Subjective Social Capital and Loneliness for the Elderly: The Moderator Role of Line and Facebook Use

Long-Jing Hsu, Hsiu-Ping Yueh, and Shih-Hsien Hsu

Abstract
Social media has become a vital source of communication for older adults, but its impact is still an ongoing debate. This study investigated the moderating effect of Line and Facebook use on social capital and loneliness in older adults, aged 55 or more, using data obtained from the 2018 Taiwan Communication Survey (TCS). Results from binary logistic regression indicated that older adult users of Line have a lower possibility of being lonely than those who do not use Line. Consistent with past studies, this study found that Line could be a form of social media that has a positive effect on the relationship between social capital and loneliness. Conversely, this article argues that Facebook does not have such a moderation effect. Overall, this study advances understanding of the impact of Facebook and Line on social capital and loneliness. The results are informative for future research on the effects of social media on the elderly.

Keywords
loneliness, older adults, social capital, social media, social network site

Introduction
Many developed countries are now facing the challenges of an aging population, as is Taiwan. The latest report from the National Development Council of Taiwan (2018) shows that Taiwan is considered an “aged society” (14.5% of the population is 65 years or older) and will become a “super-aged society” in 2027. One of the major issues for the discussion is social capital and loneliness.

Social capital is the connections among people (Putnam, 2000). Past studies have proposed that people gain social capital through workplaces, neighborhoods, or other offline organizations. Older adults in Taiwan, in particular, usually contain a network of personal relations, including relatives, friends, families, and/or health service workers (Liao et al., 2012). One of the benefits of social capital may be that it dissipates feelings of loneliness (Lima et al., 2017). Loneliness is a subjective state of feeling alone or lonely (Finlay & Kobayashi, 2018), and it may arise from weakening of physical and mental health, or loss of independence, roles, or possessions, as well as feelings of loss and grief when facing deaths in family and friendship networks (Finlay & Kobayashi, 2018; Giummarra et al., 2007; Klinenberg, 2016; Luanaigh & Lawlor, 2008). With the emergence of new technologies, more attention has focused on the provision of social capital through social media (Cho, 2015; Lima et al., 2017)—a platform where people conduct computer-mediated communication (Leist, 2013). Moreover, this effect may be different among various platforms (Li & Chen, 2014).

Despite the extensive research on social media, most of the studies of social media have focused on young adults, and there is still a lack of studies on social media use in the older population (Hogeboom et al., 2010; Moore & Hancock, 2020; Vošner et al., 2016; Yu et al., 2016). The older population is important because the number of them using social media is growing (Greenwood et al., 2016). Therefore, this study aimed to explore (1) the direct effect of social capital on loneliness, and (2) the moderation effect of different social media of social capital on loneliness. The results underscore the importance of considering social media use and the effect of social capital on loneliness in older adults.

National Taiwan University
Corresponding Author:
Hsiu-Ping Yueh, Department of Psychology, Department of Bio-Industry Communication and Development, National Taiwan University, No. 1, Sec. 4, Roosevelt Rd., Daan Dist., Taipei 10617.
Email: yueh@ntu.edu.tw
Social Capital on Loneliness

Social capital is famously defined by Putnam (2000) as “connections among individuals—social networks and the norms of reciprocity and trustworthiness that arise from them.” Here, “social network” refers to the structural feature of social capital, while “norms of reciprocity” (or social support) and “trustworthiness” refer to the cognitive features of social capital (Ferlander, 2007). Putnam (2000) suggests that social capital can be further differentiated into two forms of connections: bridging and bonding social capital. Bridging social capital is referred to as relationships with people from different backgrounds (Putnam, 2000). It is inclusive and usually associated with peripheral, or weak, ties (D. Williams, 2006). Bonding social capital is exclusive (D. Williams, 2006). It refers to relationships that have similar characteristics, and it is often related to close friends and family (Ellison et al., 2007). Bonding and bridging social capital are not separate from each other, for a group can be categorized as “more or less” in one form or the other (Putnam, 2000). Therefore, bonding and bridging social capital are considered together as a whole in this study.

People of different backgrounds gain social capital differently. For example, older adults in China who have families feel that they can gain social capital through the concept of filial piety and family support (Xu & Norstrand, 2012). Those who do not have families can turn to community to gain social capital (N. Lu et al., 2016). Older adults receive primary satisfaction in life in both conditions.

When people are satisfied with their lives, the psychological feeling of loneliness is dissipated. Loneliness can be described as a state of distress that arises when individuals lack a wider social network or intimate relationships (Gierveld & Tilburg, 2006), or when the quality of the social relationships cannot meet their social needs (Hawkley & Cacioppo, 2010). This feeling is especially common in older adults because people feel lonelier and more depressed as they age, retire, increase their likelihood of deteriorating health conditions and being disabled, and decrease their social network size (Cacioppo et al., 2010; Litwin, 2003). Disability creates barriers that can lead to decreases in contact with neighbors, friends, and family members (Litwin, 2003). In the same vein, researchers have found that older people who have physical disabilities along with those living alone tend to be lonelier than those who live with a spouse or those who are not disabled (Russell, 2009).

A person’s social capital is related to loneliness, and it can be seen in interventions that increase social capital for the elderly. For example, a 2-year study in Spain found that loneliness could be alleviated when social capital was increased through the intervention of coordinated action and group-based programs (Coll-Planas et al., 2017). A similar study in Africa found a significant difference in social capital and loneliness after a community-based intervention (Goodman et al., 2020). In general, those with higher social capital, that is, those who are more socially engaged, will be less likely to be socially isolated, less stressed, and healthier (Putnam, 2000), and they will have fewer feelings of loneliness (Sum et al., 2008). Therefore, the first hypothesis is as follows:

Hypothesis 1 (H1): Older adults with higher social capital will have fewer feelings of loneliness.

Social Media Use of the Elderly

Social capital research suggests that the loneliness is less likely to occur when people enhance or increase the number of relationships with social media. And luckily, there is an increase in older adults’ adaptation to the internet and social media. In the United States, internet use and home broadband use by older adults 65 years or older increased dramatically from 12% in 2013 to 67% in 2017, and the usage of social networking sites grew steadily from 27% in 2013 to 34% in 2017 (Anderson & Perrin, 2017). In Taiwan, adults 65 years or more also have relatively high percentages of internet and social media use. In 2017, 92.5% of them had experienced using WiFi or mobile internet devices, and 91.8% of them had used social networking sites and instant messaging (IM) apps (National Development Council of Taiwan, 2017). Given that the use of social media has been increasing in the older population, it is important to understand what social media is and its effects on their well-being.

By definition, social media is a tool or platform for people to generate computer-mediated communication, and on such a platform, people can absorb, co-create, and share user-generated content (Leist, 2013). On social network sites (SNSs), people build public profiles that can be viewed by other individuals in their lists of connections. People not only connect online with individuals they know offline but also initiate connections with strangers via the visibility of social networks and create connections with “latent ties” in offline connections (Boyd & Ellison, 2007). One’s degree of loneliness will inevitably decrease as one’s original social capital strengthens or as one gains more social capital.

Past studies have investigated the effect of social media on social capital that depends on multiple factors. First, several studies have revealed that an increased social media frequency usage has a positive effect on social capital. A study based on college students found that increasing the intensity of Facebook use will increase social capital, especially for students with low satisfaction and low self-esteem (Ellison et al., 2007). The reason is that Facebook use helps these students overcome barriers, changes latent ties to weak ties, and allows them to widen their social networks and worldviews. Similarly, a meta-analysis of 63 studies on over 35,500 adults (Domahidi, 2018) and a systematic review of 54 articles found that the use of SNSs is positively
related to social capital (J. R. Williams, 2019). In older adults, an empirical study found that those who use social media frequently have greater social capital (Neves et al., 2018). Evidence suggests that people with a higher frequency of social media use tend to contact friends and family more, attend more organizational meetings, and strengthen their social networks (Hogeboom et al., 2010). Second, how they use social media can also affect social media’s influence on social capital. People cultivate different levels of social capital based on whether they use social media for IM purposes, mostly used for one-on-one or groups with small audiences. Although less audience could be reached at once, the IM environment was more intimate, relational, and private (Gil de Zúñiga et al., 2017). However, close and strong friends who you trust for important aspects in the lives were to remain regardless of how many new friends you have, and exposure to news has limited effect to loneliness. On the contrary, if older adults use the internet to find new people, they may weaken their relationships with their original friends, make themselves feel more socially isolated, and hence decrease their personal well-being. Moreover, social media may be a harmful place if people do not know how to distinguish what’s right and wrong when they are exposed to overstated reports and negative news from friend’s posts (Lee, 2020). However, close and strong friends who you trust for important aspects in the lives were to remain regardless of how many new friends you have, and exposure to news has limited effect to loneliness. On the contrary, if older adults use the internet for communication or to seek information (positive information), this will mediate social capital, which in turn will decrease loneliness and increase well-being (Sum et al., 2008). Social media could also be helpful when there are higher proportions of actual friends. This is especially benevolent for older adults who focus on maintaining intimate relationships, such as actual friends and close family, due to socioemotional selectivity theory (Chang et al., 2015; Yu et al., 2016).

While social media has an effect on both social capital and loneliness, social media could be helpful on reaping the benefits of social capital on loneliness. Past study suggested online social interactions interventions can combat loneliness (T. T. Nguyen, Lee, et al., 2020; Ong et al., 2016). As such, many older adults are using digital media to maintain and strengthen existing relationships and could be used as a way to combat feelings of social isolation and loneliness (Quan-Haase et al., 2017). Moreover, different platforms may offer different levels of moderation due to the people they are interacting with. For example, older adults in East York used line to maintain relationships with family members, and email for friends. This then raised a question regarding the effects of different types of social media on social capital and loneliness in older adults in Taiwan.

In Taiwan, the two most popular social media platforms are Facebook (71.5%) and Line (86.5%) (Taiwan Communication Survey [TCS], 2018). Both Facebook and Line match the definition of social media, wherein people can absorb, co-create, and share user-generated content (Leist, 2013), but the apps have different emphases in their functions. Facebook was originally developed as a platform for users to develop an online profile, add friends, comment on one another’s pages, view others’ profiles, and join groups (Ellison et al., 2007). This is still one of their major features that is especially useful for people to reach a broad audience in a more public way (Malhotra, 2020) and gain social capital and combat negative feelings all at once. On the contrary, most Line users use it for IM purposes, mostly for one-on-one or groups with small audiences. Although less audience could be reached at once, the IM environment was more intimate, relational, and private (Gil de Zúñiga et al., 2021; Malhotra, 2020). Because of this, the different offerings of the platforms may result in different types of social media use and thus variation in the moderating effect of social capital on loneliness. Therefore, this study predicts the following hypotheses:

**Hypothesis 2 (H2):** Facebook does not moderate the effect of social capital on loneliness.

**Hypothesis 3 (H3):** Line moderates the effect of social capital on loneliness.

### Marital Effect on Social Capital to Loneliness

There were debates on how sociodemographic factors may lie in the relationship between social capital and loneliness. Some studies assert that marital background, gender, and educational background were cascading factors that should be controlled when determining the relationships (Sum et al., 2008; Yang et al., 2018). Marital factors, in particular, have an effect. Single and divorced older adults in Chinese culture were lonelier than older adults who were married (Yang et al., 2018). Another study in the United States also discovered that loneliness was related to unmarried individuals (T. T. Nguyen, Lee, et al., 2020). Other variables, however, were
inconsistent in the past study. For example, there was no gender difference for loneliness (Maes et al., 2019). The educational background did not affect loneliness when marital effects were controlled (Neto, 2014). Nevertheless, there was no difference in Line use in different gender, ages, and education of Taiwanese (Chou & Liu, 2016). Because of this, this study only added control for marital status that is influential.

The theoretical framework is summarized in Figure 1.

**Research Design**

**Participants**

This study was based on the 2018 TCS, conducted as a research project supported by the Ministry of Science and Technology of R.O.C. The TCS conduct surveys around 2,000 Taiwanese annually to understand how they consume media, and in 2018, data were collected from 2,138 individuals. The 2018 TCS was the second year and second phase, and focused on social media use and social interaction.

**Measures**

The TCS (2018) consists of basic demographic questions and six subtopics. This study used questions from the subtopics on media behavior (interpersonal and communication), social media, and personal values.

**Independent Variable.** Social capital in the survey consists of six social capital questions, adapted from D. Williams (2006), specifically tested for internet content. These measures from this survey was chosen and used in various studies in the past (Lin, 2019; TCS, 2018). The six questions had a Cronbach’s alpha of .749: “there are several people I trust to help solve my problems,” “there are some people that I feel comfortable talking to about intimate personal problems,” “when I feel lonely there are several people I can talk to,” “interacting with people makes me want to try new things,” “interacting with people makes me interested in what people unlike me are thinking,” and “talking with people makes me curious about other places in the world.” The answers were given on a 5-point Likert-type scale from strongly agree to strongly disagree, and the overall mean of the survey was calculated.

**Dependent Variables**

**Levels of Loneliness.** Participants were asked, “Overall, do you currently feel lonely?” and chose answers varying from 1 (not at all lonely) to 5 (very lonely) on a 5-point Likert-type scale. Among the participants 55 years or older, only four answered 5 (very lonely), so lonely and very lonely were combined such that the self-report loneliness level ranged from not at all lonely (88) to lonely (70).

**Moderator**

**Social Media Use of Line and Facebook.** The respondents were asked how many times a week they used Line/Facebook. Participants filled in the number of days. The participants who answered zero were classified as “Non-users,” and those who answered with values higher than zero were classified as “Users.”

**Control Variable.** Individuals with different marital statuses have different behavioral use of social media (Sum et al., 2008; Vergeer & Pelzer, 2009), leading to various degrees of outcomes of social capital and psychological well-being (Neves et al., 2018; Nieminen et al., 2013). In this study, participants were asked, “What is your current marital status?” and respondents chose one of the following answers: “single and never married,” “married,” “cohabitating,” “divorced or separated,” “widowed,” or “other.” The marital status was recoded to “married” and “other” dichotomously for the control because married individuals stand for more than half of the population for all the loneliness scale (see Tables 1 and 2), and was similar to the past study when calculating regression models (Park et al., 2020; Sum et al., 2008).
Procedure

The TCS 2018 survey was done through probability-proportional-to-size (PPS) sampling. Participants were first divided into six geographic regions, and 9 to 10 clusters in each region were selected. The next sampling unit was house numbers, and the surveyed individuals were randomly assigned based on their age. The survey was conducted face to face with a tablet to record the data, focusing on people aged 18 or more, from July to October 2018. More details can be found on the website (TCS, 2018). The current study was limited to participants aged 55 or older. This data set is available for the public, so this analysis did not involve human subjects and required no Institutional Review Board (IRB) approval.

The data were analyzed in SPSS 20.0. Binary logistic regression was employed to test the hypotheses to understand the statistical associations among the variables. The analysis began with the building of a logistic regression model to examine the relationships between the frequency of social media use and loneliness. The first equation with intercept ($\beta_0$), social capital ($\beta_1$) to loneliness, and control variable of being married could be expressed as

$$\ln \left( \frac{p_1}{p_0} \right) = \beta_0 + \beta_1 D_{1}X + \text{control}$$

The second model measured the moderating effect of social media use of Line ($\beta'_2$) and its interaction effect ($\beta'_3$), along with Facebook ($\beta'_4$) and its interaction effect ($\beta'_5$) on the relationship of social capital ($\beta'_1$) to loneliness, with the control variable of being married

$$\ln \left( \frac{p_1}{p_0} \right) = \beta'_0 + \beta'_1 D_{1}X + \left[ \beta'_2 D_{2}X + \beta'_3 (D_{1}X \times D_{2}X) \right] + \left[ \beta'_4 D_{4}X + \beta'_5 (D_{1}X \times D_{4}X) \right] + \text{control}$$

Results

Descriptive Analysis

Of the 2,000 samples of the TCS, 865 participants’ age ranged from 55 to 95 years. As shown in Table 1, most of the participants were at the age range of 55 to 64 (45.55%) and 65 to 74 (34.91%), about half of them are male (45.43%), and most of the participants were married (74.80%), had highest education at elementary school (29.02%) or senior high school (32.25%), and unemployed or other (64.05%). Furthermore, 70 (8.09%) participants self-reported that they

| Variable                  | Not at all lonely (n = 88) | Not very lonely (n = 570) | I have no feelings one way or the other (n = 137) | Lonely (n = 70) |
|---------------------------|---------------------------|---------------------------|-----------------------------------------------|----------------|
| Social media use          |                           |                           |                                               |                |
| Line                      | 42 (47.7%)                | 329 (57.7%)               | 60 (43.8%)                                    | 28 (40%)       |
| Facebook                  | 18 (20.5%)                | 198 (34.7%)               | 40 (29.2%)                                    | 12 (17.14%)    |
| Married                   | 72 (81.8%)                | 435 (76.3%)               | 101.2 (67.9%)                                 | 39 (55.71%)    |
| M (SD)                    | 3.56 (0.69)               | 3.45 (0.56)               | 3.10 (0.64)                                   | 3.20 (0.63)    |
| Social capital            | 66.95 (6.96)              | 66.59 (8.19)              | 67.25 (9.34)                                  | 67.49 (9.75)   |
| Age                       |                           |                           |                                               |                |
were lonely, 137 (15.84%) participants reported no feelings one way or the other, 570 (65.90%) reported that they were not very lonely, and 88 (10.17%) reported that they were not at all lonely. Among those who were lonely, 40% used Line and 17.14% used Facebook. Among those who had no feelings about loneliness, 43.8% used Line and 29.2% used Facebook. Of those who were not very lonely, 57.7% used Line and 34.7% used Facebook; of those who were not at all lonely, 47.7% used Line and 20.5% used Facebook. Next, the mean of the social capital for people who self-reported that they were lonely was 3.20 (SD = 0.63); for no feelings one way or the other, 3.10 (SD = 0.64); for not very lonely, 3.45 (SD = 0.56); and for not at all lonely, 3.56 (SD = 0.69). Next, it was found that 55.71% of the people who said they were lonely were married, 67.9% of the people who had no feelings one way or the other were married, 76.3% of people who were not very lonely were married, and 81.8% of the people who were not at all lonely were married (Table 2).

Logistic Regression Results

Next, the binary logistic regression odds of lonely participants, those who had no feelings one way or the other, and those who were not very lonely were compared with those of the participants who reported that they were not lonely. Table 2 presents the estimates of the association between social capital to loneliness and the moderating effect of social media use. The variable columns in the table are B coefficients and standard error. The B coefficients associated with explanatory variables are estimators of the change in the logit caused by a unit change in the independent variable. A B coefficient of 0 indicates that the exploratory variable does not affect the logit (probability of loneliness = not lonely). Positive or negative B coefficients represent that the explanatory variable increases or decreases the logit of the dependent variable. Exp(B) is the odds ratio (OR) for the explanatory variable. The reference category for social media use was those who did not use Line or Facebook, and those who were not married. Figure 2 shows the means of social capital for different levels of loneliness, and Figure 3 shows the probabilities of different levels of loneliness for Line and Facebook use.

Model 1 shows the direct effect of social capital on loneliness, with controls only for the married status. The chi-square of the omnibus test was significant (χ² = 64.117, df = 6, p = .000), showing that the final model predicted significantly better the odds of lonely people compared with the model with only the intercept. Results showed that increasing social capital decreases the odds of being lonely when compared with those who are not at all lonely, with the exception of those who are not very lonely. For one unit of increase in social capital, the probability of being lonely compared with not at all lonely was −7% (OR = 0.404). For one unit of increase in social capital, the probability of having no feelings one way or the other compared with not being at all lonely was −23.49% (OR = 0.287). In other words, increasing one’s social capital decreases the probability of being lonely. This finding supports H1. As for the control variable, those who were married differed significantly from those who were not (p = .002). The odds of being lonely for married individuals were 0.683 (1 − 0.317) lower than those who were not married. The resulting equation for those who were lonely compared with those who were not at all lonely was as follows

$$\ln \left( \frac{p_l}{p_n} \right) = 3.643 \pm 0.906 (D_l X) - 1.150$$

Model 2 explained the relationship between social capital and loneliness, with moderations of Line and Facebook use (Table 3). The chi-square of the omnibus test was significant (χ² = 94.294, df = 18, p = .000), showing that the final model predicted significantly better the odds of lonely people. Comparing the different degrees of loneliness with those of people who were not at all lonely, only those who were lonely showed a significant effect in the moderation effect of Line. After Line usage and the interaction effect were controlled for, it was found that, with one unit of increase in social capital, the probability of being lonely compared with being not at all lonely decreased from −7% to −12.15% (OR = 0.195). Specifically, the probability of being lonely compared with being not at all lonely for those who used Line was 44.42% (OR = 0.003). Also, for one unit of increase in the interaction effect on social capital and Line use, the probability of being lonely compared with being not at all lonely was 12.99% (OR = 5.739). This means that Line use has a buffering role; using Line decreases the linkage of social capital to loneliness. Finally, for the control variable, the odds of being lonely for a married individual were 0.702 (1 − 0.298) lower than for those who were not married

$$\ln \left( \frac{p_l}{p_n} \right) = 6.011 + -1.633(D_l X) + [-5.973(D_l X)$$
$$+ 1.747 (D_l X^* D_l X)] + [-.462(D_l X)$$
$$+.175 (D_l X^* D_l X)] -1.210$$

A summary of the hypotheses testing results is provided in Table 4.

Discussion

This study aimed to find the relationship between social capital and loneliness, through the moderation of social media. The logistic regression on Taiwanese adults, aged 55 or more, showed that social capital affected loneliness (supported H1), was moderated by Line, and was not moderated by Facebook (supported H2 and H3). As part of the control, marital status had a significant effect on loneliness.
Direct Effects of Social Capital to Levels of Loneliness

The direct effect of social capital on loneliness was examined, and the results supported H1, suggesting that social capital is negatively correlated with loneliness. The odds of being lonely compared with those of being not at all lonely decreased when social capital increased.

The findings were congruent with previous studies of the relationship between social capital and loneliness. Past studies stated that people felt more emotional support (Ferlander, 2007), had higher social connectedness (Nieminen et al., 2013; Putnam, 2000), were less lonely, and had better psychological health (Xu & Norstrand, 2012) when they had a higher perceived feeling of social capital. On the contrary, those who were not socially engaged and had fewer connections were more likely to feel socially isolated and lonely (Putnam, 2000). This study thus highlighted the importance of social capital.

Social capital is important for people of all ages in every society, including the elderly in Taiwan. In Taiwanese society, which shares roots with general Chinese society, social relationships (known as guanxi) are embedded in people’s lives even when people do not have face-to-face contact (Gabrenya & Hwang, 1996). Because of this importance, it is a problem for the elderly when their children leave their homes and move to cities (Zhong et al., 2017). To solve this, past studies recommended that governments and organizations look after
the elderly who do not have many connections in life by increasing social capital from the community (N. Lu et al., 2016). Other literature also suggested that the government could promote volunteering, formal and informal, to enhance social capital after retirement (Gonzales & Nowell, 2016). Moreover, younger people could spend more valuable time with the older adults in the family to let their elders know that these connections are still possible and make them not feel lonely. This connection is possible with the enhancement of social media, such as Line.

**Line, but Not Facebook, as a Moderator of Social Capital on Loneliness**

The results of this study showed that the use of social media Line is a moderator of older adults’ social capital on loneliness, which supported the third hypothesis. The odds of being lonely compared with those of being not at all lonely increased when Line and the interaction effect with social capital were controlled for. This could be because Line, like other apps that focus on IM, provides an environment that is more intimate and private within the encrypted space (Gil de Zúñiga et al., 2021; Malhotra, 2020). When people chat within this platform, they were able to be more open to share their thoughts with their existing relationships, reinforce their social capital, and thus feel that they were not alone. This application could be useful for older adults who rely closely on intimate and private relationships (Chang et al., 2015; Yu et al., 2016) and intergeneration relationships (Ohashi et al., 2017). Thus, it was similar to the results on the positive correlation of cell phone use and online social activity to happiness in Chinese older adults (Chai & Kalyal, 2018; M. H. Nguyen, Hunsaker, & Hargittai, 2020), and social media use to social capital (Domahidi, 2018; Neves et al., 2018; J. R. Williams, 2019).

Not only combating alleviating loneliness through one-on-one deep conversation, Line could also moderate social capital to loneliness from the conversations of groups with more people. In these big groups, people can chat, send greetings or photographs, and learn about meeting information. Nevertheless, Line shares the benefits of internet use on social capital to loneliness through the increasing frequency of contact with friends and family, attendance at more organizational meetings, and stronger social networks (Hogeboom et al., 2010).

Not all social media acts as a moderator of social capital to loneliness, one example being Facebook, as found in the current study. This result might be due to the difference in the highlighted functions on the platform. Different highlights would eventually lead to users selecting specific platforms for particular purposes (M.-H. Lu et al., 2018). When users first open Line, it automatically shows the users the most recent contacts or groups with whom they interacted. It reminds the user to give feedback in the window specifically for this particular “chat.” In this one-on-one contact, users...
felt safe in an encrypted space where they can chat, talk, and coordinate activities (W. Lu & Hampton, 2016) as they will in an offline relationship. At the same time, users receive new information, increase their frequency of contact with friends and family, gain more chances to join meetings, and strengthen their social networks (Hogeboom et al., 2010). Because of this, users increase their closeness and well-being (Lima et al., 2017) as they decrease their loneliness. Although Facebook also has a one-on-one chat function, the platform emphasizes the newsfeed that the effect of well-being is highly dependent on the autonomy of its users (Docherty, 2020). The content on the Facebook newsfeeds is more public and does not aim at any specific user (Gil de Zúñiga et al., 2021), so it is unlike the one-on-one interaction in Line, and users can choose not to interact. Due to the wide audience on Facebook, the platform might be like an exhibition to post images and videos, as it became a burden for the older adults (Hogan, 2010; Schrock, 2016). As a result, Facebook provides little benefits in leveraging the relationship between social capital and loneliness for older adults in Taiwan.

Another possible reason for the lack of significance in the relationship was the limitations and other influencing factors. First, the secondary analysis of this study could lead to limits of the measures of loneliness and social capital not administered directly to examine the effects of social media, and that the uses of Line and Facebook measured by the times a week insufficient to explore the uses in depth. Next, other factors that were not the main focus of this study, such as the frequency of social media, types of social capital (bonding or bridging), and personal variables such as self-esteem (Ellison et al., 2007), education level, employment, and how they use each particular platform or their communication practices (Ellison et al., 2011) could also affect the relationship. For example, there was not much of social capital effect of social media for people with high self-esteem (Ellison et al., 2007) and/or using social media to meet new people (Ellison et al., 2011). At the same time, some people may spend their time lurking (Sum et al., 2008); comparing themselves with others; looking at misleading, overstated, and negative news that appears threatening to them (Lee, 2020); choosing not to interact because of concerns about the algorithm (Ellison et al., 2020); or pursuing other behaviors that affect the relationship of social media use to loneliness. Nevertheless, the location, family structure, could affect the perceived social capital, and its effect on well-being. In general, those who live in rural areas might be less educated, have limited access to the internet, and use fewer SNSs (Zhong et al., 2017). There were also findings on the positive effect of cognitive decline that was correlated to loneliness. Thus, future researchers could conduct longitudinal studies to further examine the relationships from the perspectives of the ways they use different platforms, as well as their location, experience, types of social capital, and knowledge of the internet and technology.

**Table 4. Summary of Hypotheses Testing Results (N = 865).**

| Hypotheses                                      | Result       |
|------------------------------------------------|--------------|
| H1 Social Capital → Loneliness                  | Supported    |
| H2 Facebook × Social Capital → Loneliness       | Supported    |
| H3 Line × Social Capital → Loneliness           | Supported    |

**Marital Effect of Social Media Use on Social Capital and Loneliness**

The results showed that controlling marital status was relevant in the sample: the married individuals had lower odds of being lonely than did unmarried individuals. The findings of those who were not married were single or widowed implied that they either lacked a partner or had experienced loss in their close ties (Neves et al., 2018), and thus they had lower social capital. This problem was worse for older people because they tend to have greater selection in relationships, and it becomes harder for people who are not married to find close friends (Chang et al., 2015). Furthermore, compared with married households, which have a high diversity of ties, single and widowed individuals have a higher likelihood of living alone, and this living arrangement may lead to lower social capital (Neves et al., 2018).

Nevertheless, this research has provided insights into the psychological results of older Taiwanese people’s social capital with the influence of specific types of social media, and some noteworthy conclusions can be drawn and summarized as follows. First, social capital is correlated to loneliness. Those who have low social capital have a higher possibility of being lonely than those who have high social capital. However, the types of platforms contribute differently to the increase in one’s well-being when marital status is controlled for. Older adults who use Line gain a positive impact of social capital on loneliness, but there is no significant moderation by Facebook use on social capital and loneliness. These findings help increase the knowledge of the research literature on the relationship between social media and social capital (Ellison et al., 2007; Neves et al., 2018).

Adults in the aging population today are more and more likely to embrace technology, but the effects of social media on their psychological well-being remain questionable. Older adults may use social media to create more or strengthen existing bonds via digital spaces, yet not all platforms can moderate the loneliness effect. For example, Line provided encrypted space for all kinds of ties that allow older adults in Taiwan to garner their social capital and minimize feelings of loneliness. Unlike Line, due to its affordances or highlighted functions, Facebook’s moderation effect was insubstantial. Other reasons may be limitations of this secondary research or other behaviors or factors that may affect the relationship, such as their friendship strategies, personalities, ways they use the platforms, experience, and places they live. Future studies should resolve this intriguing
question by tackling these specific factors to find out what leads the relationship between social capital and loneliness for the different social media platforms.

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ORCID iDs

Long-Jing Hsu https://orcid.org/0000-0001-9975-9436
Hsiu-Ping Yueh https://orcid.org/0000-0002-8216-3836

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Author Biographies

Long-Jing Hsu received her Master of Science degree from Department of Bio-Industry Communication and Development, National Taiwan University. She was a Research Assistant at Center for Artificial Intelligence and Advanced Robotics, National Taiwan University, and currently is a PhD student of Indiana University Bloomington, USA. She specializes in human–computer interaction, social media, and social robots.

Hsiu-Ping Yueh (Ph.D. Pennsylvania State University) is a Distinguished Professor of Department of Psychology and Department of Bio-Industry Communication and Development, and a research fellow of Center for Artificial Intelligence and Advanced Robotics at National Taiwan University. Her research interests include educational psychology, learning science and technology, social interaction, human-robot interaction, and Gerontechnology.

Shih-Hsien Hsu (Ph.D. University of Texas at Austin) is an Assistant Professor of the Department of Bio-Industry Communication and Development, National Taiwan University. Her research interests include social media communication and use behavior, social network and social capital, discourse framework, and comparative media research.