RE-EVALUATION AND EXPANSION OF THE COGNITIVE MODEL OF LONELINESS IN THE DIGITAL CONTEXT：A CROSS-CULTURAL COMPARISON

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Chapter 1 Introduction

In the last two decades, the Internet, especially Social Networking Sites (SNS; e.g., Facebook), has become a significant part of individuals' daily communication. While SNS has been lauded as being instrumental in bringing old friends together, at the same time, some users have been disillusioned by its promises and subsequently experience even accentuated loneliness. Early academic studies have mainly been interested in whether and how the use of SNS affects the feeling of loneliness. However, there is still little agreement being drawn between studies. Reviews on the matter (for example, Anderson, Fagan, Woodnutt & Chamorro-Premuzic, 2012; Kraut & Burke, 2015) have identified several common problems in the existing literature:

1) Many studies have utilized over-simplified measures, and others have failed to delineate types of Internet and their users. (e.g., Burke & Kraut, 2013, 2016; Burke, Kraut, & Marlow; 2011, Huang, 2010).

2) Most of the reviewed studies fail to explicitly adopt a theoretical framework; hence they only add sporadic and unorganized bits and pieces of knowledge without incorporating them in a coherent and comprehensive model. (Meng, Martinez, Holmstrom, Chung, & Cox, 2017).

In view of the above issues, this dissertation focuses on the relationship between loneliness and SNS usage, addressing the shortcomings of not specifying a particular user population and being atheoretical in nature. The theoretical framework of the Cognitive Discrepancy Model of Loneliness was adapted to identify what users of SNS expect in their participation compared to what they get. A series of studies were conducted to test the Western culture conceived model in this matter, within the Asian, collectivistic culture context, specifically in Japan and China. Western models, especially when dealing with social relationships, often fall short of explaining phenomena

found in Eastern, collectivistic cultures. This dissertation consists of a literature review, followed by two studies addressing the above measurement issue and a subsequent study that utilized a newly devised scale to apply a theoretical framework connecting SNS usage and user well-being.

In this chapter, previous works pertaining to the effects of engaging in SNS social activities on mental health, particularly on loneliness, are reviewed, focusing on the methodological issues and underlying mechanisms. First, existing investigations on relationships between Internet (especially SNS) usage and loneliness in the last 30 years were reviewed. The methodological and theoretical problems were sorted out. Next, to resolve the overly simplified assessment problem of SNS social activities, the literature dealing with measurement in social media uses and gratifications was reviewed. Third, to fill the theoretical gaps in previous studies, a focus was placed on studies dealing with the cognitive discrepancy model of loneliness. Fourth, the cultural valences of SNS uses and gratification and those effects on mental health were discussed. After a brief discussion of the gaps of these literature, the purpose of this research is presented in the final part of this chapter.

1.1. Relationships between SNS usage and loneliness

Initial studies on the relationship between Internet use and loneliness at pre-SNS age (before 2004, the year Facebook was launched) had focused on the following two theories. One is the Internet paradox phenomenon (Kraut, Patterson, Lundmark, Kiesler, Mukophadhyay, & Scherlis, 1998), demonstrating that the use of the Internet has a negative effect on social involvement and psychological well-being. Greater use of the Internet was associated with small but statistically significant declines in social

involvement, with an increase in loneliness and depression. The rich-get-richer theory (Kraut, Kiesler, Boneva, Cummings, Helgeson, & Crawford, 2002), on the contrary, suggested the possibility that communication through Internet may bring particular benefits (e.g., decreasing loneliness and social anxiety, increasing life satisfaction), especially for extraverted individuals (e.g., Kraut et al., 2002; Shaw & Gant, 2002; Modayil, Thompson, Varnhagen, & Wilson, 2003). In other words, those who have an extensive face-to-face interpersonal network will also have a large online network. However, as the reviews of Anderson et al. (2012) and Kraut et al. (2015) mention, these works typically use just one or two effortless, rough items to measure quantitative aspects, rather than using a comprehensive scale to measure qualitative aspects of online social activities. Furthermore, they have failed to differentiate between online communication formats and their online partner categories. These methodological weaknesses have hampered insightful understanding of mechanisms at play.

Subsequent studies investigated these SNS effects in more sophisticated ways. Rains and Young (2009) and Steinfield, Ellison, and Lampe (2008) agree that communication with solid ties rather than weak ties increases the amount of social support, which in turn reduces depression, stress, and loneliness. Besides the strength of ties, Huang (2010), Burke and Kraut (2013), and Burke et al. (2011) suggested that the impact of SNS also varies with types of personal goals, the ways in which communication is exchanged, as well as intimacy with communication partners. Despite the fact that scholars agree that the association between SNS use and well-being depends on how the Internet is used, there remain unanswered questions about the relevant factors (Burke & Kraut, 2016).

1.2. Uses and gratifications of SNS

This study is categorized under the realm of uses and gratifications theory (UGT), which deals with how media usage brings user satisfaction and the attainment of personal and social needs. This theory quickly developed from the popularization of television in the 1960s and ’70s, when the TV became a household appliance. The impact of television on viewers' lifestyles coerced researchers to focus on the way people use this newly accepted medium and what satisfactions they derive from it. According to Katz, Blumler, and Gurevitch (1974), UGT research is concerned with: “social and psychological origins of needs, which generate expectations from the mass media or other sources. These needs lead to differential patterns of media exposure (or engagement in other activities), resulting in need gratifications and other consequences, perhaps mostly unintended ones.” (p. 20).

This audience-centered approach was initially developed to answer the questions, why do people use mass media, and what do they use them for? Over the past several decades, extensive research has been conducted to examine “new” media usage and behavioral patterns, as well as their underlying motives, from the classic UGT theoretical perspective (Rubin, 2009).

Carried on mainly from television viewing, the advent of the Internet and its accompanying SNS provides a new and deep field for exploring UGT. The tools offered by modern social media (e.g., SNS) allow users to experience media in unique ways and have expanded the range and scope of our interactions with media content (Sundar & Limperos, 2013). Wang and Tchernev (2012) studied daily mediated and non-mediated college students' activities and identified four categories of SNS gratifications. These are 1) emotional needs (e.g., strengthening aesthetic, pleasurable, and

emotional experience); 2) cognitive needs (e.g., strengthening information, knowledge, and understanding); 3) social needs (e.g., strengthening contact with family, friends, and the world); and 4) habitual needs (e.g., ritualized and help bring structure to one's day).

By the definition of SNS, social needs are perceived to be the most prominent force compelling individuals to SNS (Wang et al., 2012). Research on the domain of social gratification has shown that SNS provides remarkable convenience and efficiency for developing, maintaining, strengthening social relationships, and encouraging information exchange via the individuals' social networks (e.g., Ellison et al. 2007; Lai & Turban, 2008). In the context of this research, the use of SNS will be probed regarding the gap between what the users expect SNS would bring about and what they actually get from it. This will be conceived in the form of how much SNS can contribute to decreasing the loneliness they experience. UGT would predict that SNS usage would be instrumental in one's attainment of optimal social needs, hence loneliness should be mitigated.

1.3. Cultural Differences in SNS Usage

Recent research on cross-cultural computer-mediated communication (CMC) has shown that the online culture reflects the offline culture in which it is embedded (Abeele & Roe, 2011; Morling & Lamoreaux, 2008), and motives (goals) and usage should potentially differ across ethnic and national groups (cf. Wu & Li, 2016). To this effect, Jackson and Wang (2013) surveyed Chinese and American students about the time spent on SNS and its importance and reasons for their use. Their results revealed that American students spend more time on SNS, consider it more critical, and

report more online friends than their Chinese counterparts. The researchers interpret the differences from the perspective of individualism and collectivism (IC) and independent and interdependent self-construals (IC at the individual level). They claimed that collectivistic emphasis on family, friends, and other face-to-face oriented groups could be partly responsible for less SNS use by Chinese participants than Americans. On the other hand, individualistic values emphasize one's characteristics and self-fulfillment goals and require a greater network of friends while not requiring them to be close and enduring. This could explain the American participants' greater use of SNS to Jackson and Wang (2013).

Likewise, Wijesundara (2014) compared participants' motivations and usage patterns of SNS in the United States and Sri Lanka. His findings revealed that while patterns of SNS usage do not differ across these two particular cultures, some of the motivations behind them did differ. These included: motives of relaxing and entertainment as well as motives of expressive information sharing. Wijesubdara also attributed these differences to the IC perspective. He states that with a collectivism orientation, Sri Lankans have strong preference for relaxing with and entertaining others (e.g., face-to-face gossiping) rather than engaging in online entertainment, which is an individual activity, such as playing online games or watching videos.

Furthermore, there may also be cultural variations behind motives for SNS usage. For instance, cultural psychologists have actively debated why North Americans are geared to self-enhance, whereas East Asians self-deprecate (e.g., Falk, Heine, Yuki, & Takemura, 2009; Heine, Lehman, Peng, & Greenholtz, 2002). Although the underlying motivation is to gain social approval, the former promotes oneself as a worthy person, emphasizing his/her virtues and achievements, while the latter shows

self-humility, maintaining humbleness. When engaging in SNS activities, the ultimate motivation is expanding and maintaining satisfying social relationships, hence for the individualist, expanding their current social network as an index of how popular they may take precedence over maintaining a small but intimate social network, as a collectivist may do (Falk et al. 2009, Sato, Yuki, Norasakkunkit, 2014).

Another cultural difference is that of relational mobility. Yuki and his colleagues (e.g., Schug, Yuki, 2010, Yuki, & Schug, 2012) have developed their concept of relational mobility, claiming that individualists tend to be relationally mobile, i.e., engaging in and ending relationships more readily than collectivists, who are more prone to treat relationships as relatively permanent entities (Wheeler, Reis, & Bond, 1989). In other words, relationally mobile persons would use SNS to seek out new relationships, expanding their current social network. Thus they will actively engage in self-promotion through SNS. To these people, gaining likes on Facebook, followers on Twitter, or comments on YouTube is the source of satisfaction. On the other hand, East Asians are likely to be satisfied with a small yet functionally integrative network of close friends with whom they engage in intimate exchanges. To this effect, Igarashi, Kashima, Kashima, Farsides, Kim, Stracke, Werth, and Yuki (2007) found that network homogeneity was greater in East Asians than Westerners, implying that the former enjoys close relationships with similar others, while the latter prefers a wide variety of ties.

These differences illustrate the divergence in SNS usage between Western users versus East-Asian. This implies that the basis for UGT may differ in content with culture since if the way people use SNS differs, the satisfaction attained from SNS usage would naturally vary. Existing scales dealing with UGT tend to be conceived

and developed under Western assumptions and may not accurately reflect what East Asian users intend to gain from it. To probe into such differences, it is necessary to delineate SNS usage and the satisfaction derived from it from an East-Asian perspective. The present study's first aim is to develop a comprehensive scale under the framework of UGT in the East Asian context. Although related to the motives of SNS usages, the UGT shed light on understanding the factors that affect an individual's feeling of fulfillment. Instead of answering why people use SNS, the author attempts to answer the research questions: what do people want to achieve from SNS? How do they evaluate their achievements?

1.4. Loneliness and cognitive discrepancy model of loneliness

Before making any further investigation, the definition of loneliness should be established. Scholars in psychology and relevant fields agree that loneliness is an empty feeling people have when they lack personal relationships (e.g., de Jong Gierveld, 1998; Fees, Martlin, & Poon, 1999; Marangoni & Ickes, 1989; Margulis, Derlega, & Winstead, 1984; Perlman, & Peplau, 1981). Moreover, several essential pieces of literature (e.g., Cutrona, 1982; Paloutzian & Janigan, 1987; Perlman & Peplau, 1982; Russell, 1982; Russell, Cutrona, McRae, & Gomez, 2012) have suggested that it is essential to distinguish between loneliness and just being alone. For instance, while some people may be involved in many social relationships, they still feel lonely because they are dissatisfied with essential aspects of their social life (e.g., quality of relationships, lack of particular relationships, or mismatch between reality and desire).

In conjunction with this, the present study defines loneliness as a subjective

feeling rather than a physical deficit of social connections. The Cognitive Discrepancy Model of Loneliness (CDML) predicts that people will experience loneliness when they perceive a difference between their desired (or expected) and actual levels of social relationships. There are two kinds of discrepancies: Ideal-actual discrepancy (IAD) and Typical-actual discrepancy (TAD). IAD is defined as a perceived gap between levels of one's desired (expected) and actual social involvement. Peplau, Miceli, and Morash (1982) have suggested that past experiences can direct people "to develop images of kinds of social interactions and relationships that make us feel satisfied and happy" (p. 136).

Meanwhile, TAD is a normative standard based on social comparison. TAD entails the perception of a typical other's social activity as a benchmark to compare one's level of social life. IAD and TAD could be both qualitative and quantitative. Although CDML has been widely cited by loneliness studies, it has rarely been directly examined through empirical studies, the knowledge of how different discrepancies impact loneliness is limited. A few studies have examined CDML qualitatively, which shall be outlined hereon.

CDML was first examined by Russell, Steffen, and Salih (1981). They found nonlinear associations between actual-CL discrepancy (a discrepancy between one's current friendships and the comparison level of social relationships) and relationship satisfaction, as well as loneliness, for three types of relationships (friendships, romantic relationships, and family Relationships). Archibald, Bartholomew, and Marx (1995) found partial support of the theory, having looked at the discrepancy between what an individual gets from their relationships and what they perceive others are getting from them and found that after controlling for actual levels of social contacts, the TAD level

of social connections could only marginally predict satisfaction and loneliness. Russell, Cutrona, McRae, and Gomez (2012) used the Social Life Questionnaire (SLQ; Archibald et al., 1995) to examine the predicted nonlinear relationships between IAD level of social contacts and feelings of loneliness, implying that what the individual expects from their relationships and what they do are not related linearly. They found that the cognitive discrepancy model of loneliness was supported only in the case of close friendships. In sum, these existing studies provide direct, while weak, support to the CDML claim that perceived discrepancies do have significant impacts on subjective satisfaction and loneliness and that these effects do not exist independently. This points to the need to take into account the actual quantity and quality of social contacts. One possible inference is that the perceived discrepancies are only salient when the actual level of social contact reaches a minimal level. Therefore, a more intricate investigation should be made to re-examine and expand this theoretical framework.

Two critical issues of the works reviewed above have been pointed out. First, the measure of social activities (i.e., SLQ; Archibald et al., 1995) focused only on face-to-face activity levels and did not access other aspects of social relationships (e.g., qualitative aspects of social connection, lack of distinction between weak ties, and strong ties). Second, CDML has not yet been examined in SNS contexts. To this effect, it is worthy of applying the CDML framework to modern, more contemporary lifestyles of the internet age.

The past year has demonstrated the importance of online communication, versus face-to-face, with the COVID-19 pandemic limiting the latter form of communication. Indeed, online communication is increasingly becoming more frequent than face-to-face, and studies on interpersonal communication and relationships cannot

overlook the former's importance. Since Internet technologies have been commonly employed, the tools and services (SNSs) might provide wider accessibility to new connections and expand on the range of scope of interactions within existing relationships. For instance, Facebook, a typical SNS, allows people to comment on each other's real-time updates, introduces new applications such as the "timeline" feature for selective self-presentations, and updates privacy policies and grouping functions to actively articulate online relationships (Ellison & Boyd, 2013). Therefore, when examining the relationship between loneliness and social activities, it is necessary to incorporate an assessment of social contact via SNS.

The current research extends the CDML in the context of SNS usage. SNS users may perceive it to be a reliable tool in which they can obtain social resources, hence they would hold high expectations of rewards in return for their usage. If they attain the same level of resources as they expected, they should not feel lonely. If not, SNS usage may contribute to their feelings of loneliness. These propositions will be explored through this dissertation.

1.5. Other cultural variations

Recent research on cross-cultural computer-mediated communication (CMC) has provided evidence that CMC culture may reflect on the face-to-face (FTF) culture in which it is embedded (Abeele & Roe, 2011; Morling & Lamoreaux, 2008). In terms of SNS uses and gratification, Wu and Li (2016) claimed potential cultural variations in SNS motives (goals) and usage across ethnic and national groups. Xu et al. (2018) showed that while the structure of SNS motives of East Asian individuals by and large replicated that of the Western, it was content that differed. According to their investi-

gation, East Asian participants tend to formulate their motives with more hesitation and social concerns. In contrast, their Western counterparts actively express and assert themselves to fulfill their self-esteem needs. Likewise, Kim, Sohn, and Choi (2011) reported behavioral and motivational differences between American and Korean SNS users. They found that North Americans show a more positive attitude and more active interests in casually seeking new friends via SNS, while Koreans mainly prefer to seek social support from existing relationships via SNS as a readily available interpersonal resource tool.

Furthermore, Jackson and Wang (2013) surveyed Chinese and American students about the intensity and importance of motives for SNS use. Their results showed that American students spend more time on SNS, consider online activities more critical, and report more SNS connections than Chinese students do. The authors explain that individualistic cultures (e.g., United States) emphasize individuals' characteristics and self-fulfillment goals. Having a vast network of social connections is an essential index of one's well-being, although the majority of these connections are neither close, nor enduring. Extrapolating from the existing evidence, inferences could be made that East Asians emphasize harmony in small, but close relational networks more than personal characteristics and goals. Therefore, the social activities of important others might be a more salient standard in the evaluation of one's own social life. Besides, DER use of SNS should be more relevant than the utility of "expanding current social network" (ECN) or "information sharing and exchange" (ISE).

In summary of the above review and discussion, it is quite clear that differences in culture regarding SNS usage, expectations, motivations, and goal attainment exist, and Western conceived models of uses and gratifications may not suffice to explain

SNS effects on East Asian people. This leads into the purpose of the current research.

1.6. Purpose of the dissertation research

This research aims to provide a potential explanation of the widely discussed yet unsolved problem of, "Why do people still feel lonely while actively engaging in SNS." This study follows the framework of the cognitive discrepancy model of loneliness. The CDML postulates that people will experience loneliness when they perceive discrepancies are significant predictors of loneliness over and above the impacts of actual quantity and quality of social contacts. While it is taken for granted that SNS should be instrumental in reducing loneliness in its users, by simple virtue of allowing them more opportunities for social interaction, with a wider variety of people, the previous sections have argued that for East Asians, quantity is not always important. The quality of interaction needs to be taken into account, and a smaller but more intimate and functionally integrated social network may be what is required for East Asians to benefit from SNS.

In an attempt to see if SNS does indeed perform a facilitating function toward mitigating loneliness, two studies have been proposed. Study 1 aims to create a measure to assess the cognitive discrepancies of output gained from online social activities. The satisfaction attained from SNS usage of Japanese and Chinese users will be established by creating a new scale on which explorative and confirmative factor analyses will be conducted, identifying culture-specific motive structures and a common structure between Japanese and Chinese. Cross-validation of the scale across the two cultures will be tested and the measure's concurrent validity against related scales.

Study 2 will implement this new scale to examine the underlying mechanism

through which SNS affects feelings of loneliness. The predictive models of CDML within this digital context will be tested in both Japanese and Chinese usership while at the same time delineating differences between the two cultures.

The overview and chapter composition of this dissertation is shown in Figure 1.1.

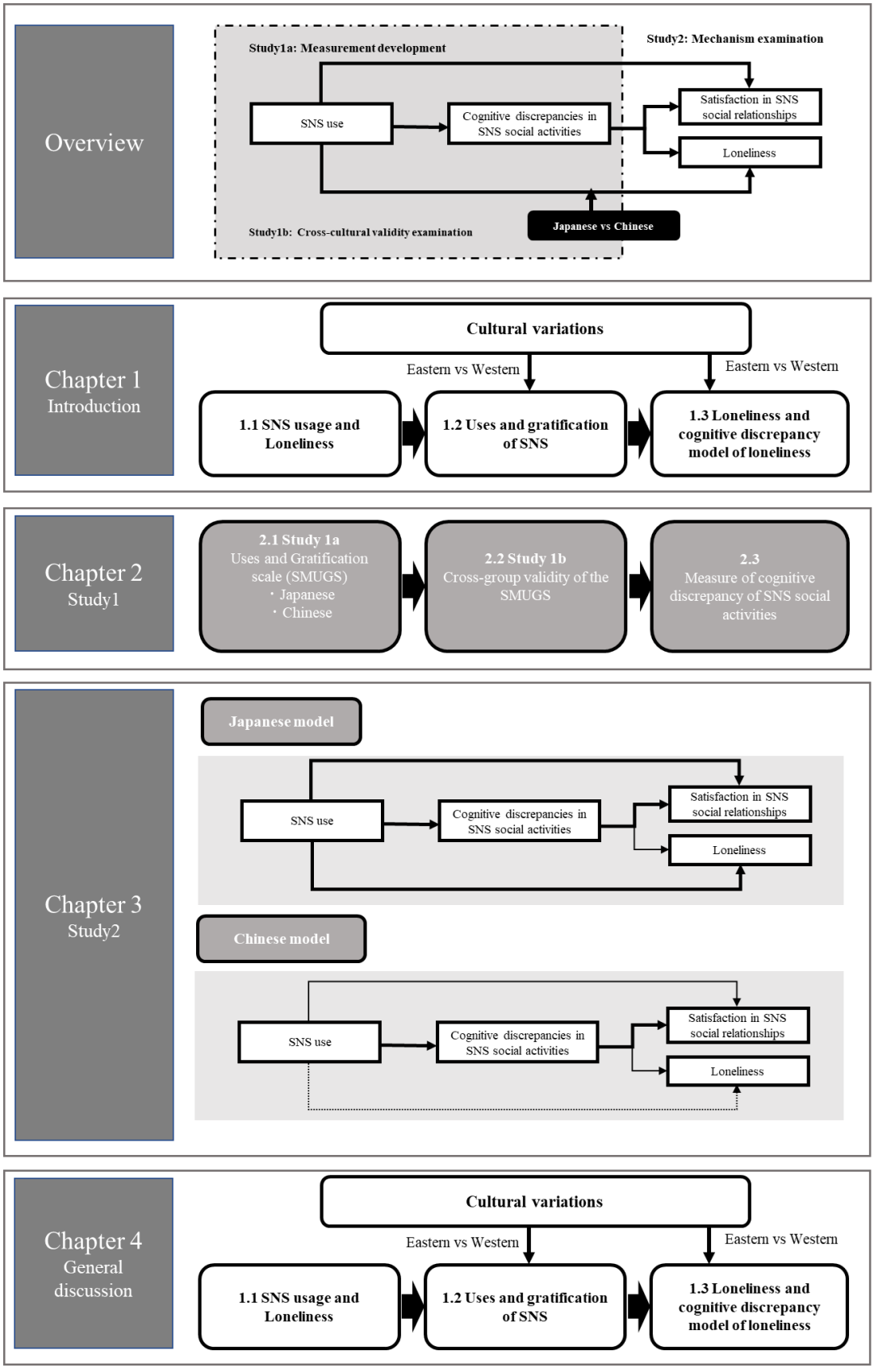

Figure 1.1. The structure of the dissertation

The dissertation has been comprised of the following articles:

Xu, W., & Takai, J. (2018). Expectancy violation theory on social media and relationships: A selective review. *Bulletin of the Graduate School of Education and Human Development, Nagoya University (Psychology and Human Development Sciences), 65*, doi: 10.18999/nupsych.65.1.5

Xu, W., Takai, J. & Liu, L. (2018). Constructing the social media uses and gratifications scale on Japanese and Chinese samples: Comparing content to western conceived scales. *Intercultural Communication Studies, 27(1)*, 125-144.

Xu, W., Takai, J. (In press). Why do people experience loneliness while using social media? Re-evaluation and expansion of the cognitive discrepancy model of loneliness in the digital context among Japanese and Chinese. *Intercultural Communication Studies.*

Chapter 2 Development and improvement of cognitive discrepancy measurements in SNS context

Numerous recent review papers have pointed out the methodological limitations of previous works on SNS effects on loneliness and other aspect of mental health. First, these works typically use simple, makeshift items to measure quantitative aspects, rather than using a comprehensive scale to measure qualitative aspects of online social activities. Furthermore, they have failed to differentiate between online communication types and partners (Anderson et al. (2012) and Kraut et al. (2015)). Second, although the few scales available have been widely implemented (Facebook Intensity Scale, Ellison, et al., 2007; Facebook Utility Scale, Ellison, Gray, & Lampe, 2011), these scales have targeted users Western cultures. For this reason, their relevance to Eastern, collectivistic cultures is up to question. Third, there is no comprehensive measure to assess the quantity and quality of SNS users' cognitive discrepancies in terms of loneliness research while engaging in SNS social activities. Due to the lack of comprehensive and robust measures, researchers have not been able to gain adequate insight into the complicated relationship between SNS use and psychological well-being (Kraut&Burke, 2016).

Given the above, the prime goal the Study1a is to develop a comprehensive scale (i.e., Social media uses and gratifications scale, SMUGS) that covers essential expectations and benefits of participation in online social networks in Eastern Asian contexts, namely, Japanese and Chinese. Study 1b aims to examine the cross-cultural validity of the newly developed scale. Based on SMUGS, the author proposes a possible measurement to assess both the quantity and quality of cognitive discrepancies of SNS social activities.

2.1. Study 1a – Development of the "SMUGS" on Japanese and Chinese sample

The goal of Study 1a is to explore how people evaluate their SNS activities in two representative East Asian cultures, Japan and China, within the framework of the use and gratification approach. A comprehensive scale that covers essential expectations and benefits of participation in online social networks will be devised. At the same time, it addresses Eastern users' particular cultural traits and contexts, namely, Japanese and Chinese, who may have other standards to evaluate SNS achievements. Specifically, a pilot study has been conducted to collect the original items of "What do people expect to use SNS" and "What makes people feel gratification while using SNS" from both Japanese and Chinese participants. And then, a series of explorative factor analyses and confirmative factor analyses have been conducted to explore and confirm the factor structure of SMUGS. Based on the results, the author proposed a common structure of SMUGs among Japanese and Chinese for further cross-cultural comparison.

Method

Pilot study

An original questionnaire for measuring online social motives by conducting a pilot study. Forty-nine third-year undergraduate students majoring in psychology from a medium-sized public university in central Japan were asked to write down 20 sentences as follows, "who (e.g., close friends, parents, acquaintances, relatives, stranger) do you want to contact and what (e.g., getting social support, exchanging information) do you expect while interacting via SNS." A content analysis was conducted in a social psychology lab (a professor and six graduate students) to create the original version of

the Social Media Usage and Gratifications Scale (SMUGS). The free-response statements gathered were categorized into like-themed groups, from which an item list was constructed. Categories of: 1) maintaining current relationships; 2) forming new relationships; and 3) sharing information were created by a conference approach by the seven researchers. For the category of maintaining current relationships, participants offered statements such as, “being connected to my friends all day long wherever I am and wherever they maybe,” “becoming more intimate with my friends,” and “I can say things on SNS that I might not say in person.” For that of forming new relationships, free responses included “meeting people who have similar interests with me,” “getting social supports from people I have never met before,” “getting close with people who leave comments on my updates.” For the category of information sharing and exchange, statements were collected such as “keep updated with families and close friends,” “attaining advice from others.” From these categories, subcategories of like responses were worded as items included in an original scale. Fourteen items were devised, consisting of for each category, respectively, four items, five items, and five items. This list was also checked by 22 Chinese undergraduate students majoring in Japanese for their relevance in the Chinese context, and these items were confirmed to be valid to the Chinese SNS user context. Therefore, this item pool was assumed to reflect both Japanese and Chinese commonalities in the targets and expectations of SNS usage and gratifications.

From this, a new scale to measure SNS usage and gratifications was constructed, which was called the Social Media Uses and Gratifications Scale (SMUGS). Four items for the tentative category of deepening existing relationships (DER) relationships, five items for the tentative category of expanding current interpersonal network

(ECN), and five items for the category of information sharing and exchange (ISE) were formed. One example for each category was presented as follows: “I feel connected to my face-to-face friends through social media” (DER), “I feel closer to people who can relate to my comments on social media” (ECN), “I can attain advice and learn from others through social media” (ISE).

The SMUGS, then, was composed of 14 items that comprehensively tapped into people’s use of SNS to pursue personal gratification. The preliminary study investigated the factor structure of this scale, its reliability, and concurrent validity of this scale compared to existing scales.

Main Study

Participants

A total of 311 undergraduates from one public and two private universities in Central Japan and two public universities in Northern China volunteered to participate in this study. The Japanese data was collected from 172 participants (62 males; 110 females) with an average age of 19.6 years (*SD*=3.53), and the Chinese data was collected from 139 participants (47males; 92 females) with an average age of 20.1

Materials and Procedures

The following four scales were applied in the present study:

Online Connectivity. To gain a general perspective of online connectivity, participants were asked to respond to a series of questions about their actual usage of social media (e.g., the size of their social network and the frequency and purpose of using social media). The author created an original scale named SMUGS and sought concurrent validity

with two similar existing scales.

Social Media Usage and Gratifications Scale (SMUGS). This scale consisted of 14 items, which were collected from the pilot study. An example item was, "I feel connected with my face-to-face friends through the use of social media." Responses were rated on a five-point Likert-type scale, ranging from 1 = "disagree", 2 = "somewhat disagree", 3 = "no comment", 4 = "somewhat agree", 5 = "agree".

MIXI Use-Satisfaction Scale (MUSS). MUSS (Kotera, 2009) is a 34-item questionnaire rated on five-point Likert scales, ranging from 1 (disagree) to 5 (agree). In this study, 31 items of the original MUSS were used since the other three items were considered exclusive to MIXI, an SNS platform-specific to Japan, with no equivalent available in China. The reliability reported in Kotera's study revealed Cronbach's Alpha coefficients of .89 for relationship maintaining, .83 for information seeking, and .85 for relationship building.

Web-blog Utility-Scale (WUS). WUS (Yamashita et al., 2005) is a nine-item questionnaire on a four-point Likert scale, ranging from 1 (disagree) to 4 (agree). In this study, the subscale (four items) "Relationship Utility" was used since the other subscale, "Self Utility," was not relevant for this study. Participants responded to the survey online. The items of each questionnaire were presented in random order.

Participants were recruited in psychology classes. After a thorough briefing on participation, informed consent was gained from those who agreed to participate, in which case they were handed out printed copies of the questionnaire to be taken home to be completed in their own time. Participation was strictly on a volunteer basis, and they were offered course credit for their participation.

Results and Discussion

Exploratory Factor Analysis of SMUGS

Japanese Data Set

Exploratory factor analysis was conducted on first, the Japanese data, with all 14 items collected from the pilot study, using the principle components analysis method. The initial Eigen values showed that the first factor explained 44% of the variance, the second factor 10% of the variance, and a third factor 9% of the variance. The fourth and fifth factors had Eigen values under 1, each factor explaining less than 5%. Hence a three-factor solution was deemed to be appropriate, explaining 63% of the variance. This decision was based in accordance with the three categories derived in the pilot study, which had been indicated to be valid when taking into account the 'leveling off' of Eigen values on the scree plot beyond three factors, the criterion of around 10% variance explained by a factor, the criterion of at least three items loading on a factor, and appropriateness of interpreting a given factor theme. Promax rotation was conducted on the least-squares factor analysis, revealing that all items had primary loadings over .5 with only one item with a cross-loading above .3 (Item14). However, this item had an acceptable primary loading of .54, and the secondary loading showed a gap of more than .2, so it was not removed. The first factor was named "Deepening existing relationships (DER)," the second factor was named "Expanding current interpersonal network (ECN)," and the third factor was named "Information sharing and exchange (ISE)." Internal consistency for each of the scales was examined. The Cronbach's alpha of SMUGS was .90, while those of the factors were .85 (five items), .85 (five items), and .74 (four items).

Chinese Data Set

A parallel set of factor analyses was conducted by using Chinese data. The initial

Eigen values showed that the first factor explained 35% of the variance, the second factor 16%, and a third factor 11%. The fourth and fifth factors had Eigen values under 1, each explaining only about 6%, far lower than the criterion of 10%.

A least-squares factor analysis using Promax rotation was conducted, with three factors explaining 62% of the variance. All items had primary loadings over .45. This structure was compared to the Japanese cohorts. The only two inconsistencies found were that Item 4 loaded onto Factor 3 (expected to load on Factor 1). The factors were named "Deepening existing relationships (DER)," "Expanding current interpersonal network (ECN)," and "Information sharing and exchange (ISE)." Internal consistencies for each of the factors were examined. The Cronbach's alpha of the overall scale was .88, while those of the factors were .76 (four items), .79 (four items), and .74 (four items).

Common Factor Structure of SMUGS between Japanese and Chinese

To allow for comparability across the two cultures, a common factor structure is needed, hence a pancultural factor analysis was conducted following Leung and Bond's (1989) procedure. The item responses of the "SMUGS" were converted into standard scores (Z scores) within each culture separately, then, a single factor analysis on the combined data set was conducted. The initial Eigen values showed that the first factor explained 39% of the variance, the second factor 11%, and the third factor 9%. The fourth and fifth factors had Eigen values under 1, each explaining about 6%. From this, it was apparent that a three-factor structure was appropriate.

No items were eliminated. A least-squares factor analysis of the 14 items using Promax rotation was conducted, with three factors explaining 60% of the variance. All items had primary loadings over .40, and no item had a cross-loading above .30. The

factor loading matrix for this final solution is presented in Table 2.1.

Table 2.1

The common factor structure of SMUGS

Item	F1	F2	F3	M	SD
Factor 1: Deepening existing relationships					
1. I feel connected with my face-to-face friends through use of social media.	**.889**	.047	-.062	3.68	1.041
2. I feel the relationships with my face-to-face friends are deepening through use of social media.	**.669**	.044	.070	3.34	1.109
5. I think my face-to-face relationships will be enriched by using social media as a contact tool.	**.467**	.027	.176	3.12	1.088
3. I can freely exchange opinions with my friends through social media.	**.441**	-.123	.268	3.85	.983
Factor 2: Expanding current interpersonal network					
6. I feel like I can become friends with people who share the same interest as me by following each other (adding each other as friends).	.185	**.794**	-.223	3.06	1.178
7. I can become close to people who can relate to my comments on social media.	-.162	**.766**	-.010	3.27	1.124
9. Somehow I feel more apt to be able to can make friends by using social media.	.200	**.635**	-.050	2.91	1.223
10. Although I may have never met them in real life, I feel like we mutually encourage each other through social media.	-.137	**.612**	.315	2.77	1.146
8. I feel like I am not alone when I meet someone with the same hobby or interests on social media.	-.045	**.453**	.353	3.13	1.148
Factor 3: Information sharing and exchange					
11. I feel I can freely interact with others through social media, regardless of how trivial the conversation topic may be.	.105	-.017	**.745**	3.93	.921
13. I can attain advice and learn from others through social media.	.163	-.108	**.676**	3.57	.974
12. Social media is a useful tool for attaining and sharing my interests through social media.	-.061	.088	**.605**	3.87	1.026
4. I can keep updated with my family and friends through social media.	.012	.005	**.571**	3.77	.969
14. I can view interesting comments about news and recent events through social media.	.109	-.017	**.337**	3.94	.886
	F 1				
	F 2 0.396***				
	F 3 0.397***	0.497***			

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

This result was by and large consistent with the structures earlier derived with Japanese and Chinese single culture analyses. Factors were named: “Deepening existing relationships,” “Expanding current interpersonal network,” and “Information sharing and exchange.” Internal consistency for each of the scales was examined. The Cronbach’s alpha of the overall scale was .87, while those of the factors were .80 (four items), .83 (five items), and .76 (five items), respectively.

To determine the concurrent validity of the SMUGS, the correlations among SMUGS and the MIXI Use-Satisfaction Scale (MUSS), Web-blog Utility-Scale (WUS), and the correspondent subscale were examined. All three factors of SMUGS correlated at least moderately with the criterion scales, ranging from .42 to .63 with the factors of MUSS and from .35 to .53 with WUS, indicating that SMUGS had satisfactory validity. The results are presented in Table 2.2.

In summary, SMUGS proved to have a three-factor structure across both Japanese and Chinese samples. These three factors had sufficient internal consistency and demonstrated satisfactory concurrent validity with related scales. However, SMUGS still needs to be tested for its cross-validity across the two cultures concerned in this dissertation. The following section will deal with this cross-validation process.

Table 2.2

Correlations among "SMUGS", "MUSS", and "WUS"

Varible	1	2	3	4	5	6	7	8	9
1. F1 of SMUGS (DER)	1.000								
2. F2 of SMUGS (ECIN)	.481**	1.000							
3. F3 of SMUGS (ISE)	.573**	.479**	1.000						
4. F1 of MUSS	.591**	.568**	.626**	1.000					
5. F2 of MUSS	.513**	.607**	.507**	.803**	1.000				
6. F3 of MUSS	.533**	.416**	.634**	.740**	.680**	1.000			
7. SMUGS	.813**	.816**	.832**	.725**	.664**	.639**	1.000		
8. MUSS	.609**	.601**	.642**	.957**	.898**	.857**	.752**	1.000	
9. WUS	.353**	.532**	.418**	.634**	.585**	.493**	.536**	.645**	1.000

SMUGS = Social media use and gratification scale. MUSS = MIXI Use-Satisfaction Scale. WUS = Web-blog Utility Scale

DER =Deepening existing relationships. ECIN = Expanding current interpersonal network . ISE = Information sharing and exchange

Note.: $N = 311$, †p < .01, * p < .05, **p <.01, ***p <.001.

Table 2.2.

2.2. Study 1b – An examine the cross-group validity of the SMUGS

The purpose of Study 1b was to examine the cross-validation of the SMUGS by simultaneous structural equation analyses with the Japanese and Chinese data sets. Ultimately, in this research, the goal was to judge the quality of the measuring instrument across the Japanese and Chinese populations where the measured concepts may or may not have the same measurement value, so the configural invariance (model A, i.e., Are the structures the same across groups?) and the metric invariance (model B, i.e., Are the regression weights equal across groups?) were examined.

Method

Participants

The data of 311 undergraduates who participated in Study1a was used in Study1b. The Japanese data was collected from 172 participants (62 males; 110 females) with an average age of 19.6 years (SD=3.53), and the Chinese data was collected from 139 participants (47males; 92 females) with an average age of 20.1 (SD=3.71) years. The locales for data collection were similar, being large metropolitan regions and highly economically affluent, in both countries.

Materials

The responses of online connectivity and the original version of SMUGS were used for the subsequent analyses.

Online Connectivity. To gain a general perspective of online connectivity, participants were asked to respond to a series of questions about their actual usage of social media (e.g., the size of their social network and the frequency and purpose of using social me-

dia). The author created an original scale, named SMUGS, and sought concurrent validity with two similar existing scales.

The procedures for data collection were as reported in section 2.2.

Results and Discussion

To examine the cross-validation of the SMUGS, a series of simultaneous structural equation analyses with the Japanese and Chinese data sets. Ultimately, in this research, the goal was to judge the quality of the measuring instrument across the Japanese and Chinese populations where the measured concepts may or may not have the same measurement value, so the configural invariance (model A, i.e., Are the structures the same across groups?) and the metric invariance (model B, i.e., Are the regression weights equal across groups?) were examined. As a result, model A testing for configural invariance indicated the $\chi 2$ value to be 256.908 (df =142). The *CFI* and the *RMSEA* values were acceptable at .932 and .051, respectively. Hence, the goodness of fit indices provided evidence that the hypothesized multi-group model of SMUGS structure fit adequately well across Japanese and Chinese populations. A common factor structure was robust. (See Figure 2.1)

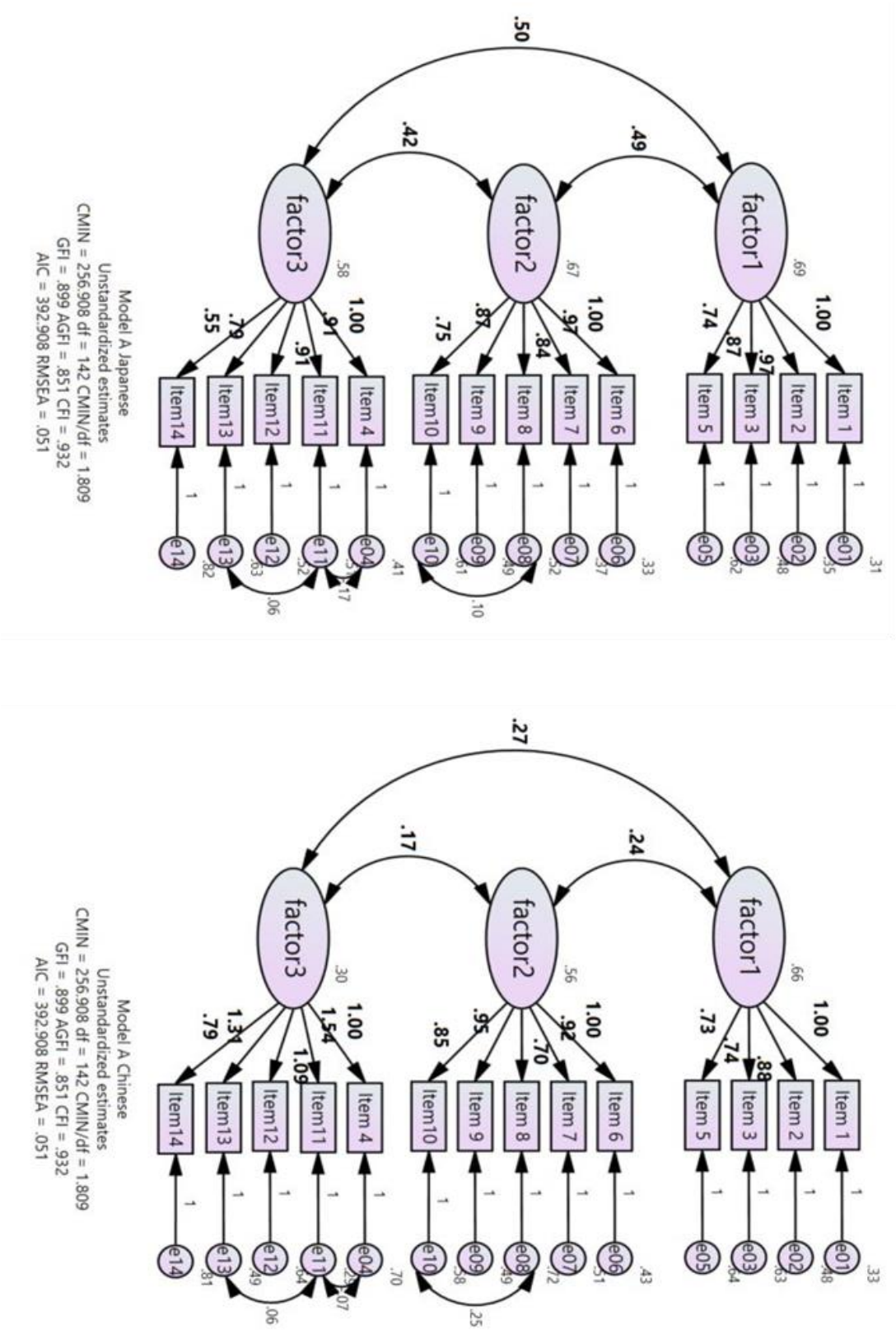

Figure 2.1. Examine the Configural Invariance of SMUGS

The fit of model B was consistent with model A (*CFI*= .932; *RMSEA*= .049). However, of prime importance in testing for the invariance of the factor loadings were the $\chi 2$ difference ($\Delta\chi 2$) and the CFI difference tests. According to Joreskog's (1971) general notion, a statistically significant value of $\Delta\chi 2$ indicates rejection of the null hypothesis of non-invariance. In the present model, the $\Delta\chi 2(11)$ =9.882 indicated evidence of non-invariance. However, numerous studies have argued that from a practical perspective, the requisite conditions are unrealistic. Cudeck & Brown (1983) and MacCallum, Roznowski, & Necowitez (1992) claimed that using $\chi 2$ difference to test invariance is excessively stringent, particularly due to the fact that SEM models are only approximations of reality. Consistent with this, Chueng and Rensvold (2002) suggested that it may be a more reasonable way to make invariance decisions on a difference in *CFI* (ΔCFI) rather than on $\Delta\chi 2$ values. They reasoned that ΔCFI is a more robust statistic for testing the between-group invariance of CFA models because they are not affected by sample size. The ΔCFI value of the present model of .000 contended that the measurement model was completely invariant, in that this value was less than the .01 cutoff point proposed by Cheung and Rensvold (2002). From this information, a conclusion could be made that the hypothesized multi-group model is metric invariant (See Figure 2.2). These results offer promise that the new scale could be used in further cross-cultural comparisons.

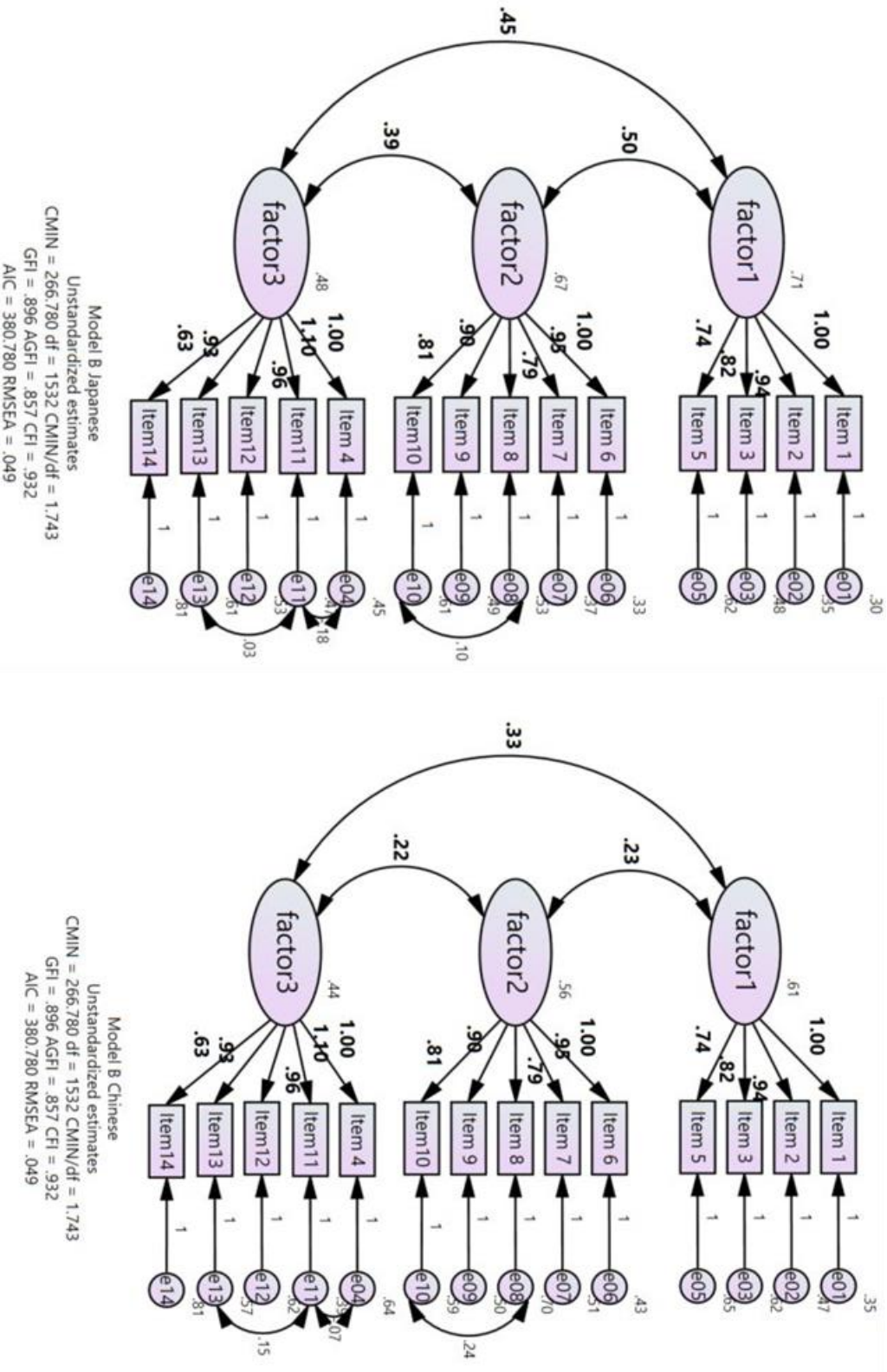

Figure 2.2. Examine the Metric Invariance of SMUGS

2.3. Measuring cognitive discrepancies of SNS social activities by SMUGS

As mentioned in Section 1.3, there are two kinds of discrepancies: Ideal-actual discrepancy (IAD) and Typical-actual discrepancy (TAD). IAD is defined as a perceived gap between levels of one's desired (expected) and actual social involvement, while TAD is a perceived gap between a typical other's social activity (as a benchmark) and one's own level of social life. IAD and TAD could be both qualitative and quantitative.

Although previous research developed a measure of the quantity of cognitive discrepancies in the Face-to-Face domain (e.g., Archibald et al., 1995, Russell et al. 2012), appropriate measures of the quality aspect of cognitive discrepancies were not accomplished. To fill this methodological gap, the author initiated a measure based on SMUGS.

Specifically, the measure consisted of 14 subsets of items (see more details in Appendix C). These included all the 14 items of the three factors SMUGS, "deepening existing relationships" (DER), "expanding current social network" (ECN), and "information sharing and exchange" (ISE) utilities, described earlier in section 2.1. Consistent with the initial social questionnaire initiated by Archibald et al. (1995) and inherit by Russel et al. (2012), in the present study, each subset consisted of four measures as well: a) the ideal level; b) the actual level; c) the perceived typical level and d) satisfaction level of SNS usage. The subsets are numbered from A to N. Participants were asked to read a total of 14 subsets of questions (56 statements in total) and select the response that best describes their actual and ideal quality of SNS social activities, those of the typical student, as well as the satisfaction level of the quality of

SNS social activities. For instance, “I would like to connect with my face-to-face friends via social media” (ideal level), “I can connect with my face-to-face friends via social media” (actual level), “I think a typical student can connect with his/her face-to-face friends well via social media” (typical level) and “I am satisfied with my connections with my face-to-face friends via social media” (Satisfaction). Responses were rated on a seven-point Likert-type scale, ranging from 1 (strongly disagree) to 7 (strongly agree) or 1(Strongly satisfied) to (Strongly dissatisfied). The measure is available in English, Japanese, and Chinese. (See the English version in Appendix. C)

The calculations of ideal-actual discrepancy (IAD) and typical-actual discrepancy (TAD) follow the initial rule suggested by Archibald and his colleagues. Specifically, to calculate the IAD scores, one’s estimates of their actual quality of SNS social activities are subtracted by the ideal score in the same subset. Then, the results of subtraction are converted to Z scores and summed separately for each factor. TAD scores for each factor are calculated under the same procedures.

2.4. General discussion

The primary goal of the present study was to explore what people expect and how people evaluate their fulfillment when engaging in SNS in two representative East Asian cultures, Japan and China, within the framework of the use and gratification approach.

The results of a series of factor analyses suggest that there are three distinct factors. These are: “Deepening existing relationships” (DER); “Expanding current inter-

personal network" (ECN); and "Information sharing and exchange" (ISE). This factor structure is consistent with the classification of Internet use motivation suggested by Western researchers. For example, Ellison et al. (2007) classified the purpose of social media usage as being "(to) present themselves, articulate their social networks, and establish or maintain connections"; Park, Kee, and Valenzuela (2009) categorized social media use with "socializing, entertainment and information"; Bonds-Raacke and Raacke (2010) described the reasons for the use of social media were "communication, friendship, and information." However, some scholars (e.g., Sundar & Limperos, 2013; Sundar & Bellur, 2011) criticized that the traditional typologies are conceptualized and operationalized too broadly (e.g., socializing). The rough and over-simplified measures may not be reflective of some specific and nuanced gratification potentially obtained from new media. This study resolved the problem by expanding the content of the items, including information on communication targets and expectancies. An example of an item adopted is: "I feel the relationships with my face-to-face friends are deepening through the use of social media."

Cronbach alpha of the overall scale, those of the factors, correlations among the SMUGS, MUSS, WUS, and the correspondent subscales were calculated, and the results indicated that the tested scale has sufficient internal reliability and concurrent validity.

The correlations among factors are also considered quite high in the present study (e.g., Factors 1 vs 3 at r= .289, Factor 2 vs 3 at r = .497; Factor1 vs 2 at r = .396). The author attempted to explain these results by applying Putnam's (2000) Social Capital theory. Putnam identified two types of social capital: "bridging" (weak ties) and "bonding" (strong ties), which in the present study, the weak ties correspond

to “new relationships built online,” and the strong ties correspond to “existing relationships maintained online.” The boundary between strong ties and weak ties is not clear. The online and offline relationships are interchangeable, explaining a relatively high correlation between Factors 1 and 2. Relational information is always spreading through weak ties and strong ties, while weak ties bridging social capital (Putnam, 2000; Ellison et al., 2007) can provide more information. In the case of the workplace, more employment-related benefits than strong ties (Granovetter, 1973). Perhaps this is why there are relatively strong co-relationships between Factors 1 and 3 and Factors 2 and 3, and why the latter is higher than the former as well.

While the factor structure by and large replicated that of Western scales, it was the content that differed. Compared with the Facebook Utility Scale (Ellison et al., 2011), our scale contained some intricately culturally nuanced traits. For instance, in creating the draft of items, participants were asked to finish subjective report tasks on why they use SNS and whom they communicate with. The typical responses were formulated like: “I feel I can freely interact with others through social media, regardless of how trivial the conversation topic may be,” “I feel like I am not alone when I meet someone with the same hobby or interests on social media,” “I can freely exchange opinions with my friends through social media.” In sum, East Asian participants tend to formulate their motives with more hesitation and social concerns compared to their Western counterparts, who have assertive needs on SNS. In terms of relational mobility, mobile persons (e.g., European Americans) seek out new relationships while weeding out existing ones based on their personal choices and for the sake of their utility. In contrast, non-mobile persons (e.g., East Asian) with relatively stable relationships have less freedom to do so.

When considering interpersonal relationships within a stable network, East Asians are more concerned with important others' feelings and evaluations, so they adopt a cautious approach to ensure that their goal and requests won't be rejected by others (Hamamura & Heine, 2008). With this in mind, an inference could be made that although both highly mobile people and low mobile people value interpersonal relationships, their orientations of motivations might be different.

To this effect, Higgins' regulatory focus theory (Higgins,1998, Higgins, Shah, & Friedman, 1997) offers a promising theoretical framework to interpret the present study results. According to his theory, promotion focus-oriented individuals seek to advance themselves and aspiring gains, while those characterized by prevention focus tend to avoid personal loss, including loss of face. Kurman and Hui's (2011) review noted that Eastern cultures (mostly East-Asian cultures) are considered prevention-oriented, whereas Western cultures are considered promotion-oriented.

Taking the perspective of this theoretical framework, it would stand to reason that Western individuals engage in SNS to actively promote themselves, seeking new and rewarding relationships, accentuated by their relational mobility. Their goal in SNS interaction would be to express and assert themselves to fulfill their self-esteem needs actively. Meanwhile, East Asians tend to be more preventively oriented, primarily concerned with avoiding adverse outcomes (i.e., losing existing relationships). Their goals lean toward avoiding breaking social norms and betraying expectations from others. In this study, Chinese and Japanese reported expectations of SNS usage consistent with such concerns and worries. Hence, these results hint toward the possibility that the basis of UGT may contextually differ across cultures. Future studies should look at the motivation behind the usage of SNS.

Limitations and Future Directions.

There are several limitations of this research. First, although this study expanded on social gratification and developed a more robust measure for future cross-cultural comparisons, other relevant psychological motivations may vary from culture to culture. Depending on the culture, motivations such as attention-seeking, emotional support, and self-confirmation may also significantly determine gratification. Future studies should explore the structural and contextual differences of SNS uses and gratifications across cultures.

Second, this study is based on a mainstream UGT (audience-centered) approach that emphasizes general, overarching social psychological factors that may miss out on medium-specific gratifications. This focus on a finite set of human needs is somewhat limiting, particularly when newer gratifications are derived through emergent media (Sundar & Limperos, 2013). Therefore, some scholars (e.g., Lichtenstein & Rosenfeld, 1983; Rubin, 2009; Ruggiero, 2000; Sundar & Limperos, 2013) suggest broadening the focus beyond social and psychological origins of need, and also to consider the potential influence of the perceived capabilities of media technology upon our gratification. With this in mind, further studies should consider nuanced, specific medium factors such as media modality, agency, interactivity, and navigability to increase the scope, relevance, and robustness of UGT for explaining new media use and effect.

Third, the author assumes that the structure and content of SNS use motives and gratifications may differ across cultures. Still, the effects of relational mobility and regulatory focus were not directly examined. Although the dichotomous operationalization of culture defined by individualism-collectivism has been solidly established in

the intercultural communication field, a more finely tuned operationalization of culture should be adopted, i.e., relational mobility and regulatory focus. The main limitation of this study is the use of a correlational design. To bring more robust evidence of the effect of engagement in prosocial behavior on well-being and the mediational role of basic psychological needs, experimental or interventional research is necessary.

Chapter 3 Re-evaluation and expansion of the cognitive discrepancy model of loneliness (CDML) in the digital context

Study 1 was dedicated to constructing a scale to assess the uses and gratifications of SNS users in two East Asian cultures. With the creation of SMUGS, the purpose of Study 2 was to apply this new scale to examine the underlying mechanism behind why people experience loneliness while using social media under the framework of the cognitive discrepancy model of loneliness. Specifically, Study 2 aimed to clarify whether self-defined and socially-defined cognitive discrepancies predict loneliness over and above the influence of actual achievements of SNS social activities. Self-defined discrepancy deals with the individual's ideal attainment from SNS versus the actual accomplishment (IAD). On the other hand, the socially defined discrepancy pertains to what the individual gets out of SNS use, compared to what s/he thinks others are attaining (TAD). In the case of this study, the effect of these discrepancies on the feeling of loneliness is examined.

In addition, the author explored the potential cultural variations of the prediction model between Japanese and Chinese populations. As discussed earlier, it is anticipated that these two cultures are anticipated to be quite different from Western cultures, which are the benchmarks for most research in this area. This study is unique in that it has placed the focus on Japan and China and goes on further to probe for differences between these seemingly similar cultures.

Furthermore, as mentioned in Chapter 1, there are several critical methodological and theoretical problems in investing the relationships between SNS usages and feelings of loneliness. First, most of the studies used over-simplified measures to assess the quantity of SNS social activities, and they failed to delineate types of Internet and their users. (e.g., Burke & Kraut, 2013, 2016; Burke, Kraut, & Marlow; 2011, Huang, 2010). These methodological weaknesses have hampered insightful understanding of the

mechanisms at play. Second, although the CDML is widely accepted and cited in the loneliness field, only a few empirical studies provide evidence that partially supports the relationship between cognitive discrepancies and loneliness. In addition, the CDML has not yet been applied in SNS contexts. An absence of comprehensive measures of cognitive discrepancies might be the bottleneck. The proposed measures in Section 1.3 would be a possible solution. Third, although previous work showed evidence that there are potential cultural variations in SNS motives (goals) and usage across different culture groups (e.g., Wu & Li, 2016, Jackson & Wang, 2013), few of them investigated why those differences occur and how the differences influence SNS social behavior and those subsequent psychological outcomes. In terms of the effects of cognitive discrepancies on loneliness, the patterns and strength might be different from culture to culture.

Given the above issues in the research, Study 2 aimed to explore two hypotheses and one research question:

H1: Besides the quantity of SNS social activities, the quality of SNS communication for the purpose of "deepening existing relationships (DER)" (strong ties) is also a predictor of SNS satisfaction and loneliness.

H2: Perceived discrepancies of SNS social activity predict satisfaction and feeling of loneliness over and above the influence of actual quality of SNS social contacts.

RQ1: Is the framework of CDML initiated in the Western cultural context suited to interpret and predict satisfaction of SNS activity and feelings of loneliness in the Eastern cultural context?

3.1. An examination of the cognitive discrepancy model of loneliness on Japanese samples

In section 3.1, the impacts of self-defined and socially-defined cognitive discrepancies on the satisfaction of SNS social activities and loneliness over and above the influence of actual achievements of SNS social activities was examined on Japanese samples, accounting for both the quantity and quality of cognitive discrepancies.

Method

Participants

A total of 191 undergraduates (78 males; 113 females) from one public and two private universities in Central Japan volunteered to participate in this study. Their age range from 18-22 years with an average of 19.8 years (SD = 1.22).

Materials and procedures

The questionnaire consisted of the following measures:

Online Connectivity. To gain a general perspective of online connectivity, participants were asked to respond to a series of questions about their actual usage of social media (e.g., the size of their social network and the average time they spent on social media per day).

Quantity of online social activities. This measure was an inventory with 20 items (5 subsets) that asked participants to estimate their actual versus the ideal amount of SNS social activity, as well as their perception of the amount of an average college

student. For example, participants were asked, “How many times on average did you comment or send ‘likes’ to others’ posts per day in the last two weeks?”, “How many times would you like to comment or send ‘likes’ to others’ posts per day?”, “How many times do you think a typical student comments or sends ‘likes’ to other’s posts per day?” and “How satisfied are you with the amount of comments and ‘likes’ you send on others’ posts?”. Responses were evaluated on a Likert-type 7-point scale measuring amount. (See Appendix B)

Quality of online social activities (self-evaluated). This measure was created based on the Social Media Uses and Gratification scale (SMUGS) (Xu et al., 2018) as described in the previous chapter. It consisted of 14 subsets of items, which assess the perceived quality of social media utilities. These include “deepening existing relationships” (DER), “expanding current social network” (ECN), and “information sharing and exchange” (ISE) utilities. Participants were asked to read 42 statements and select the response that best describes their actual and ideal quality of SNS social activities, as well as those of the typical student. For instance, “I would like to connect with my face-to-face friends via social media” (ideal level), “I can connect with my face-to-face friends via social media: (actual level),” “I think a typical student can connect with his/her face-to-face friends well via social media” (typical level), and “How satisfied are you with your connections with face-to-face friends via social media” (satisfaction). Responses were rated on a seven-point Likert-type scale, ranging from 1 (strongly disagree) to 7 (strongly agree).

UCLA Loneliness Scale. A Japanese translated version of the UCLA Loneliness Scale Version 3 (20 items, 4-point Likert scale; Russell, 1996) was used to tap feelings of loneliness. The scale has been proven to possess high internal consistency and

has been widely used in studies in both Japanese and Chinese contexts.

Procedures Participants were recruited from introductory classes of psychology and communication. First, a thorough briefing was conducted. Then, informed consent forms were collected from those who agreed to participate. Questionnaires were distributed to each participant to be completed at home and collected the following week. Participation was strictly on a volunteer basis during the whole survey, and they were offered course credit for participation.

Results & Discussion

Descriptive statistics

The average loneliness score for the Japanese sample was 41.52 (*SD* = 8.98). This score is consistent with other research using Version 3 of the UCLA Loneliness Scale for college student samples (cf. Russell, 1996). The mean loneliness score for male students was 40.94 (*SD* = 8.92), and the one for female students was 41.93 (*SD* = *9.04*). No significant gender difference was found.

Quantity of SNS social activity

On average, Japanese students reported a higher level of quantity of ideal social activity than their actual level (t (190) = 3.08, $p < .01$). Furthermore, they reported higher estimates of typical students' SNS social activity than their actual levels (t (190) = 7.68, $p < .001$).

Quality of SNS social activity

Similarly, Japanese students reported a higher level of quality of ideal social activity than their actual level (t (190) = 3.86, $p < .001$). They also estimated that a typical

student has a higher quality of SNS social activity than themselves (t (190) = 2.76, p < .01).

Intercorrelations between loneliness, satisfaction, and SNS social activities are shown in Table 3.1.

Table 3.1

TABLE 3.1. Correlations among the measures of Loneliness, Satisfaction, quantity and quality of online social activities (Japanese)

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Actual level of online social activities (quantity)	—	-.31***	-.32***	.35***	.41***	.60***	-.12	-.13	-.07	-.19**	-.10	-.17*	.47***	-.09
2. Ideal-actual Discrepancy (quantity)		—	.52***	-.07	-.06	-.10	.27***	.23***	.17*	.21***	.12	.23***	-.18*	.00
3. Typ.-actual Discrepancy (quantity)			—	-.08	-.09	-.18*	.25***	.37***	.10	.40***	.31***	.49***	.02	-.10
4. Actual level of DER (quality)				—	.17*	.47***	-.28***	-.56***	.00	-.09	-.05	-.08	.49***	-.37***
5. Actual level of ECN (quality)					—	.42***	.01	-.21***	-.24***	-.65***	-.02	-.33***	.32***	.15*
6. Actual level of ISE (quality)						—	-.13	-.26***	-.05	-.22***	-.28***	-.31***	.50***	-.11
7. Ideal-actual Discrepancy of DER (quality)							—	.33	.52	.14	.51	.27	-.07	.02
8. Typ.-actual Discrepancy of DER (quality)								—	.14	.50***	.21***	.58***	-.18*	.14
9. Ideal-actual Discrepancy of ECN (quality)									—	.32***	.48***	.16*	-.04	-.14
10. Typ.-actual Discrepancy of ECN (quality)										—	.13	.70***	-.05	-.13
11. Ideal-actual Discrepancy of ISE (quality)											—	.38***	-.03	-.09
12. Typ.-actual Discrepancy of ISE (quality)												—	.48***	.15
13. Satisfaction													—	-.40***
14. Loneliness (UCLA)														—

Typ.= Typical. DER = Deepening Existing Relationships. ECN = Expanding Current network. ISE = Information sharing and exchange

Note. *N* (Japanese) =191.

***$p < .001$. **$p < .01$. *$p < .05$. †$p < .1$.

Prediction of satisfaction and loneliness by multiple regression model

To examine H1, a series of multiple regression analyses were conducted. First, a multiple regression was carried out to investigate whether SNS social activities' quality predicts SNS satisfaction. The results indicated that besides the actual amount of SNS social activities, the quality measures of DER and ISE also significantly predict SNS satisfaction, $Adj.R^2$= .361, F (4,186)＝27.82, p ＝.000 (See Table 3.2). Similarly, a multiple regression was conducted to examine the effect of quality measures on loneliness following the same procedure. The results showed that the perceived quality of DER and ERN are also significant predictors of loneliness, $Adj.R^2$= .169, F (4,186)＝10.63, p ＝.000 (See Table 3.3).

Table 3.2.

TABLE 3.2. Multiple regression on predicting SNS satisfaction (Japanese)

Variables	*β*	*SD*	95%Lower CI	95%Upper CI	*t*	*df*	*p*	
Intercept	84.918	0.764	83.411	86.425	111.172	186	.000	
Quantity	0.699	0.251	0.205	1.193	2.790	186	.006	***
Quality (DER)	1.374	0.288	0.806	1.942	4.772	186	.000	***
Quality (ECN)	0.339	0.219	-0.092	0.770	1.550	186	.123	
Quanlity (ISE)	0.820	0.358	0.114	1.526	2.291	186	.023	**
Adjust R^2	.361	**						

****p< .001. **p< .01.*p< .05. †p< .1.*

Table. 3.3.

TABLE 3.3. Multiple regression on predicting Loneliness (Japanese)

Variables	*β*	*SD*	95%Lower CI	95%Upper CI	*t*	*df*	*p*	
Intercept	41.489	0.603	40.300	42.678	68.821	186	.000	
Quantity	-0.119	0.198	-0.509	0.272	-0.600	186	.550	
Quality (DER)	-1.204	0.227	-1.652	-0.756	-5.298	186	.000	***
Quality (ECN)	0.538	0.173	0.198	0.878	3.119	186	.002	***
Quanlity (ISE)	0.026	0.282	-0.531	0.583	0.093	186	.926	
Adjust R^2	.169	***						

****p< .001. **p< .01.*p< .05. †p< .1.*

Prediction of satisfaction by hierarchical regressions

A series of hierarchical regression analyses were conducted to evaluate the ability of cognitive discrepancy measures to predict satisfaction with SNS social activity over and above the influence of actual quantity and quality of SNS use. In these analyses, the gender of the participants was entered in step 1. The actual amount of SNS social usage was entered in step 2, followed by the actual quality of each factor (DER, ECN, and ISE) of SNS social activity in step 3. In separate equations, discrepancy measures were entered in step 4, and the interactions of the actual quality and cognitive discrepancy in step 5.

Table 3.4 presents the results of the regression analysis predicting satisfaction. For the Japanese sample, gender was not related to satisfaction, whereas the level of the actual amount of SNS social activity was a highly significant predictor (ΔR^2 = .22). The quality of DER, ECN, and ISE utilities were also statistically significant predictors, accounting for additional 13%, 2%, and 7% of the variance in the SNS satisfaction measure. Subsequently, in step 4, typical-actual discrepancy of ECN use accounted for an additional 3% of the variance in SNS satisfaction. Finally, after controlling for the contribution of other independent variables, interactions between actual quality and ide-

al-actual discrepancy, the actual quality and typical-actual discrepancy of ECN also accounted for a significant portion of the variance (4% and 6%).

Prediction of Loneliness by hierarchical regressions

An identical series of hierarchical regression analyses were conducted to predict loneliness using SNS social activity and discrepancies. Table 3.5 presents the results.

Table.3.4.

TABLE 3.4. Hierarchical Regression Analyses Predicting SNS satisfaction with DER, ECN, ISE (Japanese)

Step	*⊿ R square*	*F*
1. Gender	.01	1.10
2. Actual quantity of SNS social activities	.22	53.46***
Deepening Existing Relationships		
3. Actual quality of DER	.13	38.26***
4. Ideal-actual discrepancy of DER	.00	1.03
5. Actual × Ideal-actual discrepancy of DER	.01	1.41
4. Typical-actual discrepancy of DER	.01	1.68
5. Actual × Typical-actual discrepancy of DER	.01	2.19
Expanding Current Network		
3. Actual quality of ECN	.02	4.16***
4. Ideal-actual discrepancy of ECN	.00	<1
5. Actual × Ideal-actual discrepancy of ECN	.04	8.96**
4. Typical-actual discrepancy of ECN	.03	7.52**
5. Actual × Typical-actual discrepancy of ECN	.06	17.85***
Information Sharing and Exchange		
3. Actual quality of ISE	.07	18.92***
4. Ideal-actual discrepancy of ISE	.01	1.71
5. Actual × Ideal-actual discrepancy of ISE	.00	<1
4. Typical-actual discrepancy of ISE	.01	2.69
5. Actual × Typical-actual discrepancy of ISE	.00	<1

Note. *N* (Japanese) = 191.

***$p < .001$. **$p < .01$. *$p < .05$. †$p < .1$.

For the Japanese sample, gender was not related to loneliness. After controlling for gender, the actual amount of SNS social activity was not related to loneliness. The quality of DER and ECN accounted for 13% and 4% of the variance in loneliness score, respectively. In step 4, typical-actual discrepancy of ISE accounted for a small but significant portion of the variance (2%). Ideal-actual discrepancy of ISE also showed a trend toward significance (p = .069). None of the interaction terms had statistically significant effects on loneliness. The result provided only weak and partial support to the CDML.

The result of intercorrelations support hypothesis 1 that the quality of "deepening existing relationships" usage is a more potent predictor of SNS satisfaction and loneliness. Specifically, the actual amount of online social activities (e.g., time, number of SNS friends, frequency of interactions) was not related to measures of satisfaction nor loneliness. Conversely, the quality of online social activities (i.e., DER, ECN, ISE) was moderately associated with satisfaction and loneliness.

The results of hierarchical regressions showed a tendency to support the cognitive discrepancy model of loneliness. Although discrepancies from both personally and socially defined evaluation standards were associated with feelings of satisfaction and loneliness, when the actual quantity of social activities and their quality were controlled, only a small amount of variance could be explained by discrepancy predictors. Therefore, Hypothesis 2 was partially supported.

Table 3.5.

TABLE 3.5. Hierarchical Regression Analyses Predicting loneliness (UCLA) with DER, ECN, ISE (Japanese)

Step	*Δ R square*	*F*
1. Gender	.00	<1
2. Actual quantity of SNS social activities	.01	1.52
Deepening Existing Relationships		
3. Actual quality of DER	.13	28.1***
4. Ideal-actual discrepancy of DER	.01	1.52
5. Actual × Ideal-actual discrepancy of DER	.01	<1
4. Typical-actual discrepancy of DER	.01	1.84
5. Actual ×Typical-actual discrepancy of DER	.00	<1
Expanding Current Network		
3. Actual quality of ECN	.04	7.49***
4. Ideal-actual discrepancy of ECN	.01	2.04
5. Actual × Ideal-actual discrepancy of ECN	.01	1.69
4. Typical-actual discrepancy of ECN	.00	<1
5. Actual × Typical-actual discrepancy of ECN	.01	<1
Information Sharing and Exchage		
3. Actual quality of ISE	.01	<1
4. Ideal-actual discrepancy of ISE	.02	3.38†
5. Actual × Ideal-actual discrepancy of ISE	.00	<1
4. Typical-actual discrepancy of ISE	.02	4.19*
5. Actual × Typical-actual discrepancy of ISE	.01	1.02

Note. N (Japanese) = 191.

****p*< .001. ***p*< .01. **p*< .05. †*p*< .1.

3.2. An examination of the cognitive discrepancy model of loneliness on Chinese samples

In Section 3.2, the impacts of self-defined and socially-defined cognitive discrepancies on the satisfaction of SNS social activities and loneliness over and above the influence of actual achievements of SNS social activities was examined on Chinese samples. Same as the analyses of Japanese samples, both the quantity and quality aspects of cognitive discrepancies were examined.

Method

Participants

A total of 164 undergraduates (56 males; 198 females) from two public universities in Northern China volunteered to participate in this study. Their age ranged from 19-24 years with an average of 21.4 years (SD = 1.61). The locations for data collection were similar, being large metropolitan regions and highly economically affluent in both Japan and China.

Materials and procedures

The same questionnaire with Section 3.1 was applied in this study.

Online Connectivity. Participants were asked to respond to a series of questions about their actual usage of social media (e.g., the size of their social network and the average time they spent on social media per day).

Quantity of online social activities. This measure is an inventory with 20 items (5 subsets) that ask participants to estimate their actual versus the ideal amount of SNS

social activity, as well as the amount of an average student. See Section 3.1 for details.

Quality of online social activities (self-evaluated). This measure was created based on the Social Media Uses and Gratification scale (SMUGS) (Xu et al., 2018). See Section 3.1 for details.

UCLA Loneliness Scale Chinese translated version of the UCLA Loneliness Scale Version 3 (20 items, 4-point Likert scale; Russell, 1996) was used to measure the feeling of loneliness.

Procedure: Participants were recruited from introductory classes of psychology. First, the author did a thorough briefing on participation and then collected informed consent forms from those who agreed to participate. The assistants subsequently distributed the questionnaire to each participant. Participation was strictly on a volunteer basis during the whole survey, and they were offered course credit for participation.

Results & Discussion

Descriptive statistics

The average loneliness score for the Chinese sample was 42.36 (SD = 7.67). The mean loneliness score for male students was 44.60 (SD = 8.92), and the one for female students was 41.19 (SD = 9.04). Male students reported higher loneliness than female students (t (162) = 2.76, $p < .001$).

Quantity of SNS social activity

Chinese students also reported a higher level of quantity of ideal social activity than their actual level (t (163) = 7.03, $p < .01$), and they reported higher estimates of typical students' SNS social activity compared to their actual levels (t (163) = 15.21, p

< 0.001).

Quality of SNS social activity

Similarly, Chinese students also reported a higher level of quality of ideal social activity than their actual level (t (163) = 10.45, p < .001). They also estimated that a typical student has a higher quality of SNS social activity than themselves (t (163) = 2.79, p < .01).

Intercorrelations between loneliness, satisfaction, and SNS social activities are shown in Table 3.6.

Prediction of satisfaction and loneliness by multiple regression model

A set of parallel multiple regressions were conducted to examine H1 by the Chinese dataset. Similar results were confirmed that besides measures of the quantity of SNS social activities, measures of quality also significantly predict SNS satisfaction, $Adj.R^2$= .537, F (4,159)＝48.19, p ＝.000, and loneliness, $Adj.R^2$= .116, F (4,159)＝6.37, p ＝.000. (See Table 3.7 and Table 3.8)

Table 3.6.

TABLE 3.6. Correlations among the measures of Loneliness, Satisfaction, quantity and quality of online social activities (Chinese)

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Actual level of online social activities (quantity)	—													
2. Ideal-actual Discrepancy (quantity)	-.34***	—												
3. Typ.-actual Discrepancy (quantity)	-.38***	.53***	—											
4. Actual level of DER (quality)	.19*	-.14	-.04	—										
5. Actual level of ECN (quality)	.18	-.07	-.04	.47***	—									
6. Actual level of ISE (quality)	.11	-.03	.09	.58***	.63***	—								
7. Ideal-actual Discrepancy of DER (quality)	.12	.42***	.09	-.47***	-.27***	-.19*	—							
8. Typ.-actual Discrepancy of DER (quality)	-.19*	.31***	.25***	-.57***	-.25***	-.17*	.50***	—						
9. Ideal-actual Discrepancy of ECN (quality)	.01	.34***	.02	-.32***	-.32***	-.30***	.73***	.36***	—					
10. Typ.-actual Discrepancy of ECN (quality)	-.31***	.34***	.29***	-.17*	-.48***	-.20***	.37***	.53***	.35***	—				
11. Ideal-actual Discrepancy of ISE (quality)	.00	.28***	-.07	-.22***	-.20***	-.38***	.60***	.29***	.73***	.29***	—			
12. Typ.-actual Discrepancy of ISE (quality)	-.19*	.20*	.11	-.26***	-.33***	-.47***	.22***	.51***	.29***	.62***	.47***	—		
13. Satisfaction	-.08	-.03	.25***	.66***	.50***	.58***	-.47***	-.33***	-.46***	-.12	-.36***	-.29***	—	
14. Loneliness (UCLA)	.06	.05	-.08	-.34***	-.07	-.17*	.28***	.17*	.18*	.01	.16*	-.03	-.24***	—

Typ.= Typical. DER = Deepening Existing Relationships. ECN = Expanding Current network. ISE = Information sharing and exchange

N (Chinese)=164.

***$p < .001$. **$p < .01$.*$p < .05$. †$p < .1$.

Table 3.7.

TABLE 3.7. Multiple regression on predicting SNS satisfaction (Chinese)

Variables	*β*	*SD*	95%Lower CI	95%Upper CI	*t*	*df*	*p*	
Intercept	83.071	0.722	81.644	84.497	115.001	159	.000	
Quantity	-1.091	0.264	-1.613	-0.570	-4.134	159	.000	***
Quality (DER)	2.100	0.287	1.534	2.666	7.328	159	.000	***
Quality (ECN)	0.566	0.226	0.120	1.012	2.505	159	.013	**
Quanlity (ISE)	0.796	0.287	0.230	1.362	2.778	159	.006	***
Adjust R^2	.537	***						

****p< .001. **p< .01.*p< .05. †p< .1.*

Table 3.8.

TABLE 3.8. Multiple regression on predicting Loneliness (Chinese)

Variables	*β*	*SD*	95%Lower CI	95%Upper CI	*t*	*df*	*p*	
Intercept	42.269	0.573	41.137	43.402	73.729	159	.000	
Quantity	0.314	0.210	-0.099	0.728	1.501	159	.135	
Quality (DER)	-0.995	0.227	-1.444	-0.546	-4.374	159	.000	***
Quality (ECN)	0.198	0.179	-0.156	0.552	1.106	159	.270	
Quanlity (ISE)	-0.020	0.227	-0.470	0.429	-0.090	159	.928	
Adjust R^2	.116	***						

****p< .001. **p< .01.*p< .05. †p< .1.*

Prediction of satisfaction by hierarchical regressions

A series of hierarchical regression analyses were conducted to evaluate the ability of cognitive discrepancy measures to predict satisfaction with SNS social activity over and above the influence of actual quantity and quality of SNS use. In these analyses, the gender of the participants was entered in step 1. The measure of the actual amount of SNS social use was entered in step 2, followed by the actual quality of each factor (DER, ECN, and ISE) of SNS social activity in step 3. In separate equations, discrepancy measures were entered in step 4, and the interactions of the actual quality and cognitive discrepancy in step 5. Table 3.9 presents the results of the re-

gression analysis predicting satisfaction.

The result of the Chinese sample generally replicated the CDML, whereas a different pattern from the Japanese result was yielded. First, gender was a weak but significant predictor of SNS satisfaction (R^2 = .02). However, the actual amount of SNS use was not related to satisfaction. The quality of DER, ECN and ISE use had strong impact on SNS satisfaction, accounting for an additional 45%, 25%, and 34% of the variance in each of their respective regression models. Subsequently, in step 4, the ideal-actual discrepancy of DER use accounted for an additional 4%, the ideal-actual discrepancy of ECN use accounting for an additional 9%, and the ideal-actual discrepancy of ISE use accounted for 2% of the variance in SNS satisfaction. Finally, after controlling for the contribution of other independent variables, interactions between actual quality and typical-actual discrepancy of DER use and ECN use also accounted for a small but significant portion of the variance (1% and 2%).

Table 3.9.

TABLE 3.9. Hierarchical Regression Analyses Predicting SNS satisfaction with DER, ECN, ISE (Chinese)

Step	*Δ R square*	*F*
1. Gender	.02	3.27†
2. Actual quantity of SNS social activities	.00	<1
Deepening Existing Relationships		
3. Actual quality of DER	.45	137.17***
4. Ideal-actual discrepancy of DER	.04	11.72***
5. Actual × Ideal-actual discrepancy of DER	.00	<1
4. Typical-actual discrepancy of DER	.00	<1
5. Actual × Typical-actual discrepancy of DER	.01	3.51†
Expanding Current Network		
3. Actual quality of ECN	.25	55.94***
4. Ideal-actual discrepancy of ECN	.09	23.29***
5. Actual × Ideal-actual discrepancy of ECN	.01	1.16
4. Typical-actual discrepancy of ECN	.01	2.14
5. Actual × Typical-actual discrepancy of ECN	.02	5.10*
Information Sharing and Exchange		
3. Actual quality of ISE	.34	83.67***
4. Ideal-actual discrepancy of ISE	.02	5.88*
5. Actual × Ideal-actual discrepancy of ISE	.00	<1
4. Typical-actual discrepancy of ISE	.02	<1
5. Actual × Typical-actual discrepancy of ISE	.00	<1

Note. *N* (Chinese) = 164.

****p* < .001. ***p* < .01. **p* < .05. †*p* < .1.

Prediction of Loneliness by hierarchical regressions

An identical series of hierarchical regression analyses as was with satisfaction was conducted to predict loneliness using the measures of SNS social activity and discrepancies. Table 3.10 presents the results.

For the Chinese sample, gender was significantly related to loneliness. Similar to

the Japanese result, after controlling for gender, the actual amount of SNS social activity was not related to loneliness. The quality of DER accounted for 10% of the variance in loneliness score. While the Chinese result largely replicated the Japanese model, a unique pattern was also observed. The discrepancy scores showed a distinct trend toward significance in predicting loneliness in step 4. More specifically, the ideal-actual discrepancy of DER and ECN, typical-actual discrepancy of ISE accounted for an additional 2% of the variance in the prediction of loneliness (p = .052, .057, .10, respectively). The interaction between actual quality and typical-actual discrepancy of ISE also accounted for an additional significant portion of the variance (5%).

Similar to the results shown in Section 3.1, the result of intercorrelations support hypothesis 1 that quality of "deepening existing relationships" usage is a more potent predictor of SNS satisfaction and loneliness. Specifically, the actual amount of online social activities (e.g., time, number of SNS friends, frequency of interactions) was not related to measures of satisfaction nor loneliness. Conversely, the quality of online social activities (i.e., DER, ECN, ISE) was moderately associated with satisfaction and loneliness.

Consistent with the Japanese results, the results of hierarchical regressions provided only marginal support for the cognitive discrepancy model of loneliness. After controlling for the actual quantity and quality of SNS social use, the cognitive discrepancies (especially the ideal-actual discrepancy of DER, ECN) added significantly to the variance accounted for in predicting satisfaction and loneliness. However, the impacts were not very strong as well. Therefore, Hypothesis 2 was considered partially supported.

Table 3.10.

TABLE 3.10. Hierarchical Regression Analyses Predicting loneliness (UCLA) with DER, ECN, ISE (Chinese)

Step	*Δ R square*	*F*
1. Gender	.05	7.60**
2. Actual quantity of SNS social activities	.00	<1
Deepening Existing Relationships		
3. Actual quality of DER	.10	18.28***
4. Ideal-actual discrepancy of DER	.02	3.83†
5. Actual × Ideal-actual discrepancy of DER	.00	<1
4. Typical-actual discrepancy of DER	.00	<1
5. Actual ×Typical-actual discrepancy of DER	.00	<1
Expanding Current Network		
3. Actual quality of ECN	.00	<1
4. Ideal-actual discrepancy of ECN	.02	3.76†
5. Actual × Ideal-actual discrepancy of ECN	.01	3.68
4. Typical-actual discrepancy of ECN	.00	<1
5. Actual × Typical-actual discrepancy of ECN	.01	1.85
Information Sharing and Exchage		
3. Actual quality of ISE	.02	3.12†
4. Ideal-actual discrepancy of ISE	.01	2.32
5. Actual × Ideal-actual discrepancy of ISE	.05	8.43***
4. Typical-actual discrepancy of ISE	.02	2.71†
5. Actual × Typical-actual discrepancy of ISE	.00	<1

Note. *N* (Chinese) = 164.

****p* < .001. ***p* < .01. **p* < .05. †*p* < .1.

3.3. General discussion

The current study expanded on the CDML in predicting satisfaction and loneliness in an SNS context and examined the cultural variation in the effect patterns in two representative Eastern cultures, Japan and China. Two hypotheses and one re-

search question were tested through a series of analyses.

H1 hypothesized that quality for the purpose of "deepening existing relationships" (DER) is a potent predictor of SNS satisfaction and loneliness. The results of a series of multiple regressions provided evidence to support this hypothesis (see details in Table 3.2, 3.3, 3.7, 3.8). In the Japanese sample, the quality of DER significantly predicted SNS satisfaction and loneliness. The results on the Chinese sample showed a similar tendency.

H2 hypothesized that cognitive discrepancies of social relationships via SNS predict satisfaction and feeling of loneliness, over and above the effects of actual quantity and quality of SNS social use. The results provided only marginal support for H2. In the Chinese sample, after controlling for actual quantity and quality of SNS social use, the cognitive discrepancies (especially the ideal-actual discrepancy of DER, ECN) added significantly to the variance accounted for in predicting satisfaction and loneliness. The Japanese results also tended to support the CDML model (ideal-actual discrepancy and typical-actual discrepancy of ISE), but the effects were relatively weak. Although discrepancies from both personally and socially defined evaluation standards were associated with feelings of satisfaction and loneliness, when the actual amount of social activities and their quality were controlled, only a small amount of variance could be explained by discrepancy predictors. This finding is similar to the works of Archibald et al. (1995) and Russell et al. (2012). The consistency in the results between studies supports our integrated model of social needs, along with the cognitive model of loneliness. The social needs perspective views loneliness as resulting from actual deficits in social contact and intimacy (Shaver & Buhrmester, 1983; Weiss, 1987). When these needs are not met because of the ab-

sence or loss of interpersonal relationships, people experience dissatisfaction and loneliness. This theory could explain why the actual amount and actual quality significantly impact feelings of satisfaction and loneliness. However, when the actual amount and the quality of social activities reach the minimum satisfaction level, the effects of subjective evaluations would be activated (CDML). In our current study, ideal-actual and typical actual discrepancies of social activities add a weak but significant impact on satisfaction and loneliness.

Our research question probed for the possibility to predict loneliness under the framework of CDML in East Asian cultures. The results on both Japanese and Chinese samples (especially the Chinese ones) bring evidence supporting the CDML. However, contrary to our expectations, different patterns between Japanese and Chinese samples were observed. Two major differences can be highlighted. First, in the Japanese regression model, the actual quantity of SNS social activities was a strong predictor of satisfaction (ΔR^2=.22), while it added little explanation to the prediction of satisfaction in the Chinese model (See Table 3.6). One possible explanation for this is that when the number of social connections (especially, connections through weak ties) reaches a threshold (e.g., 150 people in Face-to-Face network in Dunbar's (1992) model, and 100-200 people in Gonçalves, Perra, & Vespignani's (2011) SNS network model), its impact on feelings of satisfaction and loneliness would no longer be salient. Although participants' exact numbers of SNS friends were not asked in the present research, a prior survey (Chu & Choi, 2010) shows evidence that Chinese SNS users have an average number of 194 contacts, which almost reaches the threshold of the number they could maintain.

Furthermore, over 80% of the SNS contacts are weak ties (i.e., strangers or dis-

tant acquaintances). Compared to Chinese users, Japanese users report fewer SNS contacts (e.g., 70-80 contacts on Mixi, which is a unique SNS platform in Japan, or 100-150 contacts on Facebook; see Barker & Ota, 2011), and the average number of weak ties is under 50%. Based on this evidence, an indirect inference could be made that a large number of SNS contacts and the high distribution of weak ties make Chinese users value quality rather than quantity of SNS social connections. Therefore, the quality of SNS social connections has a stronger influence on the satisfaction of SNS social activities and feeling of loneliness.

Second, perceived ideal-actual discrepancies added significant explanation of variance in predicting feelings of satisfaction and loneliness in the Chinese model, but not in the Japanese (See Tables 2 and 3). The reason for this difference may be explained by variations in the type of collectivism prevalent in each culture. According to the review of Dien (1999), Japanese and Chinese share the same value of collectivism, but the pattern is claimed to be different. She asserted that the Chinese have a particular form of authority-directed orientation while retaining a strong sense of individuality. On the other hand, the Japanese emphasize a peer-group orientation and incorporate their desires and personal goals within those groups. The different patterns lead to different cognitive strategies, behaviors, and psychological outcomes when engaging in social activities. In particular, when a discrepancy between one's personal goal and reality, or between one's goal and the group norm occurs, an individual from a typical peer-group oriented collectivistic cultural group (e.g., Japanese) would readily forgo his/her personal needs over the socially desired norms.

On the other hand, an individual from an authority-directed collectivistic cultural group (e.g., Chinese) will conform only when they perceive reality or social norms as

unchangeable. Yet, they would still not give up on their own goals. In other words, the Japanese are flexible in assuming the group's needs, while the Chinese would more likely feel such conformity had been forced upon them and seek opportunities for pursuing their goals at another time. This interpretation of collectivism serves to elaborate on our results, showing that cognitive discrepancy (particularly, ideal-actual cognitive discrepancy) predicts satisfaction with SNS social activity and loneliness in the Chinese sample, but not in the Japanese. When the cognitive discrepancy between one's ideal level and actual level of SNS social activity occurs, the Japanese would naturally accept the reality and adjust their original goals accordingly. Therefore, the discrepancy does not significantly impact their psychological well-being. Conversely, for Chinese people, the need for self-restraint makes the cognitive discrepancy more salient, and this frustration leads to dissatisfaction and feelings of loneliness.

Related to the two major differences mentioned above, a minor difference should also be mentioned. In the Chinese model, both cognitive discrepancies in DER and ECN usage predict SNS satisfaction, while only cognitive discrepancy in ECN usage significantly predicts SNS satisfaction in the Japanese model. A possible interpretation could also be the differences in network size and density among Chinese and Japanese users. As mentioned, Japanese users reported smaller and more densely SNS networks. Compared to the Chinese counterparts, their existing networks would be more stable, and their expectations of maintaining a strong network would be fulfilled better. Therefore, exploring new connections becomes the only primary task of SNS usage rather than maintaining existing network. Consequently, the perceived achievement and perceived discrepancy between the expectation level become the only salient predictor of satisfaction for Japanese users. Further investigations should

be made to examine this inference.

Limitations

There are several limitations that should be noted. First, in the present study, the quantity, quality, and cognitive discrepancies of SNS social activities were assessed through self-reported surveys. Although this study improved upon the methodology of past studies (e.g., Russell et al., 2012) that involved measures of mediated social contacts, it still failed to investigate the online-offline interactions of social activities and their effects on mental health. For instance, an individuals' offline social network structure may shape one's goals and strategies of SNS communication and the evaluation standard of SNS social contacts. These factors would, in turn, affect one's face-to-face social activities and those psychological outcomes. Therefore, to expand our findings, future studies should explore the dynamic relationships between online and offline social contacts and their impact on feelings of satisfaction and loneliness. Besides self-report data, objective data (e.g., SNS log information) should be employed to validate the current implications.

Second, the author explained the cultural variations in the patterns of CDML results between Japanese and Chinese samples through variations in collectivism. Although the framework of authority-directed orientation and the peer-group orientation of collectivism offers a convincing interpretation of our findings, the underlying mechanism was not confirmed. In future studies, a more finely tuned examination of this relationship should be examined.

Chapter 4 General discussion

This overlying purpose of this research was to provide a potential explanation of the question “Why do people feel lonely while using SNS.” The author conducted a series of studies to 1) improve the cognitive discrepancy measures in the SNS context and 2) re-evaluate and expand the framework of the cognitive discrepancy model of loneliness in the SNS context by samples collected from two East Asian countries. The implications, limitations, and future directions are described as follows:

4.1. Summary of main findings

The overlying purpose of this research was to provide a potential explanation of the question “Why do people still feel lonely while using SNS.” In this dissertation, two studies have conducted to fulfill the two research purposes: 1) To initiate a comprehensive measurement of both the quantity and quality aspects of cognitive discrepancy while using social media; and 2) To examine the underlying mechanism of experiencing loneliness under the framework of cognitive discrepancy model in the digital context. Moreover, the originality of East Asian culture conceived measurement and the potential cultural variance of the casual model were discussed.

In study 1, a comprehensive scale named “Social media use and gratification” (SMUGS) was developed by Japanese and Chinese samples. Three distinct factors were gained to describe the social needs of social media usages. Those are “Deepening existing relationships,” “Expanding current interpersonal networks,” and “Information sharing and exchange.” The result has not only simply replicated the structure of mainstream Western scales (e.g., Facebook Utility Scale, Ellison et al., 2011) but expand the content of items with information of communication targets and expectan-

cies. For example, an item describes the relevant expectations of SNS usage as "(I use SNS because) I feel the relationship with my face-to-face friends are deepening through the use of social media."

In addition, the SMUGS contained intricately culturally nuanced traits of East Asia. Specifically, compared to Westerners' direct and assertive expression of self needs, East Asians (e.g., Japanese and Chinese) formulate and express their motives with more hesitation and social concerns. For example, when asked to free description of the relevant expectations of social media usage, our participants had a similar tendency to report as follows: "(Because) I feel I can freely interact with others through social media, regardless of how trivial the conversation topic maybe," "(Because) I feel like I am not alone when I meet someone with the same hobby or interests on social media." The author provided two possible explanations from the perspective of cultural psychology.

One possible explanation may be the difference in the degree of relational mobility. For a low mobile person (e.g., East Asian), maintaining a stable network may be a fundamental goal for interpersonal communication. Therefore, they formulate and express their communication goal and request a cautious approach to avoid being rejected or ignored by others (Hamamura & Heine, 2008). On the other hand, for people from a highly mobile society (e.g., North American), SNS can be perceived as an optimal tool in order to seek out new friends and acquaintances, with whom they can garner attention and admiration, as would someone with a relationally mobile inclination. Therefore, they formulate more direct and assertive goals. They evaluate the achievement of SNS social activities based on only the goals without extra concerns. Another possible explanation may be the difference in regulatory focus between

Westerners and East Asians. Unlike Westerners' promotion orientation, East Asians are more preventively oriented, primarily concerned with avoiding adverse outcomes (i.e., losing existing relationships, breaking social norms, or betraying social expectations). Therefore, avoiding embarrassments and offenses may be embedded into their SNS usage, while they would not be as aggressive in promoting themselves and their achievements as Western users.

Based on SMUGS, the author proposed a measurement of the quality aspect of cognitive discrepancies in the SNS context. The measurement consists of 14 subsets of items, covering three major utilities of SNS, "deepening existing relationships" (DER), "expanding current social network" (ECN), and "information sharing and exchange" (ISE). Each subset consists of four questions, those are 1) the ideal level; 2) the actual level; 3) the perceived typical level, and 4) the satisfaction level of SNS usage. By this measurement, scholars may be able to assess the personal-defined and socially-defined cognitive discrepancy while using SNS. This measurement fills the methodological gap claimed by Russell and his colleagues (2012).

In study 2, the author examined the cognitive discrepancy model of loneliness in the SNS context to answer the general research question: Why do people experience loneliness while using social media. The author also examined the cross-cultural validity of the theoretical model by data collected from two collectivistic cultural groups, Japan and China. Two significant insights were gained.

First, both the Japanese and Chinese models provided partial supports to the CDML model. For the Japanese model, the interaction between actual quality and IAD of ECN, TAD of ECN, and the interaction between actual quality and TAD of ECN predict SNS satisfaction, and TAD of ISE predicts loneliness. For the Chinese

model, IAD of DER, the interaction between actual quality and TAD of ECN, IAD of ISE significantly predict SNS satisfaction, IAD of DER, TAD of ISE, interaction between actual quality IAD of ISE predict loneliness. However, the impacts were relatively weak. When actual amounts of social activities and their quality were controlled, only small amounts of variance could be explained by discrepancy predictors. A similar tendency was also confirmed by prior studies (Archibald et al. 1995; Russell et al. 2012). They interpreted this tendency by the social needs perspective of loneliness (Shaver & Buhrmester, 1983; Weiss, 1987). When the absence of social contacts and intimacy occurs, people experience feelings of dissatisfaction and loneliness. This mechanism may also be applied in the SNS context. When the quality and quantity of social contacts are scantier than one's threshold of social needs, they feel unfulfilled and loneliness (social needs perspective). However, when the actual amount and the quality of social activities reach the minimum satisfaction level, the effects of subjective evaluations would become salient (Cognitive discrepancy perspective). Being informed by the above, the author proposed an integrated model of social needs perspective and cognitive discrepancy perspective to explain the mechanism of loneliness.

Second, although both Japanese and Chinese models partially supported the CDML, different patterns were observed contrary to our expectations. The first difference is that: in the Japanese regression model, the actual quantity of SNS social activities was a strong predictor of satisfaction, while it added little explanation to the prediction of satisfaction in the Chinese model. One possible explanation could be made from the perspective of Dunbar's number (Dunbar, 1992) and its related models (e.g., Gonçalves, Perra, & Vespignani's (2011) SNS network model). Evidence from

prior studies shows that Chinese college students have significantly larger but weaker social networks (e.g., 194 contacts, over 80% weak connections) than their Japanese counterparts (e.g., less than 100 contacts, less than 50% weak connections) on social media. Based on this evidence, an indirect inference could be made that for people whose network size is too large to maintain while consisting of low intimacy connections, quality, rather than quantity, has a more substantial impact on satisfaction and loneliness.

The second difference is that IAD added a significant explanation of variance in predicting feelings of satisfaction and loneliness in the Chinese model, but not in the Japanese. The author interpreted this cultural difference by variations in the type of collectivism prevalent in each culture (Dien, 1999). According to Dien's thoughts, although Japanese and Chinese share the same value of collectivism, the pattern is claimed to be different. Chinese have a particular form of authority-directed orientation emphasizing the sense of individuality. In contrast, the Japanese emphasize a peer-group orientation and incorporate their desires and personal goals within those groups. The different orientations lead to different cognitive strategies, behaviors, and psychological outcomes when engaging in social activities. In our case, when a cognitive discrepancy between one's ideal level and actual level of SNS social activity occurs, the Japanese adjust their original goals flexibly to reduce discrepancies between expectations and reality. Therefore, in our model, the discrepancies have no significant negative impacts on their psychological outcomes. Conversely, for Chinese people, the need for self-restraint makes the cognitive discrepancies' impacts salient, and this frustration leads to dissatisfaction and feelings of loneliness.

The implications, limitations, and future directions are described as follows:

4.2. Theoretical and practical implications

Implications for Theory. The two studies of this dissertation have the following significant theoretical implications: 1) Study 1 suggests that while the structure of SNS uses and gratifications largely replicated that of Western scales, cultural characteristics has been embedded into SNS usage; 2) The cognitive discrepancy model of loneliness which developed based on face-to-face research could be applied to the SNS scholarship, while the patterns differ depending on communication motives, size and density of social networks, and cultural orientations.

First, in Study 1, Chinese and Japanese reported SNS usage consistent with such concerns and worries. Hence, these results hint toward the possibility that the basis of UGT may contextually differ across cultures. As had been previously mentioned, these cultural differences could be explained by the theoretical framework of regulatory focus theory (Higgins,1998, Higgins, Shah, & Friedman, 1997). According to this theory, individuals are motivated to approach gains and avoid losses. In terms of communication, this could amount to self-presentation tactics. The promotion focus-oriented individuals (e.g., North American) engage in SNS to actively promote themselves, constantly expanding their relationships, moving from one audience to another depending on who can fulfill their self-esteem needs at the particular moment, and gaining widespread approval and popularity. For these people, gaining popularity metrics in the form of likes, views, and followers allows them to achieve satisfaction. Their goal in SNS interaction, then, would be to actively express and assert themselves, to stand out from the crowd, to fulfill their self-esteem needs, and to present themselves in a self-enhancing manner (Heine & Hamamura, 2007). East Asians, on the other hand, tend to be more preventive-oriented, primarily concerned with avoid-

ing adverse outcomes (i.e., losing existing relationships, losing face amongst others), and their goals lean toward avoiding breaking social norms and betraying expectations from others.

For this reason, prevention-focused individuals may not aggressively seek approval via SNS by attempting to stand out from the crowd but rather use SNS to be part of their group in a modest manner. To this fact, Heine (2007) distinguishes East Asians from Westerners by their propensity to be self-deprecating, which creates an image of someone humble, and hence pleasant, and also socially desirable. While this study involved two East Asian samples, the Chinese seem more promotion-oriented, while the Japanese appear to be more preventive. Further studies based on this theoretical framework are necessary to determine if this is true.

Second, Study 2 brings new insights to the cognitive model of loneliness (SDT), showing that cognitive discrepancies of social relationships via SNS predict satisfaction and feeling of loneliness, over and above the effects of actual quantity and quality of SNS social use. However, the patterns would be influenced by communication motives, size and density of social networks, and cultural orientation. In detail, people who are engaging in an extensive yet shallow social network may seek deeper communication. For these people, the impacts of cognitive discrepancies on loneliness can become more salient than the actual level of social activities. In addition, for people from cultures emphasizing personal value and desire, the self-defined cognitive discrepancies, rather than the social defined ones, have a stronger impact on the feeling of loneliness.

Implications for Measurement and practices. Findings from this study have practi-

cal implications for understanding and assessing East-Asians' SNS usage motives and gratifications. Research in this area tends to be dominated by investigators from American and other English-speaking countries. The author set out to conduct this research to determine the uniqueness of East Asian SNS uses and gratification compared to the Western. Data were collected from China and Japan, which are geographically and characteristically similar, and are both representatives of East-Asian culture. Our results indicate both the commonality and distinctiveness of SNS uses and gratifications between Western and East Asian cultures, which added to the cross-cultural understanding of this theoretical framework.

The findings advance our knowledge of adult social activities and relationship engagement through SNS. While other studies had employed the "Social Life Questionnaire" (Archibald, Bartholomew & Marx, 1995) to measure young adults' social activities and relational satisfaction, Russell, Cutrona, McRae, and Gome (2012) claimed that this scale "does not involve contact with others using different forms of technology, such as the Internet or cell phones, that are commonly employed by high school students" (pp. 20). This study constructed an original scale with the above issue in mind, and it has much potential use for subsequent research in this matter.

Another distinguishing feature of this study is that the author has compared China with Japan, something few studies had attempted, perhaps due to the platform differences between the two countries, pertaining to free access to global internet services. While the SNS services may not be the same, the present study indicated from an interpersonal communication perspective that Chinese users have similar SNS usage motives and receive similar benefits from SNS participation as do the Japanese. The present study may have been the first step toward developing a comprehensive and

comparable measure for exploring Chinese SNS uses and gratification, which many have likely thought would differ significantly due to internet access restrictions.

4.3. Limitations and future directions

The studies presented in this dissertation have several notable limitations, those are the existence of alternative explanations, sampling biases, and measurement issues. The details of the limitations, the suggestions for future investigations are discussed below.

Alternative Explanations. There are two alternative explanations of the predictive model of loneliness and its cultural differences.

First, although discrepancies from both personally and socially defined evaluation standards were associated with feelings of satisfaction and loneliness, when the actual amount of social activities and their quality were controlled for, the impacts reduce sharply. Archibald et al. (1995) and Russell et al. (2012) also found this same tendency. The consistency in the results shows the possibility of an integrated model of social needs and the cognitive discrepancy model of loneliness. The social needs perspective views loneliness as resulting from actual deficits in social contact and intimacy (Shaver & Buhrmester, 1983; Weiss, 1987). When these needs are not met because of the absence or loss of interpersonal relationships, people experience dissatisfaction and loneliness. This theory could explain why the actual amount and actual quality greatly impact feelings of satisfaction and loneliness. However, when the actual amount and the quality of social activities reach the minimum satisfaction level, the effects of subjective evaluations would be activated (CDML). Future investiga-

tions should be conducted to prove the inference of the integrated model and provide empirical evidence of the threshold of minimum satisfaction level of social contact.

Second, the underlying mechanism of the cultural differences in the predictive models between Japanese and Chinese was not directed confirmed. Although the framework of authority-directed orientation and peer-group orientation of collectivism offers a convincing interpretation of our findings, alternative explanations could be imputed. For instance, the frameworks of individualism and collectivism (Hofstede, 1984), interdependent self, and independent self (Markus, & Kitayama 1991). In future studies, a more finely tuned examination of this relationship should be examined.

Sampling Biases. Several relevant limitations of sampling should be mentioned as well. First, the data was collected from college students, which may affect the generalizability of the results. Previous studies (e.g., Archibalt,1995) inference that ideal standards may become a more important factor with increasing age, perhaps because life development makes individuals attain more explicit notions of what an ideal social relationship should be like. It is important to replicate this study to other age groups.

To this fact, recent investigations on loneliness echoed Arichibalt's inference (e.g., Nicolaisen & Thorsen, 2014, Luhmann & Hawkley, 2016). Scholars claim that people may experience loneliness at any life stage, while the cause may be different. For instance, a first-year college student may suffer from loneliness due to homesickness, while a new mother may feel lonely and helpless when feeding her new baby at midnight while her family sleeps. A survey conducted by Nicolaisen and Thorsen (2014) shows that for the young-age group (ages 18-29), the quantity of social rela-

tionships rather than quality seems to be the most important factor predicting loneliness, while for the adult ages 30-64, quality becomes the primary standard of social activities. How long they spend with friends does not predict loneliness. In terms of SNS use, the importance of quantity and quality may be reversed from the life stages of young adults to mid-age adults. The actual quality and the perceived discrepancy for "Deepening existing relationships" may become paramount factors predicting loneliness.

Furthermore, the primary purpose for people engaging in SNS social relationships may also change across different life stages. Searching for new friendships and maintaining intimacy relationships may be the primary motive for SNS usage for college students. As they get older, they spend time building careers and seeking business collaboration. For elderly people, they use SNS with low expectations for friendships and occasional communication, and some social support. The changes in motives and expectations may also influence the effect processes and psychological outcomes of SNS usage.

In reference to cultural samples, while this study aimed to investigate the role of culture, it isn't easy to draw sound conclusions from only two countries. More diverse samples should be compared to accurately assess the role of culture in SNS uses and gratification.

Measurement Issues. The present study assessed the quantity, quality, and cognitive discrepancies of SNS social activities through self-reported surveys. Although the author improved upon the methodology of past studies (e.g., Russell et al., 2012) that involved measures of mediated social contacts, the online-offline interactions of so-

cial activities and their effects on mental health was not investigated. Most of the current studies in computer-mediated communication construed online and offline as separate stage sets. However, numbers of scholars point out that SNS often involve individuals who are known in an FTF situation (e.g., Kujarth, 2011, Tong, Van Der Heide, Langwell, & Walther, 2008) or who are already a part of their extended social network (Boyd and Ellison, 2008, p. 211). There are also possibilities for online friends to meet each other physically. Therefore, Beer (2008) suggests that future researchers should pay more attention to the continuing connections between the SNS mediated environment and FTF relationships. In terms of SNS usage on mental health, an individuals' offline social network structure may shape one's goals and strategies of SNS communication and the evaluation standard of SNS social contacts. These factors would, in turn, affect one's face-to-face social activities and those psychological outcomes. Therefore, to expand our findings, future studies should explore the dynamic relationships between online and offline social contacts and their impact on feelings of satisfaction and loneliness. Besides self-report data, objective data (e.g., SNS log information) should be employed to validate the current implications.

4.4. Conclusions

This dissertation presents two studies that draw the conclusion that the cognitive discrepancy model of loneliness, which developed based on face-to-face research, could be applied to the SNS scholarship, while the effect patterns differ depending on factors, such as communication motives, size, and density of social networks, and

cultural orientations.

First, adding to the literature of SNS uses and gratifications, the present study suggests that while the structure of SNS uses and gratifications largely replicated Western scales, cultural characteristics have been embedded into motives of SNS usage. Chinese and Japanese reported SNS usage consistent with social concerns and worries, compared to strictly personal promotion.

Second, the study brings new insights to the cognitive model of loneliness (SDT), showing that cognitive discrepancies of social relationships via SNS predict satisfaction and feeling of loneliness, over and above the effects of actual quantity and quality of SNS social use. However, the patterns would be influenced by communication motives, size and density of social networks, and cultural orientation.

As suggested by the two studies in this dissertation, the underlying mechanism through which the SNS usage affects loneliness is more complex than initially presumed. Factors of communication motives, social network structures, online-offline interaction, life stages, cultural orientations may influence patterns and strength. Considering the complexity of online-offline human interaction and rapid changes of the computer-mediated communication platform, the present study may only provide an initial answer to the question of "Why do people experience feeling lonely while using SNS." Besides the quantity and quality of SNS social activities, the self-defined and socially defined cognitive discrepancies are also potential predictors of feelings of satisfaction and loneliness. Further investigations should be conducted to enrich the comprehension of the effects of computer-mediated communication on mental health.

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Appendices

Appendix A

Social media uses and gratification scale

English version

Please choose the item best describes the reason that motivate you to use SNS.					
Factor 1: Deepening existing relationships					
1.I feel connected with my face-to-face friends through use of social media.	disagree	somewhat disagree	no comment	somewhat agree	agree
2.I feel the relationships with my face-to-face friends are deepening through use of social media.	disagree	somewhat disagree	no comment	somewhat agree	agree
5.I think my face-to-face relationships will be enriched by using social media as a contact tool.	disagree	somewhat disagree	no comment	somewhat agree	agree
3.I can freely exchange opinions with my friends through social media.	disagree	somewhat disagree	no comment	somewhat agree	agree
Factor 2: Expanding current interpersonal network					
6.I feel like I can become friends with people who share the same interest as me by following each other (adding each other as friends).	disagree	somewhat disagree	no comment	somewhat agree	agree
7.I can become close to people who can relate to my comments on social media.	disagree	somewhat disagree	no comment	somewhat agree	agree
9.Somehow I feel more apt to be able to can make friends by using social media.	disagree	somewhat disagree	no comment	somewhat agree	agree
10.Although I may have never met them in real life, I feel like we mutually encourage each other through social media.	disagree	somewhat disagree	no comment	somewhat agree	agree
8.I feel like I am not alone when I meet someone with the same hobby or interests on social media.	disagree	somewhat disagree	no comment	somewhat agree	agree
Factor 3: Information sharing and exchange					
11. I feel I can freely interact with others through social media, regardless of how trivial the conversation topic may be.	disagree	somewhat disagree	no comment	somewhat agree	agree
13. I can attain advice and learn from others through social media.	disagree	somewhat disagree	no comment	somewhat agree	agree
12.Social media is a useful tool for attaining and sharing my interests through social media.	disagree	somewhat disagree	no comment	somewhat agree	agree
4.I can keep updated with my family and friends through social media.	disagree	somewhat disagree	no comment	somewhat agree	agree
14.I can view interesting comments about news and recent events through social media.	disagree	somewhat disagree	no comment	somewhat agree	agree

ソーシャルメディアの利用と満足度尺度

Japanese version

あなたのソーシャルメディアの利用動機に最も当てはまる選択肢をお選びください。					
Factor 1: 既存の人間関係の深まり					
1. ソーシャルメディアでは、実生活での友人とのつながりを感じる。	当てはまらない	やや当てはまらない	どちらとも言えない	やや当てはまる	当てはまる
2. ソーシャルメディアを通じて、実生活での友人との関係が深くなる気がする。	当てはまらない	やや当てはまらない	どちらとも言えない	やや当てはまる	当てはまる
5. 連絡手段としてソーシャルメディアを利用すると、対面的な人間関係が豊かになる。	当てはまらない	やや当てはまらない	どちらとも言えない	やや当てはまる	当てはまる
3. ソーシャルメディアを通じて、友人と気軽に意見を交換できる。	当てはまらない	やや当てはまらない	どちらとも言えない	やや当てはまる	当てはまる
Factor 2: 個人のソーシャルネットワークの広がり					
6. ソーシャルメディアで同じ趣味や関心を持っている人とお互いにフォロー（友人リストに追加）すると、友達になれるような気がする。	当てはまらない	やや当てはまらない	どちらとも言えない	やや当てはまる	当てはまる
7. ソーシャルメディアで自分に共感してくれる他者に出会うと、親しくなれる。	当てはまらない	やや当てはまらない	どちらとも言えない	やや当てはまる	当てはまる
9. ソーシャルメディアを使うと、何となく友達ができそうな気がする。	当てはまらない	やや当てはまらない	どちらとも言えない	やや当てはまる	当てはまる
10. 実際に会ったことがない人でも、ソーシャルメディアを通じて、自分と一緒にがんばっている気がする。	当てはまらない	やや当てはまらない	どちらとも言えない	やや当てはまる	当てはまる
8. ソーシャルメディアで同じ趣味や関心を持っている人に出会うと、自分がひとりではない気がする	当てはまらない	やや当てはまらない	どちらとも言えない	やや当てはまる	当てはまる
Factor 3: 情報収集と共有					
11. 大したことではない話題でも、ソーシャルメディアを介して気軽にやり取りができる。	当てはまらない	やや当てはまらない	どちらとも言えない	やや当てはまる	当てはまる
13. ソーシャルメディアを通じて、他人から経験やアドバイスを獲得することができる	当てはまらない	やや当てはまらない	どちらとも言えない	やや当てはまる	当てはまる
12. ソーシャルメディアを通じて、自分の趣味や関心のある情報を獲得・交換することが便利である。	当てはまらない	やや当てはまらない	どちらとも言えない	やや当てはまる	当てはまる
4. ソーシャルメディアを通じて、友人や家族とお互いの近況を報告したり、気持ちを共有したりすることができる。	当てはまらない	やや当てはまらない	どちらとも言えない	やや当てはまる	当てはまる
14. ソーシャルメディアを通じて、ニュースや最近の出来事などに関する面白い意見を見ることができる。	当てはまらない	やや当てはまらない	どちらとも言えない	やや当てはまる	当てはまる

社交媒体的利用和满足量表

Chinese version

请选择最确切表达您使用社交媒体的动机的选项。					
Factor 1: 加深现有人际关系					
1. 通过社交网络工具的使用，能感觉到与现实生活中的友人的联结。	不同意	有点不同意	很难说	有点同意	同意
2. 通过使用社交网络工具，感觉自己与现实生活中的朋友的关系也得到了进一步加深。	不同意	有点不同意	很难说	有点同意	同意
5. 以社交网络工具作为联络手段，会更好地丰富我们在现实生活中的人际关系。	不同意	有点不同意	很难说	有点同意	同意
3. 社交网络工具，能够轻松地与朋友互通有无。	不同意	有点不同意	很难说	有点同意	同意
Factor 2: 扩展人机交往圈子					
6. 在社交网络上，与有同样兴趣爱好的人们相互关注（即，将对方加入自己的朋友列表）后，会感觉到与对方成为了朋友。	不同意	有点不同意	很难说	有点同意	同意
7. 在社交网络平台上遇到和自己有共鸣的人，便容易与对方熟悉起来。	不同意	有点不同意	很难说	有点同意	同意
9. 通过社交网络工具的使用，感觉自己能够结识新朋友。	不同意	有点不同意	很难说	有点同意	同意
10. 即使是未曾谋面的朋友，通过社交网络工具，也能够感受到对方在和自己一起努力。	不同意	有点不同意	很难说	有点同意	同意
8. 在社交网络平台上遇到有相同兴趣爱好的人让我再不觉得孤单。	不同意	有点不同意	很难说	有点同意	同意
Factor 3: 搜索和交换信息					
11. 即使是不太重要的话题，通过社交网络工具也可以轻松谈及。	不同意	有点不同意	很难说	有点同意	同意
13. 通过社交网络工具，可以获得他人的经验以及建议。	不同意	有点不同意	很难说	有点同意	同意
12. 通过社交网络工具，能够很方便地获取、交流与自己兴趣相关的信息。	不同意	有点不同意	很难说	有点同意	同意
4. 通过社交网络工具，能够很方便地获取、交流与自己兴趣相关的信息。	不同意	有点不同意	很难说	有点同意	同意
14. 通过社交网络工具，能够很方便地获取、交流与自己兴趣相关的信息。	不同意	有点不同意	很难说	有点同意	同意

Appendix B

Quantity of SNS social activities

English version

1 In the last two weeks, how many hours on average..										
① would you like to spend on SNS per day?	0	less than 0.5	0.5-1	1-2	2-3	3-4	more than 4			
② did you spend on SNS per day?	0	less than 0.5	0.5-1	1-2	2-3	3-4	more than 4			
③ do you think a typical colege student spend on SNS per day?	0	less than 0.5	0.5-1	1-2	2-3	3-4	more than 4			
④ How satisfied are you with the current number of social media friends?	Extremely dissatisfied	Moderately dissatisfied	Slightly dissatisfied	Neither satisfied nor dissatisfied	Slightly satisfied	Moderately satisfied	Extremely satisfied			
2 How many social media friends in total..										
① would you like to have?	0	1-3	4-10	11-30	31-50	51-100	more than 100			
② do you have?	0	1-3	4-10	11-30	31-50	51-100	more than 100			
③ do you think a typical colege student have?	0	1-3	4-10	11-30	31-50	51-100	more than 100			
④ How satisfied are you with the current number of social media friends?	Extremely dissatisfied	Moderately dissatisfied	Slightly dissatisfied	Neither satisfied nor dissatisfied	Slightly satisfied	Moderately satisfied	Extremely satisfied			
3 Among you social media friends, how many of them..										
① would you like to meet offline?	0	1-3	4-10	11-30	31-50	51-100	more than 100			
have you met /have a plan to meet offline?	0	1-3	4-10	11-30	31-50	51-100	more than 100			
② how many social media friends do you think a typical student has met offline?	0	1-3	4-10	11-30	31-50	51-100	more than 100			
④ How satisfied are you with the number of social media friends you have met or will meet offline?	Extremely dissatisfied	Moderately dissatisfied	Slightly dissatisfied	Neither satisfied nor dissatisfied	Slightly satisfied	Moderately satisfied	Extremely satisfied			
4 How many times on average..										
① would you like to comment or send "likes" to others' posts per day?	0	1	2-3	4-5	6-7	8-9	more than 9			
② did you comment or send "likes" to others' posts per day in the last two weeks?	0	1	2-3	4-5	6-7	8-9	more than 9			
③ do you think a typical student comments or sends "likes" to others' posts per day?	0	1	2-3	4-5	6-7	8-9	more than 9			
④ How satisfied are you with the amount of comments and "likes" you send on others' posts?	Extremely dissatisfied	Moderately dissatisfied	Slightly dissatisfied	Neither satisfied nor dissatisfied	Slightly satisfied	Moderately satisfied	Extremely satisfied			
5 How many times on average..										
① would you like to receive comments or likes from your social media friends per day?	0	1	2-3	4-5	6-7	8-9	more than 9			
② did you actually receive comments or likes from your social media friends per day during the last two weeks?	0	1	2-3	4-5	6-7	8-9	more than 9			
③ do you think a typical student receives comments and likes per day?	0	1	2-3	4-5	6-7	8-9	more than 9			
④ How satisfied are you with the amount of comments and likes from your social media friends?	Extremely dissatisfied	Moderately dissatisfied	Slightly dissatisfied	Neither satisfied nor dissatisfied	Slightly satisfied	Moderately satisfied	Extremely satisfied			

Japanese version

1 SNSの平均利用時間について								
①1日に何時間利用すればちょうどいいと思いますか？	0時間	0.5時間以下	0.5-1時間	1-2時間	2-3時間	3-4時間	4時間以上	
②直近の2週間に平均で１日に何時間，ソーシャルメディアを利用しましたか？	0時間	0.5時間以下	0.5-1時間	1-2時間	2-3時間	3-4時間	4時間以上	
③典型的な大学生なら1日に何時間を利用すべきと思いますか？	0時間	0.5時間以下	0.5-1時間	1-2時間	2-3時間	3-4時間	4時間以上	
④1日のSNSの利用時間に対してどれぐらい満足していますか？	非常に不満	不満	やや不満	どちらともいえない	やや満足	満足	非常に満足	
2 SNSの友人数について								
①何人がいればちょうどいいと思いますか？	0人	1-3人	4-10人	11-30人	31-50人	51-100人	100人以上	
②何人がいますか？	0人	1-3人	4-10人	11-30人	31-50人	51-100人	100人以上	
③典型的な大学生なら何人がいると思いますか？	0人	1-3人	4-10人	11-30人	31-50人	51-100人	100人以上	
④SNSの友人の人数に対してどれぐらい満足していますか？	非常に不満	不満	やや不満	どちらともいえない	やや満足	満足	非常に満足	
3 SNSの友人の中に、実生活でも付き合っている友人の人数について								
①何人がいればちょうどいいと思いますか？	0人	1-3人	4-10人	11-30人	31-50人	51-100人	100人以上	
②何人がいますか？	0人	1-3人	4-10人	11-30人	31-50人	51-100人	100人以上	
③典型的な大学生なら何人がいるべきと思いますか？	0人	1-3人	4-10人	11-30人	31-50人	51-100人	100人以上	
④SNSの友人の中に、実生活でも付き合っている友人の人数に対してどれぐらい満足していますか？	非常に不満	不満	やや不満	どちらともいえない	やや満足	満足	非常に満足	
4 SNSで友人のポストにコメントするまたは「いいね」を押す回数について								
①1日に何回すればちょうどいいと思いますか？	0回	1回	2-3回	4-5回	6-7回	8-9回	9回以上	
②直近の2週間に平均で1日に何回しましたか？	0回	1回	2-3回	4-5回	6-7回	8-9回	9回以上	
③典型的な大学生なら1日に何回すべきと思いますか？	0回	1回	2-3回	4-5回	6-7回	8-9回	9回以上	
④SNSで友人のポストにコメントするまたは「いいね」を押す回数についてどれぐらい満足していますか？	非常に不満	不満	やや不満	どちらともいえない	やや満足	満足	非常に満足	
5 SNSで友人からにコメントまたは「いいね」をもらう回数について								
①1日に何回コメントまたは「いいね」されたらちょうどいいと思いますか？	0回	1回	2-3回	4-5回	6-7回	8-9回	9回以上	
②直近の2週間に平均で1日に何回されましたか？	0回	1回	2-3回	4-5回	6-7回	8-9回	9回以上	
③典型的な大学生なら1日に何回されるべきと思いますか？	0回	1回	2-3回	4-5回	6-7回	8-9回	9回以上	
④SNSで友人からもらったコメントまたは「いいね」の回数についてどれぐらい満足していますか？	非常に不満	不満	やや不満	どちらともいえない	やや満足	満足	非常に満足	

Chinese version

1 SNS的平均使用时间							
①您认为每天使用几小时比较理想?	0小时	0.5小时以下	0.5-1小时	1-2小时	2-3小时	3-4小时	4時間小时
②最近两周内，您平均每天使用SNS几个小时？	0小时	0.5小时以下	0.5-1小时	1-2小时	2-3小时	3-4小时	4時間小时
③您认为一个典型的大学生每天使用SNS几小时?	0小时	0.5小时以下	0.5-1小时	1-2小时	2-3小时	3-4小时	4時間小时
④您对自己使用SNS的时间是否满意?	非常不满意	不满意	不太满意	说不好	还算满意	满意	非常满意
2 SNS的朋友数							
①您认为有多少个SNS朋友比较理想?	0人	1-3人	4-10人	11-30人	31-50人	51-100人	100人以上
②您有多少个SNS朋友？	0人	1-3人	4-10人	11-30人	31-50人	51-100人	100人以上
③您认为一个典型的大学生应该有多少个SNS朋友?	0人	1-3人	4-10人	11-30人	31-50人	51-100人	100人以上
④您对自己的SNS朋友数是否满意?	非常不满意	不满意	不太满意	说不好	还算满意	满意	非常满意
3 SNS的朋友中，线下也见面的朋友数							
①您认为有多少个线下也见面的SNS朋友比较理想?	0人	1-3人	4-10人	11-30人	31-50人	51-100人	100人以上
②您有多少个线下也见面的SNS朋友?	0人	1-3人	4-10人	11-30人	31-50人	51-100人	100人以上
③您认为一个典型的大学生应该有多少个线下也见面的SNS朋友?	0人	1-3人	4-10人	11-30人	31-50人	51-100人	100人以上
④您对自己线下也见面的SNS朋友数是否满意?	非常不满意	不满意	不太满意	说不好	还算满意	满意	非常满意
4 对SNS朋友所发布的文字、图片等信息进行回复、转载或点赞的次数							
①您认为每天理想的回复，转载和点赞数为?	0次	1次	2-3次	4-5次	6-7次	8-9次	9次以上
②您每天的回复、转载和点赞的次数约为？	0次	1次	2-3次	4-5次	6-7次	8-9次	9次以上
③您认为一个典型的大学生每天应该回复，转载和点赞的次数为?	0次	1次	2-3次	4-5次	6-7次	8-9次	9次以上
④您对自己每天的回复，转载和点赞数是否满意?	非常不满意	不满意	不太满意	说不好	还算满意	满意	非常满意
5 从SNS朋友获得评论和点赞的次数							
①您认为每天获得评论和点赞的理想的次数为？	0次	1次	2-3次	4-5次	6-7次	8-9次	9次以上
②您每天获得的评论和点赞的次数为?	0次	1次	2-3次	4-5次	6-7次	8-9次	9次以上
③您认为一个典型的大学生每天应该获得评论和点赞的次数为?	0次	1次	2-3次	4-5次	6-7次	8-9次	9次以上
④您对自己每天的获得评论和点赞的次数是否满意?	非常不满意	不满意	不太满意	说不好	还算满意	满意	非常满意

Appendix C

Quality of SNS social activities

①Please select the item that best describes your attitude toward social media usage.
②Pease check the item that best describes your current social media activities.
③Please select the item that would best describe a typical student's social media activities.
④How satisfied are you with the current social media usages?

A

①	I would like to connect with my face-toface friends via social media.	Strongly disagree						Strongly agree
②	I can connect with my face-to-face friends via social media.	Strongly disagree						Strongly agree
③	I think a typical student can connect with his/her face-to-face friend well via social media.	Strongly disagree						Strongly agree
④	I can connect with my face-to-face friends via social media.	Extremely dissatisfied						Extremely satisfied

B

①	I would like to become friends with people who share the same interest as me by "following" each other on social media.	Strongly disagree						Strongly agree
②	I think it is easy to become friends with people who share the same interest as me by following each other (adding each other as friends).	Strongly disagree						Strongly agree
③	I think a typical student can become friends with people who share the same interest as him/her by following each other.	Strongly disagree						Strongly agree
④	I think it is easy to become friends with people who share the same interest as me by following each other (adding each other as friends).	Extremely dissatisfied						Extremely satisfied

C

①	I would like to get close to people who relate to my comments on social media.	Strongly disagree						Strongly agree
②	I can get close to people who relate to my comments on social media.	Strongly disagree						Strongly agree
③	I think a typical student can get close to people who relate to his/her comments on social media.	Strongly disagree						Strongly agree
④	I can get close to people who relate to my comments on social media.	Extremely dissatisfied						Extremely satisfied

D

①	I would like to enrich my face-to-face relationships by using social media as a contact tool.	Strongly disagree						Strongly agree
②	I can enrich my face-to-face relationships by using social media as a contact tool.	Strongly disagree						Strongly agree
③	I think a typical student can enrich his/her face-to-face relationships by using social media as a contact tool.	Strongly disagree						Strongly agree
④	I can enrich my face-to-face relationships by using social media as a contact tool.	Extremely dissatisfied						Extremely satisfied

E

①	I expect that it easier to make new friends via social media.	Strongly disagree						Strongly agree
②	Somehow I think it's more apt to be able to make new friends via social media.	Strongly disagree						Strongly agree
③	I think a typical student can easily make new friends via social media.	Strongly disagree						Strongly agree
④	Somehow I think it's more apt to be able to make new friends via social media.	Extremely dissatisfied						Extremely satisfied

F

①	I want to exchange opinions easily with my friends through social media.	Strongly disagree						Strongly agree

②	I can freely exchange opinions with my friends through social media.	Strongly disagree						Strongly agree
③	I think a typical student can easily exchange his/her opinion with friends through social media.	Strongly disagree						Strongly agree
④	I can freely exchange opinions with my friends through social media.	Extremely dissatisfied						Extremely satisfied

G

①	Although I may have never met them in face-to-face conversation, I expect hope that we can mutually encourage each other through social media.	Strongly disagree						Strongly agree
②	Although I may have never met them in face-to-face conversation, we can mutually encourage each other through social media.	Strongly disagree						Strongly agree
③	I think a typical student and his/her friends can mutually encourage each other although they have never met in face-to-face conversation.	Strongly disagree						Strongly agree
④	Although I may have never met them in face-to-face conversation, we can mutually encourage each other through social media.	Extremely dissatisfied						Extremely satisfied

H

①	I hope I can attain advice and learn from others through social media.	Strongly disagree						Strongly agree
②	I am able to attain advice and learn from others through social media.	Strongly disagree						Strongly agree
③	I think a typical student can attain advice and learn from others through social media.	Strongly disagree						Strongly agree

④	I am able to attain advice and learn from others through social media.	Extremely dissatisfied						Extremely satisfied

I

①	I would like to use social media to attain and share my interests.	Strongly disagree						Strongly agree
②	I believe that social media is a useful tool for attaining and sharing my interests.	Strongly disagree						Strongly agree
③	To a typical student, I think social media is a useful tool for attaining and sharing his/her interests.	Strongly disagree						Strongly agree
④	I believe that social media is a useful tool for attaining and sharing my interests.	Extremely dissatisfied						Extremely satisfied

J

①	I would like to keep undated with my family and friends via social media.	Strongly disagree						Strongly agree
②	I am able to keep up with my family and friends via social media.	Strongly disagree						Strongly agree
③	I think a typical student is able to keep up with his/her family and friends via social media.	Strongly disagree						Strongly agree
④	I am able to keep up with my family and friends via social media.	Extremely dissatisfied						Extremely satisfied

K

①	I would like to view interesting comments about news and recent events through social media.	Strongly disagree						Strongly agree
②	I can view interesting comments about news and recent events through social media.	Strongly disagree						Strongly agree

③	I think a typical student enjoy viewing interesting comments about news and recent events through social media.	Strongly disagree						Strongly agree
④	I can view interesting comments about news and recent events through social media.	Extremely dissatisfied						Extremely satisfied

L

①	I want to interact with others through social media freely, regardless of how trivial the conversation topic may be.	Strongly disagree						Strongly agree
②	I can freely interact with others through social media, regardless of how trivial the conversation topic may be.	Strongly disagree						Strongly agree
③	I think a typical student can freely interact with others through social media, regardless of how trivial the conversation topic may be.	Strongly disagree						Strongly agree
④	I can freely interact with others through social media, regardless of how trivial the conversation topic may be.	Extremely dissatisfied						Extremely satisfied

M

①	I have a willingness to deepen my face-toface relationships through use of social media.	Strongly disagree						Strongly agree
②	I can deepen my face-to-face relationships through use of social media.	Strongly disagree						Strongly agree
③	I think a typical student can deepen his/her face-to-face relationships through use of social media.	Strongly disagree						Strongly agree
④	I can deepen my face-to-face relationships through use of social media.	Extremely dissatisfied						Extremely satisfied

N

①	I want to meet new friends with the same hobby or interests on social media.	Strongly disagree						Strongly agree
②	I can meet new friends with the same hobby or interests on social media.	Strongly disagree						Strongly agree
③	I think a typical student can connect with his/her face-to-face friend well via social media.	Strongly disagree						Strongly agree
④	I can meet new friends with the same hobby or interests on social media.	Extremely dissatisfied						Extremely satisfied