Why Do People Experience Loneliness While Using Social Media?

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Abstract: The Cognitive Discrepancy Model of Loneliness (CDML) postulates that people experience loneliness when they perceive a difference between their desired (or expected) and actual levels of social relationships. Although the model has been widely cited, only a few empirical studies support this statement in Face-to-Face context. In the present study, we re-evaluate and expand the CDML in the digital context in two representative East Asian countries, Japan and China. The results partially support the idea of CDML that besides 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, but the patterns may differ depending on communication purposes and cultural orientations.

Keywords: Social media, online social activity, cognitive discrepancy, loneliness, cultural variation

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 experience loneliness. To this effect some worldwide mass media, such as the New York Times and the Atlantic, have published articles to provoke public thinking on this issue, posing questions to their readers, such as, "Are we living in a sad and lonely world?", "Is Facebook making us lonely?", and "Should the virtual contact replace direct human contact?" Early academic studies have mainly been interested in whether and how the use of SNS affects the feeling of loneliness. At the same time, somehow, there is still little agreement on the three questions mentioned above (see the reviews of Anderson, Fagan, Woodnutt & Chamorro-Premuzic, 2012; Kraut & Burke, 2015).

Kraut and Burke (2015) criticized that early studies on the Internet's effects have several common methodological and substantive problems. For instance, many studies have utilized over-simplified measures, and others have failed to delineate types of Internet and their users. They also pointed out that much current research on social media (e.g., SNS) falls into the same trap. They claim that the effects of online social interaction on loneliness should be contingent on personal goals or expectations, the characteristics and processes of communication, and the strength of the communication ties (e.g., Burke & Kraut, 2013, 2016; Burke, Kraut & Marlow, 2011; Huang, 2010). In the present study, we differentiate SNS use by motives and strength of ties, as well as addressing the issue of measurement, by using a standardized scale (Social Media Use and Gratification Scale; Xu, Takai & Liu, 2018), to measure expectation and outcomes of SNS social activities.

Additionally, another narrative review of SNS effects on well-being (Meng, Martinez, Holmstrom, Chung & Cox, 2017) pointed out that most of the reviewed studies fail to explicitly adopt a theoretical framework. Specifically, they pointed out that the majority of studies in this field only focus on how people use SNS for social support or how the use of SNS impacts well-being, including loneliness. Additionally, these studies fail to provide a functional and mechanistic explanation of the relationship between SNS behavior, perceived social support, and well-being. To address this limitation, we adopt the cognitive discrepancy model to interpret how SNS use, perceived social relationships, and cognitive violations affect the feeling of loneliness.

Moreover, as reviewed, the majority of the studies in this area were conducted in the USA or other Western countries. Relatively little attention, however, has been paid to the cross-cultural aspect of this worldwide phenomenon. Only a few studies have begun to look at cultural differences in motivations (e.g., Xu et al., 2018) and behavioral outcomes (e.g., Choi, Chu & Kim, 2012; Jackson & Wang, 2013) in online interaction and relational building. Informed by their works, we examine the effects of SNS use on relationship satisfaction and loneliness using samples from two representative East Asian countries, Japan and China. Through this investigation, we attempt to shed light on the cultural forces that shape SNS effects on psychological well-being.

In the following sections, we first review relevant research on SNS effects on loneliness, cognitive discrepancy model of loneliness (CDML), and cultural variations in SNS use. Based on prior studies, we propose several research questions and hypotheses. We then present findings from an online questionnaire survey and discuss theoretical and practical implications.

2. Literature Review

2.1. SNS Use 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), which demonstrates 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). However, as the reviews of Anderson et al. (2012) and Kraut et al. (2015) mention, these studies 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. 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) suggested that

communication with strong 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 the way the Internet is used, there still remain unanswered questions as to what the relevant factors are (Burke & Kraut, 2016). To dig deeper into this issue, the present study explores predictions made from CDML on how communication goals and partner intimacy via SNS influence feelings of loneliness. In particular, we use Xu et al.'s
(2018) typology to distinguish between three types of SNS use: (1) contacting offline friends (strong ties) via SNS for "deepening existing relationships"; (2) initiating online relationships (weak ties) for "expanding current social network"; and (3) "information sharing and exchange" through both strong and weak ties. We hypothesize that:

> **H1**: Quality of SNS communication for the purpose of "deepening existing relationships (DER)" (strong ties) is a more potent predictor of loneliness than other types of use.

2.2. 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 important literatures (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 a large number of social relationships, they still feel lonely because they are dissatisfied with important aspects of their social life (e.g., quality of relationships, lack of particular relationships, or mismatch between reality and desire). In conjunction with this, we define 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, which are called 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 the CDML is widely accepted and cited in the loneliness field, to our knowledge, only a few empirical studies provide evidence that partially supports the relationship between cognitive discrepancies and loneliness.

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 that after controlling for actual levels of social contacts, the discrepancy between actual and typical levels of social contacts 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 actual and desired social contacts and feelings of loneliness. They found that the cognitive discrepancy model of loneliness was supported only in the case of close friendships.

Two critical issues of the works reviewed above have been pointed out. First, CDML has not been yet applied in SNS contexts. 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). In addition, although Russell et al.'s (2012) work is relatively new, they implemented SLQ as well. Since Internet technologies have been commonly employed, the tools and services (SNSs) might not only provide wider accessibility to new connections but also expand on the range of scope of interactions with 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.

In this study, we aim to examine the CDML in the context of SNS. We test the following hypothesis, based on the above arguments:

> **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.

2.3. Cultural Variations in Related Valences

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 that there are 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 investigation, 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 to be 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, we can make the inference that rather than personal characteristics and goals, East Asians emphasize harmony in small, but close relational networks, more. 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).
From this, we formed one research question:

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

3. Method

3.1. Participants

A total of 334 undergraduates from one public and two private universities in Central Japan, as well as two public universities in Northern China, volunteered to participate in this study.

The Japanese data was collected from 191 participants (78 males; 113 females), ranging in age from 18-22 years with an average of 19.8 years (*SD*=1.22). The Chinese data was collected from 164 participants (56 males; 108 females) ranging from 19-24 years, with an average of 21.4 (*SD*=1.61) years. The locations for data collection were similar, being large metropolitan regions, and highly economically affluent in both countries.

3.2. Materials

We compiled a questionnaire composed of the following four scales:

Online Connectivity. In order 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 is an inventory with 20 items (5 subsets) that ask participants to estimate their actual versus ideal amount of SNS social activity, as well as the amount of an average 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 others' 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 7-point scale of amount.

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). This scale is available in English, Japanese, and Chinese languages. 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, described earlier in the introductory section of this article. 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), and "I think a typical student can connect with his/her face-to-face friends well via social media" (typical level). Responses were rated on a seven-point Likert-type scale, ranging from 1 (strongly disagree) to 7 (strongly agree).

UCLA Loneliness Scale. We used the Japanese and Chinese translations of the Version 3 UCLA Loneliness Scale (20 items, 4-point Likert scale; Russell, 1996). The scale has high internal consistency and has been used in several studies in both Japanese and Chinese contexts.

3.3. Procedure

Participants were recruited from introductory classes of psychology and communication. First, we did a thorough briefing on participation, and then collected informed consent forms from those who agreed to participate. We 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.

4. Result

4.1. Descriptive Statistics

4.1.1. Japanese Sample

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 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 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 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 1.

4.1.2. Chinese Sample

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 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 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 1.

Table 1. Correlations among the Measures of Loneliness, Satisfaction, Quantity and Quality of Online Social Activities

TABLE 1. Correlations among the measures of Loneliness, Satisfaction, quantity and quality of online social activities

(The upper matrix: Japanese The lower matrix: Chinese)

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)	-.34***	–	.52***	-.07	-.06	-.10	.27***	.23***	.17*	.21***	.12	.23***	-.18*	.00
3. Typ.-actual Discrepancy (quantity)	-.38***	.53***	–	-.08	-.09	-.18*	.25***	.37***	.10	.40***	.31***	.49***	.02	-.10
4. Actual level of DER (quality)	.19*	-.14	-.04	–	.17*	.47***	-.28***	-.56***	.00	-.09	-.05	-.08	.49***	-.37***
5. Actual level of ENR (quality)	.18	-.07	-.04	.47***	–	.42***	.01	-.21***	-.24***	-.65***	-.02	-.33***	.32***	.15*
6. Actual level of ISE (quality)	.11	-.03	.09	.58***	.63***	–	-.13	-.26***	-.05	-.22***	-.28***	-.31***	.50***	-.11
7. Ideal-actual Discrepancy of DER (quality)	.12	.42***	.09	-.47***	-.27***	-.19*	–	.33	.52	.14	.51	.27	-.07	.02
8. Typ.-actual Discrepancy of DER (quality)	-.19*	.31***	.25***	-.57***	-.25***	-.17*	.50***	–	.14	.50***	.21***	.58***	-.18*	.14
9. Ideal-actual Discrepancy of ENR (quality)	.01	.34***	.02	-.32***	-.32***	-.30***	.73***	.36***	–	.32***	.48***	.16*	-.04	-.14
10. Typ.-actual Discrepancy of ENR (quality)	-.31***	.34***	.29***	-.17*	-.48***	-.20***	.37***	.53***	.35***	–	.13	.70***	-.05	-.13
11. Ideal-actual Discrepancy of ISE (quality)	.00	.28***	-.07	-.22***	-.20***	-.38***	.60***	.29***	.73***	.29***	–	.38***	-.03	-.09
12. Typ.-actual Discrepancy of ISE (quality)	-.19*	.20*	.11	-.26***	-.33***	-.47***	.22***	.51***	.29***	.62***	.47***	–	.48***	.15
13. Satisfaction	-.08	-.03	.25***	.66***	.50***	.58***	-.47***	-.33***	-.46***	-.12	-.36***	-.29***	–	-.40***
14. Loneliness (UCLA)	.06	.05	-.08	-.34***	-.07	-.17*	.28***	.17*	.18*	.01	.16*	-.03	-.24***	–

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

Note. N(Japanese) =191. N(Chinese)=164.

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

4.2. Prediction of Satisfaction

We conducted a series of hierarchical regression analyses 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, gender of the participants was entered in step 1. The measure of 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, we entered discrepancy measures in step 4, and the interactions of actual quality and cognitive discrepancy in step 5.

Table 2 presents the results of the regression analysis predicting satisfaction with SNS social activity for both Japanese and Chinese samples.

For the Japanese sample, gender was not related to satisfaction, whereas the level of 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 ideal-actual discrepancy, actual quality and typical-actual discrepancy of ECN also accounted for a significant portion of the variance (4% and 6%).

The result of the Chinese sample generally replicated the CDML, whereas it showed a different pattern from the Japanese result. 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 the satisfaction measure. Subsequently, in step 4, ideal-actual discrepancy of DER use accounted for an additional 4%, ideal-actual discrepancy of ECN use accounting for an additional 9%, and 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 2. Hierarchical Regression Analyses Predicting SNS satisfaction with DER, ECN, ISE

TABLE 2 . Hierarchical Regression Analyses Predicting SNS satisfaction with DER, ECN, ISE

	Japanese		**Chinese**	
Step	*Δ R square*	*F*	*Δ R square*	*F*
1. Gender	.01	1.10	.02	3.27†
2. Actual quantity of SNS social activities	.22	53.46***	.00	<1
Deepening Existing Relationships				
3. Actual quality of DER	.13	38.26***	.45	137.17***
4. Ideal-actual discrepancy of DER	.00	1.03	.04	11.72***
5. Actual × Ideal-actual discrepancy of DER	.01	1.41	.00	<1
4. Typical-actual discrepancy of DER	.01	1.68	.00	<1
5. Actual × Typical-actual discrepancy of DER	.01	2.19	.01	3.51†
Expanding Current Network				
3. Actual quality of ECN	.02	4.16***	.25	55.94***
4. Ideal-actual discrepancy of ECN	.00	<1	.09	23.29***
5. Actual × Ideal-actual discrepancy of ECN	.04	8.96**	.01	1.16
4. Typical-actual discrepancy of ECN	.03	7.52**	.01	2.14
5. Actual × Typical-actual discrepancy of ECN	.06	17.85***	.02	5.10*
Information Sharing and Exchange				
3. Actual quality of ISE	.07	18.92	.34	83.67***
4. Ideal-actual discrepancy of ISE	.01	1.71	.02	5.88*
5. Actual × Ideal-actual discrepancy of ISE	.00	<1	.00	<1
4. Typical-actual discrepancy of ISE	.01	2.69	.02	<1
5. Actual × Typical-actual discrepancy of ISE	.00	<1	.00	<1

Note. N (Japanese) = 191. *N* (Chinese)= 164.

***p< .001. **p< .01.*p< .05. †p< .1.

4.3. Prediction of Loneliness

An identical series of hierarchical regression analyses was conducted to predict loneliness using the measures of SNS social activity and discrepancies for both Japanese and Chinese sample. Table 3 presents the results.

For the Japanese sample, gender was not related to loneliness. After controlling for gender, 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.

For the Chinese sample, gender was significantly related to loneliness. Similar to the Japanese result, after controlling for gender, actual amount of SNS social activity was not related to loneliness either. 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, 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). The interaction between actual quality and typical-actual discrepancy of ISE also accounted for an additional significant portion of the variance (5%). The results on the Chinese dataset provided stronger support to the CDML compared to the Japanese one.

Table 3. Hierarchical Regression Analyses Predicting Loneliness (UCLA) with DER, ECN, ISE

TABLE 3. Hierarchical Regression Analyses Predicting loneliness (UCLA) with DER, ECN, ISE

	Japanese		Chinese	
Step	*Δ R square*	*F*	*Δ R square*	*F*
1. Gender	.00	<1	.05	7.60**
2. Actual quantity of SNS social activities	.01	1.52	.00	<1
Deepening Existing Relationships				
3. Actual quality of DER	.13	28.1***	.10	18.28***
4. Ideal-actual discrepancy of DER	.01	1.52	.02	3.83†
5. Actual × Ideal-actual discrepancy of DER	.01	<1	.00	<1
4. Typical-actual discrepancy of DER	.01	1.84	.00	<1
5. Actual ×Typical-actual discrepancy of DER	.00	<1	.00	<1
Expanding Current Network				
3. Actual quality of ECN	.04	7.49***	.00	<1
4. Ideal-actual discrepancy of ECN	.01	2.04	.02	3.76†
5. Actual × Ideal-actual discrepancy of ECN	.01	1.69	.01	3.68
4. Typical-actual discrepancy of ECN	.00	<1	.00	<1
5. Actual × Typical-actual discrepancy of ECN	.01	<1	.01	1.85
Information Sharing and Exchage				
3. Actual quality of ISE	.01	<1	.02	3.12†
4. Ideal-actual discrepancy of ISE	.02	3.38†	.01	2.32
5. Actual × Ideal-actual discrepancy of ISE	.00	<1	.05	8.43***
4. Typical-actual discrepancy of ISE	.02	4.19*	.02	2.71†
5. Actual × Typical-actual discrepancy of ISE	.01	1.02	.00	<1

Note. N (Japanese) = 191. *N* (Chinese)= 164.

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

5. Discussion

The current study expanded the CDML in predicting satisfaction and loneliness in an SNS context and examined the cultural variation in effect patterns in two representative Eastern cultures, Japan and China. We tested two hypotheses and explored one research question through a series of analyses.

H1 hypothesized that quality, rather than quantity of SNS communication, particularly for the purpose of "deepening existing relationships" (DER), is a more potent predictor of loneliness. The results of correlational analyses provided evidence to support this hypothesis (see Table 1). In the Japanese sample, 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, quality of online social activities (i.e., DER, ECN, ISE) were moderately associated with 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 showed a tendency 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 actual amount of social activities and their quality were controlled for, 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 give support to 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 absence or loss of interpersonal relationships, people experience feelings of dissatisfaction and loneliness. This theory could explain the reason why actual amount and actual quality have a large impact on 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 the case of our current study, ideal-actual and typical actual discrepancies of social activities add 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 one) 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, actual quantity of SNS social activities was a strong predictor of satisfaction ($\Delta R^2 = .22$), while it added little explanation to the prediction of satisfaction in the Chinese model (See Table 2). 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 not be salient any more. Although in the present research we did not ask the participants' exact numbers of SNS friends, 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 distant acquaintances). Compared to Chinese users, Japanese users report less SNS contacts (e.g., 70-80 contacts on Mixi, an original SNS 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, we can make the indirect inference that the large number of SNS contacts and the high distribution of weak ties make Chinese users value quality rather than quantity of SNS social connections. This result may seem unexpected, however, it could be explained as follows: when the quantity of social contacts (e.g., numbers of SNS connections) is larger than the threshold, and the density of the social connections is low, quality may affect the feeling of loneliness significantly. Therefore, quality of SNS social connections has a stronger influence on 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 Chinese have a particular form of authority-directed orientation while retaining a strong sense of individuality. On the other hand, Japanese emphasize a peer-group orientation, and incorporate their desires and personal goals within those of the group. 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 to be unchangeable, yet they would still not totally give up on their own goals. In other words, Japanese are flexible in assuming the needs of the group, while Chinese would more likely feel such conformity had been forced upon them, and seek opportunities for pursuing their goals at another time. This theoretical framework of collectivism serves to interpret our results showing that cognitive discrepancy (in particular, ideal-actual cognitive discrepancy) predicts satisfaction with SNS social activity and loneliness in the Chinese sample, but not in the Japanese. When 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.

6. Limitations

There are several limitations that should be noted. First, in the present study, we assessed the quantity, quality, and the cognitive discrepancies of SNS social activities through self-reported surveys. Although we improved upon the methodology of past studies (e.g., Russell et al., 2012) that involved measures of mediated social contacts, we 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, we 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 peer-group orientation of collectivism offers a convincing interpretation of our findings, the underlying mechanism was not

directed confirmed. In future studies, a more finely tuned examination of this relationship should be examined.

Third, the data collected only from college students also affects the generalizability of this study. It is important to replicate these findings in other social categories and age groups.

7. Conclusion

In summary, in the present study, we explored a general research question asking why people feel loneliness while using social media in East Asian cultural contexts. The results indicated that besides 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, but the patterns differ depending on communication motives and cultural orientations.

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