personality and coping: A meta-analysis. *Journal of Personality and Social Psychology*, *93*(6), 1080-1107. https://doi.org/10.1037/0022-3514.93.6.1080

Copeland, W. E., Sun, H., Costello, E. J., Angold, A., Heilig, M. A., & Barr, C. S. (2011). Child μ-Opioid Receptor Gene Variant Influences Parent–Child Relations. *Neuropsychopharmacology*, *36*(6), 1165-1170. https://doi.org/10.1038/npp.2010.251

Craighead, W. E., Kimball, W. H., & Rehak, P. J. (1979). Mood changes, physiological responses, and self-statements during social rejection imagery. *Journal of Consulting and Clinical Psychology*, *47*(2), 385-396. https://doi.org/10.1037/0022-006X.47.2.385

Cuff, B. M. P., Brown, S. J., Taylor, L., & Howat, D. J. (2014). Empathy: A Review of the Concept. *Emotion Review*, *8*(2), 144-153. https://doi.org/10.1177/1754073914558466

Davidow, Juliet Y., Foerde, K., Galván, A., & Shohamy, D. (2016). An Upside to Reward Sensitivity: The Hippocampus Supports Enhanced Reinforcement Learning in Adolescence. *Neuron*, *92*(1), 93-99. https://doi.org/https://doi.org/10.1016/j.neuron.2016.08.031

Davis, M. H. (1983). Measuring individual differences in empathy: Evidence for a multidimensional approach. *Journal of Personality and Social Psychology*, *44*(1), 113-126. https://doi.org/10.1037/0022-3514.44.1.113

Davis, M. H. (2015). Empathy and prosocial behavior. In *The Oxford handbook of prosocial behavior.* (pp. 282-306). Oxford University Press. https://doi.org/10.1093/oxfordhb/9780195399813.013.026

Davis, M. H. (2018). *Empathy: A social psychological approach*. Routledge.

de Araujo, A. A. (2011). Adjustment issues of international students enrolled in American colleges and universities: A review of the literature. *Higher education studies*, *1*(1), 2-8.

de Greck, M., Shi, Z., Wang, G., Zuo, X., Yang, X., Wang, X., Northoff, G., & Han, S. (2012). Culture modulates brain activity during empathy with anger. *Neuroimage*, *59*(3), 2871-2882. https://doi.org/10.1016/j.neuroimage.2011.09.052

de Jong-Gierveld, J. (1987). Developing and testing a model of loneliness. *Journal of Personality and Social Psychology*, *53*(1), 119-128. https://doi.org/10.1037/0022-3514.53.1.119

Decety, J., & Lamm, C. (2006). Human Empathy Through the Lens of Social Neuroscience. *TheScientificWorldJOURNAL*, *6*, 280363. https://doi.org/10.1100/tsw.2006.221

Demes, K. A., & Geeraert, N. (2014). Measures Matter:Scales for Adaptation, Cultural Distance, and Acculturation Orientation Revisited. *Journal of Cross-Cultural Psychology*, *45*(1), 91-109. https://doi.org/10.1177/0022022113487590

Demes, K. A., & Geeraert, N. (2015). The highs and lows of a cultural transition: A longitudinal analysis of sojourner stress and adaptation across 50 countries. *Journal of Personality and Social Psychology*, *109*(2), 316-337. https://doi.org/10.1037/pspp0000046

DePaulo, B. M. (1982). Social-psychological processes in informal help seeking. *Basic processes in helping relationships*, 255-279.

DePaulo, B. M., Leiphart, V., & Dull, W. (1984). Help seeking and social interaction. In *Development and maintenance of prosocial behavior* (pp. 337-357). Springer.

Devoldre, I., Davis, M. H., Verhofstadt, L. L., & Buysse, A. (2010). Empathy and Social Support Provision in Couples: Social Support and the Need to Study the Underlying Processes.

The Journal of Psychology, *144*(3), 259-284. https://doi.org/10.1080/00223981003648294

Doucerain, M. M. (2018). Heritage Acculturation Is Associated With Contextual Factors at Four Different Levels of Proximity. *Journal of Cross-Cultural Psychology*, *49*(10), 1539-1555. https://doi.org/10.1177/0022022118796976

Doucerain, M. M., Deschênes, S. S., Gouin, J.-P., Amiot, C. E., & Ryder, A. G. (2017). Initial Mainstream Cultural Orientations Predict Early Social Participation in the Mainstream Cultural Group. *Personality and Social Psychology Bulletin*, *43*(2), 245-258. https://doi.org/10.1177/0146167216679642

Dovidio, J. F., Allen, J. L., & Schroeder, D. A. (1990). Specificity of empathy-induced helping: Evidence for altruistic motivation. *Journal of Personality and Social Psychology*, *59*(2), 249-260. https://doi.org/10.1037/0022-3514.59.2.249

Downey, G., & Feldman, S. I. (1996). Implications of rejection sensitivity for intimate relationships. *Journal of Personality and Social Psychology*, *70*(6), 1327-1343. https://doi.org/10.1037/0022-3514.70.6.1327

Dykstra, P. A. (2009). Older adult loneliness: myths and realities. *European Journal of Ageing*, *6*(2), 91-100. https://doi.org/10.1007/s10433-009-0110-3

Eisenberg, N., Fabes, R. A., Miller, P. A., Fultz, J., Shell, R., Mathy, R. M., & Reno, R. R. (1989). Relation of sympathy and personal distress to prosocial behavior: A multimethod study. *Journal of Personality and Social Psychology*, *57*(1), 55-66. https://doi.org/10.1037/0022-3514.57.1.55

Eisenberg, N., Fabes, R. A., Murphy, B., Karbon, M., Maszk, P., Smith, M., O'Boyle, C., & Suh, K. (1994). The relations of emotionality and regulation to dispositional and situational

empathy-related responding. *Journal of Personality and Social Psychology*, *66*(4), 776-797. https://doi.org/10.1037/0022-3514.66.4.776

Eisenberg, N., & Miller, P. A. (1987). The relation of empathy to prosocial and related behaviors. *Psychological Bulletin*, *101*(1), 91-119. https://doi.org/10.1037/0033-2909.101.1.91

Ellis, B. J., Figueredo, A. J., Brumbach, B. H., & Schlomer, G. L. (2009). Fundamental Dimensions of Environmental Risk. *Human Nature*, *20*(2), 204-268. https://doi.org/10.1007/s12110-009-9063-7

Epley, N., Keysar, B., Van Boven, L., & Gilovich, T. (2004). Perspective Taking as Egocentric Anchoring and Adjustment. *Journal of Personality and Social Psychology*, *87*(3), 327-339. https://doi.org/10.1037/0022-3514.87.3.327

Fareri, D., Chang, L., & Delgado, M. (2012). Effects of Direct Social Experience on Trust Decisions and Neural Reward Circuitry [Original Research]. *Frontiers in Neuroscience*, *6*. https://doi.org/10.3389/fnins.2012.00148

Farr, R. M. (1991). Individualism as a collective representation. *Ideologies et representations sociales*, 129-143.

Feldman, S., & Downey, G. (1994). Rejection sensitivity as a mediator of the impact of childhood exposure to family violence on adult attachment behavior. *Development and Psychopathology*, *6*(1), 231-247. https://doi.org/10.1017/S0954579400005976

FeldmanHall, O., Dalgleish, T., Evans, D., & Mobbs, D. (2015). Empathic concern drives costly altruism. *Neuroimage*, *105*, 347-356. https://doi.org/https://doi.org/10.1016/j.neuroimage.2014.10.043

Fiske, A. P. (1992). The four elementary forms of sociality: Framework for a unified theory of social relations. *Psychological Review*, *99*(4), 689-723. https://doi.org/10.1037/0033-295X.99.4.689

Fiske, A. P. (2002). Using individualism and collectivism to compare cultures--A critique of the validity and measurement of the constructs: Comment on Oyserman et al. (2002). *Psychological Bulletin*, *128*(1), 78-88. https://doi.org/10.1037/0033-2909.128.1.78

Flasbeck, V., Moser, D., Kumsta, R., & Brüne, M. (2018). The OXTR Single-Nucleotide Polymorphism rs53576 Moderates the Impact of Childhood Maltreatment on Empathy for Social Pain in Female Participants: Evidence for Differential Susceptibility [Original Research]. *Frontiers in Psychiatry*, *9*. https://doi.org/10.3389/fpsyt.2018.00359

Flynn, F. J., & Lake, V. K. B. (2008). If you need help, just ask: Underestimating compliance with direct requests for help. *Journal of Personality and Social Psychology*, *95*(1), 128-143. https://doi.org/10.1037/0022-3514.95.1.128

Folkman, S., Lazarus, R. S., Dunkel-Schetter, C., DeLongis, A., & Gruen, R. J. (1986). Dynamics of a stressful encounter: Cognitive appraisal, coping, and encounter outcomes. *Journal of Personality and Social Psychology*, *50*(5), 992-1003. https://doi.org/10.1037/0022-3514.50.5.992

Fraley, R. C. (2019). Attachment in Adulthood: Recent Developments, Emerging Debates, and Future Directions. *Annual Review of Psychology*, *70*(1), 401-422. https://doi.org/10.1146/annurev-psych-010418-102813

Ganczarek, J., Hünefeldt, T., & Olivetti Belardinelli, M. (2018). From "Einfühlung" to empathy: exploring the relationship between aesthetic and interpersonal experience. *Cognitive Processing*, *19*(2), 141-145. https://doi.org/10.1007/s10339-018-0861-x

Gaylord-Harden, N. K., Campbell, C. L., & Kesselring, C. M. (2010). Maternal parenting behaviors and coping in African American children: The influence of gender and stress. *Journal of Child and Family Studies*, *19*(5), 579-587. https://doi.org/10.1007/s10826-009-9333-3

Geeraert, N., Demoulin, S., & Demes, K. A. (2014). Choose your (international) contacts wisely: A multilevel analysis on the impact of intergroup contact while living abroad. *International Journal of Intercultural Relations*, *38*, 86-96. https://doi.org/https://doi.org/10.1016/j.ijintrel.2013.08.001

George, C., & Solomon, J. (1996). Representational models of relationships: Links between caregiving and attachment. *Infant Mental Health Journal*, *17*(3), 198-216. https://doi.org/https://doi.org/10.1002/(SICI)1097-0355(199623)17:3<198::AID-IMHJ2>3.0.CO;2-L

Gheorghiu, M. A., Vignoles, V. L., & Smith, P. B. (2009). Beyond the United States and Japan: Testing Yamagishi's Emancipation Theory of Trust across 31 Nations. *Social Psychology Quarterly*, *72*(4), 365-383. https://doi.org/10.1177/019027250907200408

Goetz, J. L., & Peng, K. (2019). Sympathy and responses to suffering: Similarity and variation in China and the United States. *Emotion*, *19*(2), 320-333. https://doi.org/10.1037/emo0000443

Gong, P., Fan, H., Liu, J., Yang, X., Zhang, K., & Zhou, X. (2017). Revisiting the impact of OXTR rs53576 on empathy: A population-based study and a meta-analysis. *Psychoneuroendocrinology*, *80*, 131-136. https://doi.org/https://doi.org/10.1016/j.psyneuen.2017.03.005

Gramzow, R. H., Gaertner, L., & Sedikides, C. (2001). Memory for in-group and out-group information in a minimal group context: The self as an informational base. *Journal of Personality and Social Psychology*, *80*(2), 188-205. https://doi.org/10.1037/0022-3514.80.2.188

Griskevicius, V., Tybur, J. M., Delton, A. W., & Robertson, T. E. (2011). The influence of mortality and socioeconomic status on risk and delayed rewards: A life history theory approach. *Journal of Personality and Social Psychology*, *100*(6), 1015-1026. https://doi.org/10.1037/a0022403

Hafer, C. L., & Bègue, L. (2005). Experimental Research on Just-World Theory: Problems, Developments, and Future Challenges. *Psychological Bulletin*, *131*(1), 128-167. https://doi.org/10.1037/0033-2909.131.1.128

Hagerty, B. M., Williams, R. A., Coyne, J. C., & Early, M. R. (1996). Sense of belonging and indicators of social and psychological functioning. *Archives of Psychiatric Nursing*, *10*(4), 235-244. https://doi.org/10.1016/S0883-9417(96)80029-X

Hamamura, T. (2012). Are Cultures Becoming Individualistic? A Cross-Temporal Comparison of Individualism–Collectivism in the United States and Japan. *Personality and Social Psychology Review*, *16*(1), 3-24. https://doi.org/10.1177/1088868311411587

Hammen, C., Bower, J. E., & Cole, S. W. (2015). Oxytocin receptor gene variation and differential susceptibility to family environment in predicting youth borderline symptoms. *Journal of personality disorders*, *29*(2), 177-192.

Hankin, B. L., Nederhof, E., Oppenheimer, C. W., Jenness, J., Young, J. F., Abela, J. R. Z., Smolen, A., Ormel, J., & Oldehinkel, A. J. (2011). Differential susceptibility in youth:

evidence that 5-HTTLPR x positive parenting is associated with positive affect 'for better and worse'. *Translational Psychiatry*, *1*(10), e44-e44. https://doi.org/10.1038/tp.2011.44

Harber, K. D., Jussim, L., Kennedy, K. A., Freyberg, R., & Baum, L. (2008). Social Support Opinions1. *Journal of Applied Social Psychology*, *38*(6), 1463-1505. https://doi.org/https://doi.org/10.1111/j.1559-1816.2008.00356.x

Hashimoto, H., & Yamagishi, T. (2016). Duality of independence and interdependence: An adaptationist perspective. *Asian Journal of Social Psychology*, *19*(4), 286-297. https://doi.org/https://doi.org/10.1111/ajsp.12145

Heine, S. J., Lehman, D. R., Peng, K., & Greenholtz, J. (2002). What's wrong with cross-cultural comparisons of subjective Likert scales?: The reference-group effect. *Journal of Personality and Social Psychology*, *82*(6), 903-918. https://doi.org/10.1037/0022-3514.82.6.903

Hendrickson, B., Rosen, D., & Aune, R. K. (2011). An analysis of friendship networks, social connectedness, homesickness, and satisfaction levels of international students. *International Journal of Intercultural Relations*, *35*(3), 281-295. https://doi.org/https://doi.org/10.1016/j.ijintrel.2010.08.001

Heu, L. C., van Zomeren, M., & Hansen, N. (2020). Far away from home and (not) lonely: Relational mobility in migrants' heritage culture as a potential protection from loneliness. *International Journal of Intercultural Relations, 77*, 140-150. https://doi.org/https://doi.org/10.1016/j.ijintrel.2020.05.005

Himichi, T., Osanai, H., Goto, T., Fujita, H., Kawamura, Y., Davis, M. H., & Nomura, M. (2018). Development of a Japanese version of the Interpersonal Reactivity Index. *Japanese Journal of Psychology*, *88*(1), 61-71. https://doi.org/10.4992/jjpsy.88.15218

Hinnen, C., Sanderman, R., & Sprangers, M. A. G. (2009). Adult attachment as mediator between recollections of childhood and satisfaction with life [https://doi.org/10.1002/cpp.600]. *Clinical Psychology & Psychotherapy*, *16*(1), 10-21. https://doi.org/https://doi.org/10.1002/cpp.600

Hofhuis, J., Hanke, K., & Rutten, T. (2019). Social network sites and acculturation of international sojourners in the Netherlands: The mediating role of psychological alienation and online social support. *International Journal of Intercultural Relations*, *69*, 120-130. https://doi.org/https://doi.org/10.1016/j.ijintrel.2019.02.002

Holt-Lunstad, J. (2018). Why Social Relationships Are Important for Physical Health: A Systems Approach to Understanding and Modifying Risk and Protection. *Annual Review of Psychology*, *69*(1), 437-458. https://doi.org/10.1146/annurev-psych-122216-011902

Holt-Lunstad, J., Smith, T. B., Baker, M., Harris, T., & Stephenson, D. (2015). Loneliness and Social Isolation as Risk Factors for Mortality:A Meta-Analytic Review. *Perspectives on Psychological Science*, *10*(2), 227-237. https://doi.org/10.1177/1745691614568352

Hostinar, C. E., Cicchetti, D., & Rogosch, F. A. (2014). Oxytocin receptor gene polymorphism, perceived social support, and psychological symptoms in maltreated adolescents. *Development and Psychopathology*, *26*(2), 465-477. https://doi.org/10.1017/S0954579414000066

House, J. S., Landis, K. R., & Umberson, D. (1988). Social relationships and health. *Science*, *241*(4865), 540-545. https://doi.org/10.1126/science.3399889

Hu, Y., Strang, S., & Weber, B. (2015). Helping or punishing strangers: neural correlates of altruistic decisions as third-party and of its relation to empathic concern [Original

Research]. *Frontiers in Behavioral Neuroscience*, *9*(24). https://doi.org/10.3389/fnbeh.2015.00024

Huber, J., Muck, T., Maatz, P., Keck, B., Enders, P., Maatouk, I., & Ihrig, A. (2018). Face-to-face vs. online peer support groups for prostate cancer: A cross-sectional comparison study. *Journal of Cancer Survivorship*, *12*(1), 1-9. https://doi.org/10.1007/s11764-017-0633-0

Huetter, F. K., Bachmann, H. S., Reinders, A., Siffert, D., Stelmach, P., Knop, D., Horn, P. A., & Siffert, W. (2016). Association of a Common Oxytocin Receptor Gene Polymorphism with Self-Reported 'Empathic Concern' in a Large Population of Healthy Volunteers. *PloS One*, *11*(7), e0160059. https://doi.org/10.1371/journal.pone.0160059

Hygen, B. W., Belsky, J., Li, Z., Stenseng, F., Güzey, I. C., & Wichstrøm, L. (2017). Change in parenting, change in student–teacher relationships, and oxytocin receptor gene (OXTR): Testing a gene-×-environment (G×E) hypothesis in two samples. *Developmental Psychology*, *53*(7), 1300-1315. https://doi.org/10.1037/dev0000333

Irwin, K., & Berigan, N. (2013). Trust, Culture, and Cooperation: A Social Dilemma Analysis of Pro-Environmental Behaviors. *The Sociological Quarterly*, *54*(3), 424-449. https://doi.org/https://doi.org/10.1111/tsq.12029

Ishii, K., Masuda, T., Matsunaga, M., Noguchi, Y., Yamasue, H., & Ohtsubo, Y. (2020). Do culture and oxytocin receptor polymorphisms interact to influence emotional expressivity? *Culture and Brain*, 1-15. https://doi.org/10.1007/s40167-020-00091-5

Ishii, K., Miyamoto, Y., Mayama, K., & Niedenthal, P. M. (2011). When Your Smile Fades Away:Cultural Differences in Sensitivity to the Disappearance of Smiles. *Social*

Psychological and Personality Science, *2*(5), 516-522. https://doi.org/10.1177/1948550611399153

Ishii, K., Mojaverian, T., Masuno, K., & Kim, H. S. (2017). Cultural Differences in Motivation for Seeking Social Support and the Emotional Consequences of Receiving Support: The Role of Influence and Adjustment Goals. *Journal of Cross-Cultural Psychology*, *48*(9), 1442-1456. https://doi.org/10.1177/0022022117731091

Ito, K., Masuda, T., Komiya, A., & Hioki, K. (2015). Seeking help from close, same-sex friends:Relational costs for Japanese and personal costs for European Canadians. *Journal of Social and Personal Relationships*, *32*(4), 529-554. https://doi.org/10.1177/0265407514539780

Ji, L.-J., Khei, M., Yap, S., Wang, X., Zhang, Z., & Hou, Y. (2021). Cultural Differences in the Construal of Suffering and the COVID-19 Pandemic. *Social Psychological and Personality Science*, *12*(6), 1039-1047. https://doi.org/10.1177/1948550620958807

Jiang, L., Drolet, A., & Kim, H. S. (2018). Age and Social Support Seeking: Understanding the Role of Perceived Social Costs to Others. *Personality and Social Psychology Bulletin*, *44*(7), 1104-1116. https://doi.org/10.1177/0146167218760798

Johnson, K. V. A., & Dunbar, R. I. M. (2016). Pain tolerance predicts human social network size. *Scientific Reports*, *6*(1), 25267. https://doi.org/10.1038/srep25267

Johnson, S. L., Carver, C. S., Joormann, J., & Cuccaro, M. L. (2016). Genetic polymorphisms related to behavioral approach and behavioral inhibition scales. *Personality and Individual Differences*, *88*, 251-255. https://doi.org/10.1016/j.paid.2015.09.024

Jordan, M. R., Amir, D., & Bloom, P. (2016). Are empathy and concern psychologically distinct? *Emotion*, *16*(8), 1107-1116. https://doi.org/10.1037/emo0000228

Kaelber, K. A. Y., & Schwartz, R. C. (2014). Empathy and emotional intelligence among eastern and western counsellor trainees: a preliminary study. *International Journal for the Advancement of Counselling*, *36*(3), 274-286. https://doi.org/10.1007/s10447-013-9206-8

Kalmakis, K. A., & Chandler, G. E. (2014). Adverse childhood experiences: towards a clear conceptual meaning. *Journal of Advanced Nursing*, *70*(7), 1489-1501. https://doi.org/https://doi.org/10.1111/jan.12329

Kaplan, R. M. (1973). Components of Trust: Note on Use of Rotter's Scale. *Psychological Reports*, *33*(1), 13-14. https://doi.org/10.2466/pr0.1973.33.1.13

Kashima, E. S., Giummarra-Vocale, L., Sadewo, G. R. P., Hale, M. W., & Kashima, Y. (2021). 5-HTTLPR polymorphism and cross-cultural adaptation: the role of relational openness as a mediator. *Culture and Brain*, *9*(1), 48-62. https://doi.org/10.1007/s40167-020-00092-4

Kashima, E. S., Kent, S., & Kashima, Y. (2014). Life satisfaction in the new country: a multilevel longitudinal analysis of effects of culture and 5-HTT allele frequency distribution in country of origin. *Social Cognitive and Affective Neuroscience*, *10*(1), 50-54. https://doi.org/10.1093/scan/nsu036

Kashima, E. S., & Loh, E. (2006). International students' acculturation: Effects of international, conational, and local ties and need for closure. *International Journal of Intercultural Relations*, *30*(4), 471-485. https://doi.org/https://doi.org/10.1016/j.ijintrel.2005.12.003

Kelley, H. H., & Stahelski, A. J. (1970). Social interaction basis of cooperators' and competitors' beliefs about others. *Journal of Personality and Social Psychology*, *16*(1), 66-91. https://doi.org/10.1037/h0029849

Kerr, W. A., & Speroff, B. J. (1954). Validation and Evaluation of the Empathy Test. *The Journal of General Psychology*, *50*(2), 269-276. https://doi.org/10.1080/00221309.1954.9710125

Kim, H., & Markus, H. R. (1999). Deviance or uniqueness, harmony or conformity? A cultural analysis. *Journal of Personality and Social Psychology*, *77*(4), 785-800. https://doi.org/10.1037/0022-3514.77.4.785

Kim, H. S., & Sasaki, J. Y. (2014). Cultural Neuroscience: Biology of the Mind in Cultural Contexts. *Annual Review of Psychology*, *65*(1), 487-514. https://doi.org/10.1146/annurev-psych-010213-115040

Kim, H. S., Sherman, D. K., Ko, D., & Taylor, S. E. (2006). Pursuit of Comfort and Pursuit of Harmony: Culture, Relationships, and Social Support Seeking. *Personality and Social Psychology Bulletin*, *32*(12), 1595-1607. https://doi.org/10.1177/0146167206291991

Kim, H. S., Sherman, D. K., Sasaki, J. Y., Xu, J., Chu, T. Q., Ryu, C., Suh, E. M., Graham, K., & Taylor, S. E. (2010). Culture, distress, and oxytocin receptor polymorphism (OXTR) interact to influence emotional support seeking. *Proceedings of the National Academy of Sciences*, *107*(36), 15717-15721. https://doi.org/10.1073/pnas.1010830107

Kim, H. S., Sherman, D. K., & Taylor, S. E. (2008). Culture and social support. *American Psychologist*, *63*(6), 518-526. https://doi.org/10.1037/0003-066X

Kitayama, S. (2002). Culture and basic psychological processes--Toward a system view of culture: Comment on Oyserman et al. (2002). *Psychological Bulletin*, *128*(1), 89-96. https://doi.org/10.1037/0033-2909.128.1.89

Kitayama, S., & Bowman, N. A. (2010). Cultural consequences of voluntary settlement in the frontier: Evidence and implications. In *Evolution, culture, and the human mind.* (pp. 205-227). Psychology Press.

Kitayama, S., Duffy, S., & Uchida, Y. (2007). Self as cultural mode of being. *Handbook of cultural psychology*, 136-174.

Kitayama, S., Ishii, K., Imada, T., Takemura, K., & Ramaswamy, J. (2006). Voluntary settlement and the spirit of independence: evidence from Japan's "Northern frontier". *Journal of Personality and Social Psychology, 91*(3), 369–384. https://doi.org/10.1037/0022-3514.91.3.369

Kitayama, S., & Markus, H. R. (1999). Yin and Yang of the Japanese self: The cultural psychology of personality coherence. In *The coherence of personality: Social-cognitive bases of consistency, variability, and organization.* (pp. 242-302). Guilford Press.

Kitayama, S., Mesquita, B., & Karasawa, M. (2006). Cultural affordances and emotional experience: Socially engaging and disengaging emotions in Japan and the United States. *Journal of Personality and Social Psychology, 91*(5), 890-903. https://doi.org/10.1037/0022-3514.91.5.890

Kitayama, S., Park, H., Sevincer, A. T., Karasawa, M., & Uskul, A. K. (2009). A cultural task analysis of implicit independence: comparing North America, Western Europe, and East Asia. *Journal of Personality and Social Psychology*, *97*(2), 236.

Klepstad, P., Rakvåg, T. T., Kaasa, S., Holthe, M., Dale, O., Borchgrevink, P. C., Baar, C., Vikan, T., Krokan, H. E., & Skorpen, F. (2004). The 118 A > G polymorphism in the human μ-opioid receptor gene may increase morphine requirements in patients with

pain caused by malignant disease. *Acta Anaesthesiologica Scandinavica*, *48*(10), 1232-1239. https://doi.org/10.1111/j.1399-6576.2004.00517.x

Kliewer, W., Fearnow, M. D., & Miller, P. A. (1996). Coping socialization in middle childhood: Tests of maternal and paternal Influences. *Child Development*, *67*(5), 2339-2357. https://doi.org/10.1111/j.1467-8624.1996.tb01861.x

Kogan, A., Saslow, L. R., Impett, E. A., Oveis, C., Keltner, D., & Saturn, S. R. (2011). Thin-slicing study of the oxytocin receptor (OXTR) gene and the evaluation and expression of the prosocial disposition. *Proceedings of the National Academy of Sciences*, *108*(48), 19189-19192. https://doi.org/doi:10.1073/pnas.1112658108

Kong, F., & You, X. (2013). Loneliness and Self-Esteem as Mediators Between Social Support and Life Satisfaction in Late Adolescence. *Social Indicators Research*, *110*(1), 271-279. https://doi.org/10.1007/s11205-011-9930-6

Krueger, F., Parasuraman, R., Iyengar, V., Thornburg, M., Weel, J., Lin, M., Clarke, E., McCabe, K., & Lipsky, R. (2012). Oxytocin Receptor Genetic Variation Promotes Human Trust Behavior [Original Research]. *Frontiers in Human Neuroscience*, *6*. https://doi.org/10.3389/fnhum.2012.00004

Krueger, J. I. (2007). From social projection to social behaviour. *European Review of Social Psychology*, *18*(1), 1-35. https://doi.org/10.1080/10463280701284645

Lachmann, B., Sindermann, C., Sariyska, R. Y., Luo, R., Melchers, M. C., Becker, B., Cooper, A. J., & Montag, C. (2018). The Role of Empathy and Life Satisfaction in Internet and Smartphone Use Disorder [Original Research]. *Frontiers in Psychology*, *9*(398). https://doi.org/10.3389/fpsyg.2018.00398

Lalwani, A. K., Shavitt, S., & Johnson, T. (2006). What is the relation between cultural orientation and socially desirable responding? *Journal of Personality and Social Psychology*, *90*(1), 165-178. https://doi.org/10.1037/0022-3514.90.1.165

Larose, S., Boivin, M., & Doyle, A. B. (2001). Parental representations and attachment style as predictors of support-seeking behaviors and perceptions of support in an academic counseling relationship. *Personal Relationships*, *8*(1), 93-113. https://doi.org/10.1111/j.1475-6811.2001.tb00030.x

Larose, S., Guay, F., & Boivin, M. (2002). Attachment, Social Support, and Loneliness in Young Adulthood: A Test of Two Models. *Personality and Social Psychology Bulletin*, *28*(5), 684-693. https://doi.org/10.1177/0146167202288012

LeClair, J., Sasaki, J. Y., Ishii, K., Shinada, M., & Kim, H. S. (2016). Gene–culture interaction: influence of culture and oxytocin receptor gene (OXTR) polymorphism on loneliness. *Culture and Brain*, *4*(1), 21-37. https://doi.org/10.1007/s40167-016-0034-7

Lee, E. J., Lee, L., & Jang, J. (2011). Internet for the internationals: effects of internet use motivations on international students' college adjustment. *Cyberpsychol Behav Soc Netw*, *14*(7-8), 433-437. https://doi.org/10.1089/cyber.2010.0406

Lee, F. (1997). When the Going Gets Tough, Do the Tough Ask for Help? Help Seeking and Power Motivation in Organizations. *Organizational Behavior and Human Decision Processes*, *72*(3), 336-363. https://doi.org/https://doi.org/10.1006/obhd.1997.2746

Lee, F. (2002). The Social Costs of Seeking Help. *The Journal of Applied Behavioral Science*, *38*(1), 17-35. https://doi.org/10.1177/0021886302381002

Lerner, M. J. (1980). The Belief in a Just World. In M. J. Lerner (Ed.), *The Belief in a Just World: A Fundamental Delusion* (pp. 9-30). Springer US. https://doi.org/10.1007/978-1-4899-0448-5_2

Leung, K., Lau, S., & Lam, W.-L. (1998). Parenting Styles and Academic Achievement: A Cross-Cultural Study. *Merrill-Palmer Quarterly*, *44*(2), 157-172. http://www.jstor.org/stable/23093664

Levy, S. R., Freitas, A. L., & Salovey, P. (2002). Construing action abstractly and blurring social distinctions: Implications for perceiving homogeneity among, but also empathizing with and helping, others. *Journal of Personality and Social Psychology*, *83*(5), 1224-1238. https://doi.org/10.1037/0022-3514.83.5.1224

Liang, B., & He, Y. (2012). The effect of culture on consumer choice: the need for conformity vs. the need for uniqueness. *International Journal of Consumer Studies, 36*(3), 352-359. https://doi.org/https://doi.org/10.1111/j.1470-6431.2011.01013.x

Lim, V. K. G., Teo, T. S. H., & Zhao, X. (2013). Psychological costs of support seeking and choice of communication channel. *Behaviour & Information Technology*, *32*(2), 132-146. https://doi.org/10.1080/0144929X.2010.518248

Lipps, T. (1903). Einfühlung, innere nachahmung und organenempfindungen. *Revue Philosophique de la France Et de l*, *56*.

Lipps, T. (1907). Das wissen von fremden Ichen. *Psychologische untersuchungen*, *1*(4), 694-722.

Luo, S., & Han, S. (2014). The association between an oxytocin receptor gene polymorphism and cultural orientations. *Culture and Brain*, *2*(1), 89-107. https://doi.org/10.1007/s40167-014-0017-5

Luo, S., Ma, Y., Liu, Y., Li, B., Wang, C., Shi, Z., Li, X., Zhang, W., Rao, Y., & Han, S. (2015). Interaction between oxytocin receptor polymorphism and interdependent culture values on human empathy. *Social Cognitive and Affective Neuroscience*, *10*(9), 1273-1281. https://doi.org/10.1093/scan/nsv019

Lykes, V. A., & Kemmelmeier, M. (2014). What Predicts Loneliness? Cultural Difference Between Individualistic and Collectivistic Societies in Europe. *Journal of Cross-Cultural Psychology*, *45*(3), 468-490. https://doi.org/10.1177/0022022113509881

Lyons-Ruth, K., & Jacobvitz, D. (1999). Attachment disorganization: Unresolved loss, relational violence, and lapses in behavioral and attentional strategies. In *Handbook of attachment: Theory, research, and clinical applications.* (pp. 520-554). The Guilford Press.

MacGeorge, E. L., Feng, B., Burleson, B. R., Knapp, M., & Daly, J. (2011). Supportive communication. *Handbook of interpersonal communication*, *4*, 317-354.

Malhi, G. S., Das, P., Outhred, T., Dobson-Stone, C., Bell, E., Gessler, D., Bryant, R., & Mannie, Z. (2020). Interactions of OXTR rs53576 and emotional trauma on hippocampal volumes and perceived social support in adolescent girls. *Psychoneuroendocrinology*, *115*, 104635. https://doi.org/https://doi.org/10.1016/j.psyneuen.2020.104635

Mallinckrodt, B., & Leong, F. T. (1992). International graduate students, stress, and social support. *Journal of College Student Development*, *33*(1), 71-78.

Margarit, C., Ballester, P., Inda, M. D., Roca, R., Gomez, L., Planelles, B., Ajo, R., Morales, D., & Peiro, A. M. (2019). OPRM1 Gene Interaction with Sleep in Chronic Pain Patients Treated with Opioids. *Pain Physician*, *22*(1), 97-107.

Markstrom, C. A., Huey, E., Stiles, B. M., & Krause, A. L. (2010). Frameworks of Caring and Helping in Adolescence: Are Empathy, Religiosity, and Spirituality Related Constructs? *Youth & Society*, *42*(1), 59-80. https://doi.org/10.1177/0044118x09333644

Markstrom, C. A., & Marshall, S. K. (2007). The psychosocial inventory of ego strengths: Examination of theory and psychometric properties. *Journal of Adolescence*, *30*(1), 63-79. https://doi.org/10.1016/j.adolescence.2005.11.003

Markus, H. R., & Kitayama, S. (1991a). Cultural Variation in the Self-Concept. In J. Strauss & G. R. Goethals (Eds.), *The Self: Interdisciplinary Approaches* (pp. 18-48). Springer New York. https://doi.org/10.1007/978-1-4684-8264-5_2

Markus, H. R., & Kitayama, S. (1991b). Culture and the self: Implications for cognition, emotion, and motivation. *Psychological Review*, *98*(2), 224.

Matthews, T., Danese, A., Wertz, J., Odgers, C. L., Ambler, A., Moffitt, T. E., & Arseneault, L. (2016). Social isolation, loneliness and depression in young adulthood: a behavioural genetic analysis. *Social Psychiatry and Psychiatric Epidemiology*, *51*(3), 339-348. https://doi.org/10.1007/s00127-016-1178-7

McConnell, A. R., Brown, C. M., Shoda, T. M., Stayton, L. E., & Martin, C. E. (2011). Friends with benefits: On the positive consequences of pet ownership. *Journal of Personality and Social Psychology*, *101*(6), 1239-1252. https://doi.org/10.1037/a0024506

McQuaid, R., McInnis, O., Stead, J., Matheson, K., & Anisman, H. (2013). A paradoxical association of an oxytocin receptor gene polymorphism: early-life adversity and vulnerability to depression [Original Research]. *Frontiers in Neuroscience*, *7*. https://doi.org/10.3389/fnins.2013.00128

Medin, D. L., Unsworth, S. J., & Hirschfeld, L. (2007). Culture, categorization, and reasoning. In *Handbook of cultural psychology.* (pp. 615-644). The Guilford Press.

Meesters, C., & Muris, P. (2004). Perceived parental rearing behaviours and coping in young adolescents. *Personality and Individual Differences*, *37*(3), 513-522. https://doi.org/https://doi.org/10.1016/j.paid.2003.09.022

Mesidor, J. K., & Sly, K. F. (2016). Factors that Contribute to the Adjustment of International Students. *Journal of International Students*, *6*(1), 262-282. https://doi.org/10.32674/jis.v6i1.569

Meyer-Lindenberg, A., Domes, G., Kirsch, P., & Heinrichs, M. (2011). Oxytocin and vasopressin in the human brain: social neuropeptides for translational medicine. *Nature Reviews Neuroscience*, *12*(9), 524-538. https://doi.org/10.1038/nrn3044

Miller, J. G., Akiyama, H., & Kapadia, S. (2017). Cultural variation in communal versus exchange norms: Implications for social support. *Journal of Personality and Social Psychology*, *113*(1), 81-94. https://doi.org/10.1037/pspi0000091

Misra, R., Crist, M., & Burant, C. J. (2003). Relationships Among Life Stress, Social Support, Academic Stressors, and Reactions to Stressors of International Students in the United States. *International Journal of Stress Management*, *10*(2), 137-157. https://doi.org/10.1037/1072-5245.10.2.137

Mojaverian, T., Hashimoto, T., & Kim, H. (2013). Cultural differences in professional help seeking: A comparison of Japan and the U.S [Original Research]. *Frontiers in Psychology*, *3*(615). https://doi.org/10.3389/fpsyg.2012.00615

Mojaverian, T., & Kim, H. S. (2013). Interpreting a Helping Hand:Cultural Variation in the Effectiveness of Solicited and Unsolicited Social Support. *Personality and Social Psychology Bulletin, 39*(1), 88-99. https://doi.org/10.1177/0146167212465319

Moos, R. H., & Holahan, C. J. (2003). Dispositional and contextual perspectives on coping: Toward an integrative framework. *Journal of Clinical Psychology*, *59*(12), 1387-1403. https://doi.org/https://doi.org/10.1002/jclp.10229

Morling, B., Kitayama, S., & Miyamoto, Y. (2002). Cultural Practices Emphasize Influence in the United States and Adjustment in Japan. *Personality and Social Psychology Bulletin, 28*(3), 311-323. https://doi.org/10.1177/0146167202286003

Mori, S. C. (2000). Addressing the Mental Health Concerns of International Students. *Journal of Counseling & Development*, *78*(2), 137-144. https://doi.org/https://doi.org/10.1002/j.1556-6676.2000.tb02571.x

Moroi, K. (1992). Dimensions of the Revised UCLA Loneliness Scale's dimensions. *Shizuoka University Reports*, *42*, 23-51.

Mortenson, S. T. (2009). Interpersonal Trust and Social Skill in Seeking Social Support Among Chinese and Americans. *Communication Research*, *36*(1), 32-53. https://doi.org/10.1177/0093650208326460

Mortenson, S. T., Burleson, B. R., Feng, B., & Liu, M. (2009). Cultural Similarities and Differences in Seeking Social Support as a Means of Coping: A Comparison of European Americans and Chinese and an Evaluation of the Mediating Effects of Self-Construal. *Journal of International and Intercultural Communication*, *2*(3), 208-239. https://doi.org/10.1080/17513050902985331

Ng, T. K., Wang, K. W. C., & Chan, W. (2017). Acculturation and cross-cultural adaptation: The moderating role of social support. *International Journal of Intercultural Relations*, *59*, 19-30. https://doi.org/https://doi.org/10.1016/j.ijintrel.2017.04.012

Nickerson, R. S. (1999). How we know—and sometimes misjudge—what others know: Imputing one's own knowledge to others. *Psychological Bulletin*, *125*(6), 737-759. https://doi.org/10.1037/0033-2909.125.6.737

Nisbett, R. E., Peng, K., Choi, I., & Norenzayan, A. (2001). Culture and systems of thought: Holistic versus analytic cognition. *Psychological Review*, *108*(2), 291-310. https://doi.org/10.1037/0033-295X.108.2.291

Nishina, K., Takagishi, H., Inoue-Murayama, M., Takahashi, H., & Yamagishi, T. (2015). Polymorphism of the Oxytocin Receptor Gene Modulates Behavioral and Attitudinal Trust among Men but Not Women. *PloS One*, *10*(10), e0137089. https://doi.org/10.1371/journal.pone.0137089

Noto, K., Suzuki, A., Shirata, T., Matsumoto, Y., Takahashi, N., Goto, K., & Otani, K. (2020). Mu-opioid receptor polymorphism moderates sensitivity to parental behaviors during characterization of personality traits. *Neuropsychiatric Disease and Treatment*, *16*, 2161-2167. https://doi.org/10.2147/NDT.S265774

Obradović, J., & Boyce, W. T. (2009). Individual Differences in Behavioral, Physiological, and Genetic Sensitivities to Contexts: Implications for Development and Adaptation. *Developmental Neuroscience*, *31*(4), 300-308. https://doi.org/10.1159/000216541

Oertel, B. G., Kettner, M., Scholich, K., Renné, C., Roskam, B., Geisslinger, G., Schmidt, P. H., & Lötsch, J. (2009). A common human μ-opioid receptor genetic variant diminishes the receptor signaling efficacy in brain regions processing the sensory information of pain.

Journal of Biological Chemistry, *284*(10), 6530-6535. https://doi.org/10.1074/jbc.M807030200

Ognibene, T. C., & Collins, N. L. (1998). Adult attachment styles, perceived social support and coping strategies. *Journal of Social and Personal Relationships*, *15*(3), 323-345. https://doi.org/10.1177/0265407598153002

Ohtsubo, Y., Matsunaga, M., Masuda, T., Noguchi, Y., Yamasue, H., & Ishii, K. (2022). Test of the Serotonin Transporter Gene × Early Life Stress Interaction Effect on Subjective Well-Being and Loneliness Among Japanese Young Adults. *Japanese Psychological Research*, *n/a*(n/a). https://doi.org/https://doi.org/10.1111/jpr.12376

Oishi, S., & Diener, E. (2009). Goals, Culture, and Subjective Well-Being. In E. Diener (Ed.), *Culture and Well-Being: The Collected Works of Ed Diener* (pp. 93-108). Springer Netherlands. https://doi.org/10.1007/978-90-481-2352-0_5

Oishi, S., & Kisling, J. (2013). The mutual constitution of residential mobility and individualism. In *Understanding Culture* (pp. 231-246). Psychology Press.

Omoto, A. M., Malsch, A. M., & Barraza, J. A. (2009). Compassionate acts: Motivations for and correlates of volunteerism among older adults. *The science of compassionate love: Theory, research, and applications*, 257-282.

Oyserman, D., Coon, H. M., & Kemmelmeier, M. (2002). Rethinking individualism and collectivism: Evaluation of theoretical assumptions and meta-analyses. *Psychological Bulletin*, *128*(1), 3-72. https://doi.org/10.1037/0033-2909.128.1.3

Partington, L. C., Borelli, J. L., Smiley, P., Jarvik, E., Rasmussen, H. F., Seaman, L. C., & Nurmi, E. L. (2018). Parental overcontrol x OPRM1 genotype interaction predicts school-aged children's sympathetic nervous system activation in response to performance

challenge. *Research in Developmental Disabilities*, *82*, 39-52. https://doi.org/10.1016/j.ridd.2018.04.011

Pearl, T., Klopf, D. W., & Ishii, S. (1990). Loneliness among Japanese and American College Students. *Psychological Reports*, *67*(1), 49-50. https://doi.org/10.2466/pr0.1990.67.1.49

Peng, K., Nisbett, R. E., & Wong, N. Y. C. (1997). Validity problems comparing values across cultures and possible solutions. *Psychological Methods*, *2*(4), 329-344. https://doi.org/10.1037/1082-989X.2.4.329

Penner, L. A., & Finkelstein, M. A. (1998). Dispositional and structural determinants of volunteerism. *Journal of Personality and Social Psychology*, *74*(2), 525-537. https://doi.org/10.1037/0022-3514.74.2.525

Persson, E., Asutay, E., Heilig, M., Löfberg, A., Pedersen, N., Västfjäll, D., & Tinghög, G. (2019). Variation in the μ-opioid receptor gene (OPRM1) does not moderate social-rejection sensitivity in humans. *Psychological Science*, *30*(7), 1050-1062. https://doi.org/10.1177/0956797619849894

Pinquart, M., Höffken, K., Silbereisen, R. K., & Wedding, U. (2007). Social support and survival in patients with acute myeloid leukaemia. *Supportive Care in Cancer*, *15*(1), 81-87. https://doi.org/10.1007/s00520-006-0114-x

Ray, R., Ruparel, K., Newberg, A., Wileyto, E. P., Loughead, J. W., Divgi, C., Blendy, J. A., Logan, J., Zubieta, J.-K., & Lerman, C. (2011). Human mu opioid receptor (OPRM1 A118G) polymorphism is associated with brain mu-opioid receptor binding potential in smokers. *Proceedings of the National Academy of Sciences*, *108*(22), 9268-9273. https://doi.org/10.1073/pnas.1018699108

Redfield, R., Linton, R., & Herskovits, M. J. (1936). Memorandum for the Study of Acculturation. *American Anthropologist*, *38*(1), 149-152. http://www.jstor.org/stable/662563

Reyes-Gibby, C. C., Shete, S., Rakvåg, T., Bhat, S. V., Skorpen, F., Bruera, E., Kaasa, S., & Klepstad, P. (2007). Exploring joint effects of genes and the clinical efficacy of morphine for cancer pain: OPRM1 and COMT gene. *Pain*, *130*(1-2), 25-30. https://doi.org/10.1016/j.pain.2006.10.023

Rodrigues, S. M., Saslow, L. R., Garcia, N., John, O. P., & Keltner, D. (2009). Oxytocin receptor genetic variation relates to empathy and stress reactivity in humans. *Proceedings of the National Academy of Sciences*, *106*(50), 21437. https://doi.org/10.1073/pnas.0909579106

Rokach, A., Orzeck, T., Moya, M. C., & Expósito, F. (2002). Causes of loneliness in North America and Spain. *European Psychologist*, *7*(1), 70-79. https://doi.org/10.1027/1016-9040.7.1.70

Romano, E., Babchishin, L., Marquis, R., & Fréchette, S. (2015). Childhood maltreatment and educational outcomes. *Trauma, Violence, and Abuse*, *16*(4), 418-437. https://doi.org/10.1177/1524838014537908

Rook, K. S. (1987). Social support versus companionship: Effects on life stress, loneliness, and evaluations by others. *Journal of Personality and Social Psychology*, *52*(6), 1132-1147. https://doi.org/10.1037/0022-3514.52.6.1132

Ross, L., Greene, D., & House, P. (1977). The “false consensus effect”: An egocentric bias in social perception and attribution processes. *Journal of Experimental Social Psychology*, *13*(3), 279-301. https://doi.org/https://doi.org/10.1016/0022-1031(77)90049-X

Ruchkin, V. V., Eisemann, M., & Hägglöf, B. (1999). Coping styles in delinquent adolescents and controls: The role of personality and parental rearing. *Journal of Youth and Adolescence*, *28*(6), 705-717. https://doi.org/10.1023/A:1021639617667

Russell, D., Peplau, L. A., & Cutrona, C. E. (1980). The revised UCLA Loneliness Scale: Concurrent and discriminant validity evidence. *Journal of Personality and Social Psychology*, *39*(3), 472-480. https://doi.org/10.1037/0022-3514.39.3.472

Ryder, A. G., Alden, L. E., & Paulhus, D. L. (2000). Is acculturation unidimensional or bidimensional? A head-to-head comparison in the prediction of personality, self-identity, and adjustment. *Journal of Personality and Social Psychology*, *79*(1), 49-65. https://doi.org/10.1037/0022-3514.79.1.49

Sacco, W. P., & Yanover, T. (2006). Diabetes and Depression: The Role of Social Support and Medical Symptoms. *Journal of Behavioral Medicine*, *29*(6), 523-531. https://doi.org/10.1007/s10865-006-9072-5

Santos, H. C., Varnum, M. E. W., & Grossmann, I. (2017). Global Increases in Individualism. *Psychological Science*, *28*(9), 1228-1239. https://doi.org/10.1177/0956797617700622

Saphire-Bernstein, S., Way, B. M., Kim, H. S., Sherman, D. K., & Taylor, S. E. (2011). Oxytocin receptor gene (OXTR) is related to psychological resources. *Proceedings of the National Academy of Sciences*, *108*(37), 15118-15122. https://doi.org/doi:10.1073/pnas.1113137108

Sasaki, J. Y., Kim, H. S., Mojaverian, T., Kelley, L. D. S., Park, I. Y., & Janušonis, S. (2011). Religion priming differentially increases prosocial behavior among variants of the dopamine D4 receptor (DRD4) gene. *Social Cognitive and Affective Neuroscience*, *8*(2), 209-215. https://doi.org/10.1093/scan/nsr089

Sasaki, Y., Aida, J., Tsuji, T., Koyama, S., Tsuboya, T., Saito, T., Kondo, K., & Kawachi, I. (2019). Pre-disaster social support is protective for onset of post-disaster depression: Prospective study from the Great East Japan Earthquake & Tsunami. *Scientific Reports*, *9*(1), 19427. https://doi.org/10.1038/s41598-019-55953-7

Sawir, E., Marginson, S., Deumert, A., Nyland, C., & Ramia, G. (2008). Loneliness and International Students: An Australian Study. *Journal of Studies in International Education*, *12*(2), 148-180. https://doi.org/10.1177/1028315307299699

Schroeder, D. A., Dovidio, J. F., Sibicky, M. E., Matthews, L. L., & Allen, J. L. (1988). Empathic concern and helping behavior: Egoism or altruism? *Journal of Experimental Social Psychology*, *24*(4), 333-353. https://doi.org/10.1016/0022-1031(88)90024-8

Schulz, J. F., Bahrami-Rad, D., Beauchamp, J. P., & Henrich, J. (2019). The Church, intensive kinship, and global psychological variation. *Science, 366*(6466), eaau5141. https://doi.org/doi:10.1126/science.aau5141

Senese, V. P., Azhari, A., Shinohara, K., Doi, H., Venuti, P., Bornstein, M. H., & Esposito, G. (2019). Implicit associations to infant cry: Genetics and early care experiences influence caregiving propensities. *Hormones and Behavior*, *108*, 1-9. https://doi.org/https://doi.org/10.1016/j.yhbeh.2018.12.012

Seon, J., Cho, H., Han, J.-B., Allen, J., Nelson, A., & Kwon, I. (2021). Help-Seeking Behaviors Among College Students Who Have Experienced Intimate Partner Violence and Childhood Adversity. *Journal of Family Violence*. https://doi.org/10.1007/s10896-021-00311-3

Shen, B.-J., McCreary, C. P., & Myers, H. F. (2004). Independent and Mediated Contributions of Personality, Coping, Social Support, and Depressive Symptoms to Physical Functioning

Outcome Among Patients in Cardiac Rehabilitation. *Journal of Behavioral Medicine*, *27*(1), 39-62. https://doi.org/10.1023/B:JOBM.0000013643.36767.22

Shiota, M. N. (2006). Silver linings and candles in the dark: Differences among positive coping strategies in predicting subjective well-being. *Emotion*, *6*(2), 335-339. https://doi.org/10.1037/1528-3542.6.2.335

Shu, F., Ahmed, S. F., Pickett, M. L., Ayman, R., & McAbee, S. T. (2020). Social support perceptions, network characteristics, and international student adjustment. *International Journal of Intercultural Relations*, *74*, 136-148. https://doi.org/https://doi.org/10.1016/j.ijintrel.2019.11.002

Sia, Alex T., Lim, Y., Lim, Eileen C. P., Goh, Rachelle W. C., Law, Hai Y., Landau, R., Teo, Y.-y., & Tan, Ene C. (2008). A118G Single Nucleotide Polymorphism of Human μ-Opioid Receptor Gene Influences Pain Perception and Patient-controlled Intravenous Morphine Consumption after Intrathecal Morphine for Postcesarean Analgesia. *Anesthesiology*, *109*(3), 520-526. https://doi.org/10.1097/ALN.0b013e318182af21

Simeon, D., Greenberg, J., Nelson, D., Schmeidler, J., & Hollander, E. (2005). Dissociation and posttraumatic stress 1 year after the World Trade Center disaster: follow-up of a longitudinal survey. *Journal of Clinical Psychiatry*, *66*(2), 231-237.

Simpson, J. S. A., Carlson, L. E., Beck, C. A., & Patten, S. (2002). Effects of a brief intervention on social support and psychiatric morbidity in breast cancer patients. *Psycho-Oncology*, *11*(4), 282-294. https://doi.org/https://doi.org/10.1002/pon.565

Slavich, G. M., Tartter, M. A., Brennan, P. A., & Hammen, C. (2014). Endogenous opioid system influences depressive reactions to socially painful targeted rejection life events.

Psychoneuroendocrinology, *49*(1), 141-149. https://doi.org/10.1016/j.psyneuen.2014.07.009

Smart Richman, L., & Leary, M. R. (2009). Reactions to discrimination, stigmatization, ostracism, and other forms of interpersonal rejection: a multimotive model. *Psychological Review*, *116*(2), 365-383. https://doi.org/10.1037/a0015250.Reactions

Smith, K. E., Porges, E. C., Norman, G. J., Connelly, J. J., & Decety, J. (2014). Oxytocin receptor gene variation predicts empathic concern and autonomic arousal while perceiving harm to others. *Social Neuroscience*, *9*(1), 1-9. https://doi.org/10.1080/17470919.2013.863223

Smith, R. A., & Khawaja, N. G. (2011). A review of the acculturation experiences of international students. *International Journal of Intercultural Relations*, *35*(6), 699-713. https://doi.org/https://doi.org/10.1016/j.ijintrel.2011.08.004

Stotland, E. (1969). Exploratory Investigations of Empathy11The preparation of this article and all of the initially reported studies were supported by a grant from the National Science Foundation. In L. Berkowitz (Ed.), *Advances in Experimental Social Psychology* (Vol. 4, pp. 271-314). Academic Press. https://doi.org/https://doi.org/10.1016/S0065-2601(08)60080-5

Sullivan, C., & Kashubeck-West, S. (2015). The interplay of international students' acculturative stress, social support, and acculturation modes. *Journal of International Students*, *5*(1), 1-11.

Sullivan, D., Landau, M. J., Kay, A. C., & Rothschild, Z. K. (2012). Collectivism and the meaning of suffering. *Journal of Personality and Social Psychology*, *103*(6), 1023-1039. https://doi.org/10.1037/a0030382

Sullivan, D., Stewart, S. A., Landau, M. J., Liu, S., Yang, Q., & Diefendorf, J. (2016). Exploring Repressive Suffering Construal as a Function of Collectivism and Social Morality. *Journal of Cross-Cultural Psychology*, *47*(7), 903-917. https://doi.org/10.1177/0022022116655963

Sun, R., Vuillier, L., Hui, B. P. H., & Kogan, A. (2019). Caring helps: Trait empathy is related to better coping strategies and differs in the poor versus the rich. *PloS One*, *14*(3), 1-29. https://doi.org/10.1371/journal.pone.0213142

Swann, G., Byck, G. R., Dick, D. M., Aliev, F., Latendresse, S. J., Riley, B., Kertes, D., Sun, C., Salvatore, J. E., Bolland, J., & Mustanski, B. (2014). Effect of OPRM1 and stressful life events on symptoms of major depression in African American adolescents. *Journal of Affective Disorders*, *162*, 12-19. https://doi.org/10.1016/j.jad.2014.03.020

Świtaj, P., Grygiel, P., Anczewska, M., & Wciórka, J. (2015). Experiences of discrimination and the feelings of loneliness in people with psychotic disorders: The mediating effects of self-esteem and support seeking. *Comprehensive Psychiatry*, *59*, 73-79. https://doi.org/10.1016/j.comppsych.2015.02.016

Szabó, Á., Z. Papp, Z., & Nguyen Luu, L. A. (2020). Social contact configurations of international students at school and outside of school: Implications for acculturation orientations and psychological adjustment. *International Journal of Intercultural Relations*, *77*, 69-82. https://doi.org/https://doi.org/10.1016/j.ijintrel.2020.05.001

Sze, J. A., Gyurak, A., Goodkind, M. S., & Levenson, R. W. (2012). Greater emotional empathy and prosocial behavior in late life. *Emotion*, *12*(5), 1129-1140. https://doi.org/10.1037/a0025011

Talhelm, T., Zhang, X., Oishi, S., Shimin, C., Duan, D., Lan, X., & Kitayama, S. (2014). Large-Scale Psychological Differences Within China Explained by Rice Versus Wheat Agriculture. *Science, 344*(6184), 603-608. https://doi.org/doi:10.1126/science.1246850

Taušová, J., Bender, M., Dimitrova, R., & van de Vijver, F. (2019). The role of perceived cultural distance, personal growth initiative, language proficiencies, and tridimensional acculturation orientations for psychological adjustment among international students. *International Journal of Intercultural Relations*, *69*, 11-23. https://doi.org/https://doi.org/10.1016/j.ijintrel.2018.11.004

Taylor, S. E. (2011). Social support: A review. In *The Oxford handbook of health psychology.* (pp. 189-214). Oxford University Press.

Taylor, S. E., Lerner, J. S., Sage, R. M., Lehman, B. J., & Seeman, T. E. (2004). Early Environment, Emotions, Responses to Stress, and Health. *Journal of Personality*, *72*(6), 1365-1394. https://doi.org/https://doi.org/10.1111/j.1467-6494.2004.00300.x

Taylor, S. E., Sherman, D. K., Kim, H. S., Jarcho, J., Takagi, K., & Dunagan, M. S. (2004). Culture and social support: Who seeks it and why? *Journal of Personality and Social Psychology*, *87*(3), 354-362. https://doi.org/10.1037/0022-3514.87.3.354.

Taylor, S. E., Way, B. M., Welch, W. T., Hilmert, C. J., Lehman, B. J., & Eisenberger, N. I. (2006). Early Family Environment, Current Adversity, the Serotonin Transporter Promoter Polymorphism, and Depressive Symptomatology. *Biological Psychiatry*, *60*(7), 671-676. https://doi.org/https://doi.org/10.1016/j.biopsych.2006.04.019

Taylor, S. E., Welch, W. T., Kim, H. S., & Sherman, D. K. (2007). Cultural Differences in the Impact of Social Support on Psychological and Biological Stress Responses.

Psychological Science, *18*(9), 831-837. https://doi.org/10.1111/j.1467-9280.2007.01987.x

Tchalova, K., Sadikaj, G., Moskowitz, D. S., Zuroff, D. C., & Bartz, J. A. (2021). Variation in the μ-opioid receptor gene (OPRM1) and experiences of felt security in response to a romantic partner's quarrelsome behavior. *Molecular Psychiatry*, *26*(8), 3847-3857. https://doi.org/10.1038/s41380-019-0600-4

Thompson, S. M., Hammen, C., Starr, L. R., & Najman, J. M. (2014). Oxytocin receptor gene polymorphism (rs53576) moderates the intergenerational transmission of depression. *Psychoneuroendocrinology*, *43*, 11-19. https://doi.org/https://doi.org/10.1016/j.psyneuen.2014.01.012

Thomson, R., Yuki, M., Talhelm, T., Schug, J., Kito, M., Ayanian, A. H., Becker, J. C., Becker, M., Chiu, C.-y., Choi, H.-S., Ferreira, C. M., Fülöp, M., Gul, P., Houghton-Illera, A. M., Joasoo, M., Jong, J., Kavanagh, C. M., Khutkyy, D., Manzi, C., Marcinkowska, U. M., Milfont, T. L., Neto, F., von Oertzen, T., Pliskin, R., San Martin, A., Singh, P., & Visserman, M. L. (2018). Relational mobility predicts social behaviors in 39 countries and is tied to historical farming and threat. *Proceedings of the National Academy of Sciences, 115*(29), 7521. https://doi.org/10.1073/pnas.1713191115

Tost, H., Kolachana, B., Hakimi, S., Lemaitre, H., Verchinski, B. A., Mattay, V. S., Weinberger, D. R., & Meyer–Lindenberg, A. (2010). A common allele in the oxytocin receptor gene (OXTR) impacts prosocial temperament and human hypothalamic-limbic structure and function. *Proceedings of the National Academy of Sciences*, *107*(31), 13936-13941. https://doi.org/doi:10.1073/pnas.1003296107

Triandis, H. C. (1989). The self and social behavior in differing cultural contexts. *Psychological Review*, *96*(3), 506-520. https://doi.org/10.1037/0033-295X.96.3.506

Triandis, H. C. (1993). Collectivism and Individualism as Cultural Syndromes. *Cross-Cultural Research*, *27*(3-4), 155-180. https://doi.org/10.1177/106939719302700301

Trobst, K. K., Collins, R. L., & Embree, J. M. (1994). The Role of Emotion in Social Support Provision: Gender, Empathy and Expressions of Distress. *Journal of Social and Personal Relationships*, *11*(1), 45-62. https://doi.org/10.1177/0265407594111003

Troisi, A., Frazzetto, G., Carola, V., Di Lorenzo, G., Coviello, M., D'Amato, F. R., Moles, A., Siracusano, A., & Gross, C. (2011). Social hedonic capacity is associated with the A118G polymorphism of the mu-opioid receptor gene (OPRM1) in adult healthy volunteers and psychiatric patients. *Social Neuroscience*, *6*(1), 88-97. https://doi.org/10.1080/17470919.2010.482786

Troisi, A., Frazzetto, G., Carola, V., Di Lorenzo, G., Coviello, M., Siracusano, A., & Gross, C. (2011). Variation in the μ-opioid receptor gene (OPRM1) moderates the influence of early maternal care on fearful attachment. *Social Cognitive and Affective Neuroscience*, *7*(5), 542-547. https://doi.org/10.1093/scan/nsr037

Unger, J. A. M., & De Luca, R. V. (2014). The Relationship Between Childhood Physical Abuse and Adult Attachment Styles. *Journal of Family Violence*, *29*(3), 223-234. https://doi.org/10.1007/s10896-014-9588-3

Unger, L. S., & Thumuluri, L. K. (1997). Trait empathy and continuous helping: The case of voluntarism. *Journal of Social behavior and Personality*, *12*(3), 787.

Unoka, Z., Seres, I., Áspán, N., Bódi, N., & Kéri, S. (2009). Trust Game Reveals Restricted Interpersonal Transactions in Patients With Borderline Personality Disorder. *Journal of personality disorders*, *23*(4), 399-409. https://doi.org/10.1521/pedi.2009.23.4.399

Usta, Y. Y. (2012). Importance of social support in cancer patients. *Asian Pacific Journal of Cancer Prevention*, *13*(8), 3569-3572.

van Ijzendoorn, M. H., Belsky, J., & Bakermans-Kranenburg, M. J. (2012). Serotonin transporter genotype 5HTTLPR as a marker of differential susceptibility? A meta-analysis of child and adolescent gene-by-environment studies. *Translational Psychiatry*, *2*(8), e147-e147. https://doi.org/10.1038/tp.2012.73

van Roekel, E., Verhagen, M., Scholte, R. H. J., Kleinjan, M., Goossens, L., & Engels, R. C. M. E. (2013). The Oxytocin Receptor Gene (OXTR) in Relation to State Levels of Loneliness in Adolescence: Evidence for Micro-Level Gene-Environment Interactions. *PloS One*, *8*(11), e77689. https://doi.org/10.1371/journal.pone.0077689

Walter, C., & Lötsch, J. (2009). Meta-analysis of the relevance of the OPRM1 118A>G genetic variant for pain treatment. *Pain*, *146*(3), 270-275. https://doi.org/https://doi.org/10.1016/j.pain.2009.07.013

Wang, C.-C. D. C., & Mallinckrodt, B. (2006). Acculturation, attachment, and psychosocial adjustment of Chinese/Taiwanese international students. *Journal of Counseling Psychology*, *53*(4), 422-433. https://doi.org/10.1037/0022-0167.53.4.422

Wang, K. T., Heppner, P. P., Fu, C.-C., Zhao, R., Li, F., & Chuang, C.-C. (2012). Profiles of acculturative adjustment patterns among Chinese international students. *Journal of Counseling Psychology*, *59*(3), 424-436. https://doi.org/10.1037/a0028532

Wang, S.-w., Shih, J. H., Hu, A. W., Louie, J. Y., & Lau, A. S. (2010). Cultural differences in daily support experiences. *Cultural Diversity and Ethnic Minority Psychology*, *16*(3), 413-420. https://doi.org/10.1037/a0019885

Ward, C., & Geeraert, N. (2016). Advancing acculturation theory and research: the acculturation process in its ecological context. *Current Opinion in Psychology*, *8*, 98-104. https://doi.org/https://doi.org/10.1016/j.copsyc.2015.09.021

Ward, C., & Kennedy, A. (1994). Acculturation strategies, psychological adjustment, and sociocultural competence during cross-cultural transitions. *International Journal of Intercultural Relations*, *18*(3), 329-343. https://doi.org/https://doi.org/10.1016/0147-1767(94)90036-1

Ward, C., & Kennedy, A. (1999). The measurement of sociocultural adaptation. *International Journal of Intercultural Relations*, *23*(4), 659-677. https://doi.org/https://doi.org/10.1016/S0147-1767(99)00014-0

Ward, C., & Rana-Deuba, A. (1999). Acculturation and Adaptation Revisited. *Journal of Cross-Cultural Psychology*, *30*(4), 422-442. https://doi.org/10.1177/0022022199030004003

Wawera, A.-S., & McCamley, A. (2020). Loneliness among international students in the UK. *Journal of Further and Higher Education*, *44*(9), 1262-1274. https://doi.org/10.1080/0309877X.2019.1673326

Way, B. M., & Lieberman, M. D. (2010). Is there a genetic contribution to cultural differences? Collectivism, individualism and genetic markers of social sensitivity. *Social Cognitive and Affective Neuroscience*, *5*(2-3), 203-211. https://doi.org/10.1093/scan/nsq059

Way, B. M., Taylor, S. E., & Eisenberger, N. I. (2009). Variation in the μ-opioid receptor gene (OPRM1) is associated with dispositional and neural sensitivity to social rejection.

Proceedings of the National Academy of Sciences, *106*(35), 15079-15084. https://doi.org/10.1073/pnas.0812612106

Wilhelm, M. O., & Bekkers, R. (2010). Helping Behavior, Dispositional Empathic Concern, and the Principle of Care. *Social Psychology Quarterly*, *73*(1), 11-32. https://doi.org/10.1177/0190272510361435

Williams, S. L., & Mickelson, K. D. (2008). A paradox of support seeking and rejection among the stigmatized. *Personal Relationships*, *15*(4), 493-509. https://doi.org/https://doi.org/10.1111/j.1475-6811.2008.00212.x

Williams, W. C., Morelli, S. A., Ong, D. C., & Zaki, J. (2018). Interpersonal emotion regulation: Implications for affiliation, perceived support, relationships, and well-being. *Journal of Personality and Social Psychology*, *115*(2), 224-254. https://doi.org/10.1037/pspi0000132

Wong, S. S., Lee, B. O., Ang, R. P., Oei, T. P. S., & Ng, A. K. (2009). Personality, Health, and Coping:A Cross-National Study. *Cross-Cultural Research*, *43*(3), 251-279. https://doi.org/10.1177/1069397109335729

Wright, K. B., & Rains, S. A. (2013). Weak-Tie Support Network Preference, Health-Related Stigma, and Health Outcomes in Computer-Mediated Support Groups. *Journal of Applied Communication Research*, *41*(3), 309-324. https://doi.org/10.1080/00909882.2013.792435

Wu, J., Balliet, D., Tybur, J. M., Arai, S., Van Lange, P. A. M., & Yamagishi, T. (2017). Life history strategy and human cooperation in economic games. *Evolution and Human Behavior*, *38*(4), 496-505. https://doi.org/https://doi.org/10.1016/j.evolhumbehav.2017.03.002

Wu, J., Yuan, M., & Kou, Y. (2020). Disadvantaged early-life experience negatively predicts prosocial behavior: The roles of Honesty-Humility and dispositional trust among Chinese adolescents. *Personality and Individual Differences*, *152*, 109608. https://doi.org/https://doi.org/10.1016/j.paid.2019.109608

Wu, N., & Su, Y. (2015). Oxytocin Receptor Gene Relates to Theory of Mind and Prosocial Behavior in Children. *Journal of Cognition and Development*, *16*(2), 302-313. https://doi.org/10.1080/15248372.2013.858042

Xu, X., Zuo, X., Wang, X., & Han, S. (2009). Do You Feel My Pain? Racial Group Membership Modulates Empathic Neural Responses. *The Journal of Neuroscience*, *29*(26), 8525-8529. https://doi.org/10.1523/JNEUROSCI.2418-09.2009

Yael Apter-Levy, M.A. ,, Michal Feldman, M.A. ,, Adam Vakart, M.A. ,, Richard P. Ebstein, Ph.D. , and, & Ruth Feldman, Ph.D. (2013). Impact of Maternal Depression Across the First 6 Years of Life on the Child's Mental Health, Social Engagement, and Empathy: The Moderating Role of Oxytocin. *American Journal of Psychiatry*, *170*(10), 1161-1168. https://doi.org/10.1176/appi.ajp.2013.12121597

Yamagishi, T., Akutsu, S., Cho, K., Inoue, Y., Li, Y., & Matsumoto, Y. (2015). Two-Component Model of General Trust: Predicting Behavioral Trust from Attitudinal Trust. *Social Cognition*, *33*(5), 436-458. https://doi.org/10.1521/soco.2015.33.5.436

Yamagishi, T., Kikuchi, M., & Kosugi, M. (1999). Trust, Gullibility, and Social Intelligence. *Asian Journal of Social Psychology*, *2*(1), 145-161. https://doi.org/https://doi.org/10.1111/1467-839X.00030

Yamagishi, T., & Yamagishi, M. (1994). Trust and commitment in the United States and Japan. *Motivation and Emotion*, *18*(2), 129-166. https://doi.org/10.1007/BF02249397

Yang, B., & Clum, G. A. (1994). Life Stress, Social Support, and Problem-Solving Skills Predictive of Depressive Symptoms, Hopelessness, and Suicide Ideation in an Asian Student Population: A Test of a Model. *Suicide and Life-Threatening Behavior*, *24*(2), 127-139. https://doi.org/https://doi.org/10.1111/j.1943-278X.1994.tb00797.x

Yeh, C. J., & Inose, M. (2003). International students' reported English fluency, social support satisfaction, and social connectedness as predictors of acculturative stress. *Counselling Psychology Quarterly*, *16*(1), 15-28. https://doi.org/10.1080/0951507031000114058

Yoon, E., Lee, R. M., & Goh, M. (2008). Acculturation, social connectedness, and subjective well-being. *Cultural Diversity and Ethnic Minority Psychology*, *14*(3), 246-255. https://doi.org/10.1037/1099-9809.14.3.246

Zeidner, M., Matthews, G., & Shemesh, D. O. (2016). Cognitive-Social Sources of Wellbeing: Differentiating the Roles of Coping Style, Social Support and Emotional Intelligence. *Journal of Happiness Studies*, *17*(6), 2481-2501. https://doi.org/10.1007/s10902-015-9703-z

Zhang, J., & Goodson, P. (2011a). Acculturation and psychosocial adjustment of Chinese international students: Examining mediation and moderation effects. *International Journal of Intercultural Relations*, *35*(5), 614-627. https://doi.org/https://doi.org/10.1016/j.ijintrel.2010.11.004

Zhang, J., & Goodson, P. (2011b). Predictors of international students' psychosocial adjustment to life in the United States: A systematic review. *International Journal of Intercultural Relations*, *35*(2), 139-162. https://doi.org/https://doi.org/10.1016/j.ijintrel.2010.11.011

Zhang, Y., Wang, D., Johnson, A. D., Papp, A. C., & Sadée, W. (2005). Allelic expression imbalance of human mu opioid receptor (OPRM1) caused by variant A118G. *Journal of Biological Chemistry*, *280*(38), 32618-32624. https://doi.org/10.1074/jbc.M504942200

Zhao, Q., Neumann, D. L., Cao, Y., Baron-Cohen, S., Yan, C., Chan, R. C. K., & Shum, D. H. K. (2019). Culture–Sex Interaction and the Self-Report Empathy in Australians and Mainland Chinese [Original Research]. *Frontiers in Psychology*, *10*(396). https://doi.org/10.3389/fpsyg.2019.00396

Zheng, S., Ishii, K., Masuda, T., Matsunaga, M., Noguchi, Y., Yamasue, H., & Ohtsubo, Y. (2022) Mu opioid receptor gene (OPRM1) moderates the influence of perceived parental attention on social support seeking. *Adaptive Human Behavior and Physiology*. https://doi.org/10.1007/s40750-022-00192-w

Zheng, S., Masuda, T., Matsunaga, M., Noguchi, Y., Ohtsubo, Y., Yamasue, H., & Ishii, K. (2020). Oxytocin receptor gene (OXTR) and childhood adversity influence trust. *Psychoneuroendocrinology*, *121*, 104840. https://doi.org/10.1016/j.psyneuen.2020.104840

Zheng, S., Masuda, T., Matsunaga, M., Noguchi, Y., Ohtsubo, Y., Yamasue, H., & Ishii, K. (2022). Cultural differences in social support seeking: The mediating role of empathic concern. *PloS One*, *16*(12), e0262001. https://doi.org/10.1371/journal.pone.0262001

Zietlow, A.-L., Nonnenmacher, N., Reck, C., Mueller, M., Herpertz, S. C., Neukel, C., Fuchs, A., Bermpohl, F., Fuehrer, D., Kluczniok, D., Attar, C. H., Jaite, C., Dittrich, K., & Boedeker, K. (2017). Early life maltreatment but not lifetime depression predicts insecure attachment in women. *Archives of Women's Mental Health*, *20*(4), 477-486. https://doi.org/10.1007/s00737-017-0731-z