Technology addiction's contribution to mental wellbeing: The positive effect of online social capital

Kate Magsamen-Conrad [a,*], China Billotte-Verhoff [b], Kathryn Greene [c]

[a] Department of Communication, Bowling Green State University, United States
[b] Department of Communication, University of New Mexico, United States
[c] Department of Communication, Rutgers University, United States

ABSTRACT

This research examines the effect of online social capital and Internet use on the normally negative effects of technology addiction, especially for individuals prone to self-concealment. Self-concealment is a personality trait that describes individuals who are more likely to withhold personal and private information, inhibiting catharsis and wellbeing. Addiction, in any context, is also typically associated with negative outcomes. However, we investigate the hypothesis that communication technology addiction may positively affect wellbeing for self-concealing individuals when online interaction is positive, builds relationships, or fosters a sense of community. Within these parameters, increased communication through mediated channels (and even addiction) may reverse the otherwise negative effects of self-concealment on wellbeing. Overall, the proposed model offers qualified support for the continued analysis of mediated communication as a potential source for improving the wellbeing for particular individuals. This study is important because we know that healthy communication in relationships, including disclosure, is important to wellbeing. This study recognizes that not all people are comfortable communicating in face-to-face settings. Our findings offer evidence that the presence of computers in human behaviors (e.g., mediated channels of communication and NCTs) enables some individuals to communicate and foster beneficial interpersonal relationships, and improve their wellbeing.

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1. Introduction

For many Americans communication technologies have become an unquestionable aspect of daily life. According to the Pew Research Internet Project over 87% of Americans use the Internet, with an additional 90% owning cellphones and 58% owning smartphones (Fox & Raine, 2014). Not only has technology changed how individuals interact on a daily basis but it has also become a necessary component to successfully managing daily activities for many Americans (e.g., communicating with friends, family members, and colleagues, information seeking online, paying bills, or even contacting health-care providers). In fact, four in ten adults within the U.S. feel that they absolutely need access to the Internet (Fox & Raine, 2014).

For some individuals this need for technological connection has become an addiction. *Internet Addiction* is an increased amount of

time spent online in order to induce feelings of pleasure (Goldberg, 1995; Hinic, Mihajlovic, Spiric, Dukic-Dejanvoic, & Jovanovic, 2008). Symptoms of Internet "addiction" range from decreased impulse control to an individual's inability to stop Internet usage (Davis, 2001). Addiction, in any context, is typically associated with negative outcomes. However, we investigate the hypothesis that increased mediated communication (even addiction) may positively affect wellbeing for those prone to self-concealment provided the content of the online communication is positive and develops social interaction, builds relationships, or fosters a sense of community. To better understand how Internet addiction and online social capital can improve wellbeing for some individuals, we begin by establishing a foundational knowledge of self-concealment, wellbeing, technology addiction, and online social capital. We then propose a model that describes the expected interactions of these concepts.

1.1. Self concealment, wellbeing, and technology addiction

Self-concealment, or the tendency to intentionally withhold personal information from others that could be considered

* Corresponding author. Address: Department of Communication, Bowling Green State University, 316B West Hall, Bowling Green, OH 43403, United States. Tel.: +1 (419) 372 9544; fax: +1 (419) 372 0202.
E-mail address: kmagsam@bgsu.edu (K. Magsamen-Conrad).

distressing, personally embarrassing or negative, has negative implications for wellbeing (Larson & Chastain, 1990; Vogel & Armstrong, 2010). It is important to note that self-concealment does not refer to general temperament but describes the active nondisclosure of intimate or distressing information, such as the concealment of a chronic illness (Cepeda-Benito & Short, 1998). Self-concealment negatively affects wellbeing, for example, current research indicates that anxiety, depression, and overall psychological distress are just some of the negative impacts caused by self-concealment (Kawamura & Frost, 2004; Wismeijer & van Assen, 2008). Additionally, research indicates that self-concealment results in lower relationship satisfaction, thereby undermining a crucial source of social capital and support (Impett et al., 2010; Uysal, Lin, Knee, & Bush, 2012). Thus, there is a direct negative association between self-concealment and wellbeing.

The negative ramifications of intentionally withholding personal information inspires an investigation into alternative contexts that can provide individuals opportunities to build social capital, foster interpersonal relationships and self-disclose in what may be perceived "safe" contexts. Individuals who are prone to conceal their personal information from others in face-to-face scenarios may consider mediated communication an attractive alternative (Magsamen-Conrad, Checton, & Venetis, 2013). For example, research indicates that individuals who have more anxiety over self-presentation have a higher preference for interacting online because they feel safer (Burke, Kraut, & Marlow, 2011). The channel of communication is particularly important for self-concealing individuals because communication channels differ in the extent to which they enable control over self-presentation, information sharing, and monitoring (Greene & Magsamen-Conrad, 2010). Additionally, Internet channels that are less media rich (e.g., those without face-to-face chat capabilities, see Media Richness Theory, Suh, 1999) provide users with a sense of anonymity that allows individuals to feel more comfortable disclosing private information (Joinson, 2001). The ability to provide anonymity may be a contributing factor to why individuals who are prone to self-concealment would turn to non face-to-face channels of communication, especially the Internet, to share information. This may be especially true for individuals who view the Internet as a gateway to escape anxiety, depression, or helplessness (Hinic et al., 2008), however, these same factors may escalate the need for technological connection into an addiction.

An investigation into the disparate channel-related information management practices of individuals, especially as they pertain to self-concealment, wellbeing, and Internet addiction, is especially important among the college-aged population. Despite debate over the appropriate terminology to reference Internet "addiction" (as it is not a physiological dependence), excessive or pathological Internet use has widespread implications as access (and channels of access) to the Internet increases providing further gateways to escalating to addiction (Davis, 2001). Currently, 92% of 18–24 year old non-college students and nearly 100% of undergraduate and graduate college students are Internet users (Fox & Raine, 2014). Thus, not only do a majority of college-aged adults use the Internet but additionally, a majority of college-aged adults also have easy home-based access. Users had limited platforms for connection when the concept of Internet addiction was introduced. However, individuals currently have a variety of different mechanisms through which to access the Internet, such as through cell phones. Eighty-nine percent of 18–24 year old non-students, 96% of undergraduate students, and 99% of graduate students own cell phones and of these individuals 61%, 63%, and 52%, respectively, own smartphones that they use for internet or email (Smith, Rainie, & Zickuhr, 2011). At this point, we transition from a narrow focus on Internet addiction to a more inclusive focus on the consumption of and addiction to communication technologies, of which college students are heavy consumers. For example, college-aged students also use their cellphones to communicate through text message, sending and receiving an average of 109.5 text messages per day (Smith, 2011). Additionally, many of these "active texters" indicate text-messaging as their preferred method of contact (Smith, 2011). As new communication technologies (NCTs) continue to advance, they change how individuals interact and manage their interpersonal relationships. We seek to determine the potential outcomes of increased communication through mediated channels, especially on wellbeing for college students prone to self-concealment. We discuss two potential intervening variables between self-concealment and wellbeing, communication technology addiction and online social capital.

1.2. Communication technology addiction

The negative outcomes of self-concealment (e.g., depression, general psychological poor health, emotional distress, etc.) and the potential to more easily monitor and manage self-presentation through mediated contexts may increase these individuals' likelihood to develop addictive behaviors related to communication technologies and communicating via mediated contexts (Bond & Bunce, 2000; Masuda et al., 2011; Masuda, Anderson, & Sheehan, 2009). If those prone to conceal are driven to communication and interactions through medicated channels this may increase the potential of developing an addiction to communication technologies. Mediated communication can be accomplished through a number of different channels (e.g., email, internet, apps) and technologies (e.g., smartphone, computer, tablet).

Internet Addiction (Goldberg, 1995; Hinic et al., 2008), broadened to communication technology addiction, is a rising potential problem, particularly for younger individuals who are the most at risk to develop the behavioral addiction (Hall & Parsons, 2001). The concept of Internet addiction can become arbitrary if applied to the overall usage of the Internet without analysis of specific components (e.g., motivations and internet behaviors, including communication/relationship building related motivations and behaviors), however, the development of the cognitive model of pathological Internet use by Davis (2001) has helped to explain the potential motivators for this type of addiction. We utilized Davis' (2001) model of pathological Internet use as a frame to expand the analysis to encompass communication technologies more broadly and examine outcomes within the context of information-management related personality traits.

Davis' (2001) cognitive-behavioral model of pathological Internet use suggests that specific maladaptive cognitions, such as low-self efficacy, depression, and negative self-appraisals can lead to Internet addiction. The model of Pathological Internet Use (PIU, Davis, 2001) may inform the explanation of the associations between self-concealment and the broader concept of addiction to communication within mediated environments. The negative cognitions described in the PIU (e.g., depressogenic or ruminative cognitive style, low-self esteem, etc.) are closely linked to negative outcomes of self-concealment, thus bolstering the explanation of how individuals with self-concealing tendencies may become addicted to communicating in mediated contexts. This concept is further validated considering that the Internet often serves as a de-stressor and escape from stress and feelings of stress and depression (Hinic et al., 2008) and impression management (e.g., avoidance of "leakage" of any unintended nonverbal cues and affect due to physical isolation) to increase favorable images in "safe" contexts is enabled by the non face-to-face nature of these communication technologies (Walther, 2007). Thus, we suggest that there is a direct, positive, association between self-concealment and communication technology addiction.

Previous research discusses Internet use and connection to addiction (Goldberg, 1995; Hinic et al., 2008); however, the implications of that addiction have yet to be examined in contexts of these NCTs. Addiction, broadly, has traditionally been connected to negative outcomes, for example disruption of academic performance and daily routines among college students (Chou, Condron, & Belland, 2005). Although mediated communication environments incorporate a multitude of different non face-to-face communicative channels, one channel has received considerable attention as it relates to communication strategies (see Greene & Magsamen-Conrad, 2010) and mental health (Neuhauser & Kreps, 2003), and it is the Internet. Understanding the relationship between addiction to mediated communication environments (e.g., the Internet) and wellbeing is of crucial importance because the mediated communication environments are utilized by a substantial subset of the population (see Young, 2004), especially among heavy consumers such as the college student population (Jones, 2002).

Greater frequency of communication and interaction online, and even communication technology addiction, may actually foster positive outcomes for some types of individuals. Some mediated communication environments afford individuals the potential for addictive behaviors to actually increase social interaction and thus experience the benefits that result from social interaction. The use of spaces on the Internet that are conducive to social and interpersonal interaction (such as social networking sites, SNS) through NCTs allows individuals to build or strengthen social relationships (and thus develop social capital), which was described by one study participant as filling "a void that we did not know we had" (McMillan & Morrison, 2006). Having access to social capital in mediated contexts is especially important for individuals who are more reticent to share personal information and communicate face-to-face. The features of mediated communication (e.g., deindividuation, time to plan messages) may make mediated communication more enticing for self-concealing individuals. Although self-concealing individuals may be driven to mediated communication environments, and potentially become "addicted", if the content of the communication is positive, fosters a sense of social interaction, builds relationships, and/or fosters a sense of community, then increased communication through mediated channels (and even addiction) may ultimately have positive outcomes. Thus, we explore the possibility that a sense of online community changes the nature of the association between self-concealment, addiction, and wellbeing.

1.3. Online social capital

Perceptions of online community may be accomplished through increasing perceptions of possessing online social capital. The potential social capital gained through online communication falls into one of two dimensions; "bonding" social capital, which centers around intra-community connections and "bridging" social capital that relies on networks outside of the community (Woolcock & Narayan, 2000). Access to a variety of SNS, blogs, support groups, and community webpages provides Internet users with a potential source of both bonding and bridging social capital. Social networking sites are a large part of Internet usage with 68.8 million users in 2006 alone (Pempek, Yermolayeva, & Calvert, 2009). Eighty-eight percent of 18–24 year old non-students, 86% of undergraduate students, and 82% of graduate students use SNS (Smith et al., 2011). Some cross-sectional research demonstrates evidence that heavy Internet usage, specifically regarding the usage of SNS, results in individuals with more social integration (Burke et al., 2011), which contributes to the development of online community and social capital. In essence, heavy usage of SNS has the potential to result in increased social capital.

Social networking sites (SNS) provide a great forum for extending the participation of social groups that already exist outside of a mediated context (e.g. friends, family, community organizations, etc.) with whom individuals know and interact (referred to as "bridging", Burke et al., 2011). This type of social capital serves as a "bridge" between non-mediated reality and the virtual world whereas individuals are able to use these sites to bolster or maintain existing relationships with their social networks. Additionally, community organizations (e.g., neighborhood associations, local clubs, national organizations such as the Red Cross, etc.) are also able to use these mediated contexts to stay connected, share information, and strengthen their relationships (through virtual means) with individual members of their organizations. In fact, SNS are designed to foster the development of online social capital by enabling various forms of interaction and reciprocity with an increasingly larger network of connections (Steinfield, DiMicco, Ellison, & C., 2009).

SNS usage can contribute to online social capital development. For example, Pempek et al. (2009) used a daily diary-like measure to assess Facebook usage among undergraduate students (e.g., how many minutes daily spent on Facebook for one week, and specific daily activities) and discovered that one primary use of SNS (such as Facebook) was to facilitate existing social relationships, particularly with college students' peer groups. Pempek et al. (2009) discovered a significant association between heavy Facebook usage and increased social capital and resources gained, especially in comparison with light users. The participants in this study also demonstrated aspects of addiction to communicating through mediated contexts, indicating that they signed into their accounts several times through the day, no matter how busy the were throughout the day (Pempek et al., 2009). Additionally, communication technology addiction involves increased time spent online that can serve to assist in the development in online and communication technology skills (Hargittai, 2002). These skills have the potential to provide their users with improved access to social support (Shah, Kwak, & Holbert, 2001). This provides further evidence that communication technology addiction positively predicts online social capital.

1.4. Self-concealment and wellbeing: The role of mediated communication

Now that we have established a basic overview of communication technology addiction, self-concealment, online social capital and wellbeing it is important to begin underlying how these concepts can relate to and impact one another. We present a structural equation model to estimate the direct and intervening causal associations between self-concealment and wellbeing. As previously stated, the mediated context of communication through new technologies allows for increased management of self-presentation. This may serve as a lure for individuals who have higher tendencies of self-concealment because it allows them to control and construct "safe" communicative environments (see Kawamura & Frost, 2004). This management of self-presentation and self-disclosure may provide a means for individuals who are prone to self-concealment to communicate with others in ways that are perceived as less threatening. Additionally, NCTs such as tablets, PDA's, and smartphones and watches allow individuals to extend their mediated communication, and even addiction, in social contexts (e.g., through forums that encourage social interaction such as SNS) that builds a sense of online community in ways that have previously been unexamined. Thus, self-concealment will positively predict technology addiction (H1) and social capital (H2).

The ability to use the Internet (and communication technologies that have access to the Internet) as a resource for the development of social capital can be seen through the use of Internet

forums, which can supplement interpersonal communication with family, friends, community organizations, and political affiliations off-line. In fact, individuals who are internet users have also been found to be more involved in community ties in real life, these ties are a component of social capital indicators (e.g. community and organizational memberships, social trust, etc.) that have been associated with better mental health (Dutta-Bergman, 2006; Yip et al., 2007). This demonstrates the connection between "offline" and "online" social capital, reinforcing the positive influences of social capital on wellbeing (Larson & Chastain, 1990; Vogel & Armstrong, 2010). Additionally, online interactions have the potential to positively affect those who have difficulty with disclosure and face-to-face communication such as individuals who are shy (Orr et al., 2009) or prone to self-concealment. Although Orr et al. (2009) found that these individuals are less likely to have a large number of social network friends, they did report increased time online and positive attitudes toward the social network. Further, despite having fewer online "friends" than non-shy individuals, the positive attitude toward the social network indicates the appeal of this non-face-to-face communication channel. Thus, individuals who are characterized as "self-concealers" may also feel motivated to interact in mediated environments because of the ability to monitor shared information and the developing sense of community (Abfalter, Zaglia, & Mueller, 2012). This provides them with an important alternative means of developing social capital outside of face-to-face communication.

Increased social interaction and online social capital development can positively influence psychological wellbeing because positive interactions have the potential to provide access to "safe" positive interpersonal interactions, particularly for individuals suffering from low self-esteem and life satisfaction (Ellison, Steinfield, & Lampe, 2007). For example, the expression of secrets through both written and verbal means is beneficial to individuals and leads to health benefits (Kelly, 2002). One explanation for the ability of online social capital to affect wellbeing could be partially owed to the perception of the Internet as an escape from stressors and depression (Hinic et al., 2008). Additionally, the design of social networking components on the Internet encourages interpersonal connections and thus has a strong potential to positively influence users' development social capital and the psychological wellbeing that derives from Internet use (Burke et al., 2011).

Self-concealers may be especially likely to develop "bridging" social capital. When virtual community members develop feelings of belonging and attachment to groups despite their primarily electronic communication methods this results in a type of social capital development that is referred to as bridging capital (Lee & Lee, 2010). Bridging social capital is capital that brings together people of different backgrounds, an important detail when understanding how bridging social interactions are primarily responsible for producing positive outcomes (Norris, 2003). Thus, self-concealment positively predicts the *bridging* type of online social capital and online social capital positively predicts wellbeing. Thus, technology addiction will positively predict online social capital (H3) and online social capital will positively predict wellbeing (H4). The path from self-concealment to wellbeing that is partially mediated by technology addiction and online social capital (positively predicting wellbeing), is the reverse of the negative causal path from self-concealment to wellbeing established in previous research (Finkenauer & Rimé, 1998; Larson & Chastain, 1990), thus, self-concealment directly negatively predicts wellbeing (H5).

1.5. Hypothesized model

Based on the proceeding rationale the following model is proposed (see Fig. 1).
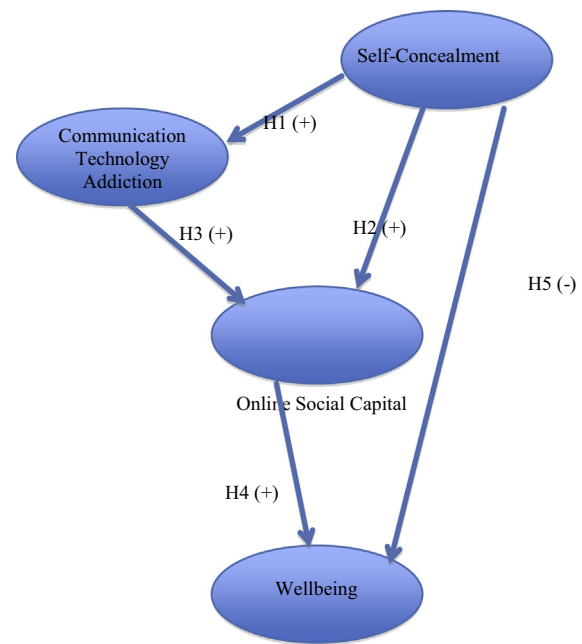

Fig. 1. Proposed model for intervening effect of technology addiction and online social capital on self-concealment and wellbeing.

Fig. 1 is the hypothesized model to examine how increased communication through non face-to-face channels of communication (and even addiction) may ultimately have positive wellbeing outcomes. Within the model several arrows are used to explain the relationships between the concepts examined through the literature and analyzed within the study. First, the arrow H1+ represents the hypothesis that more self-concealment will predict more self-reported technology addiction, and more online social capital (H2+). Second, the H3+ arrow represents the hypothesis that more technology addiction will predict more online social capital. Third, the H4+ arrows represents the hypothesis that more online social capital predicts better wellbeing. Finally, the H5- arrow represents the hypothesis that great degrees of self-concealment predict reduced wellbeing. That is, H5 represents the direct relationship between self-concealment and wellbeing, such that those who are more prone to self-concealment suffer from reduced experience of wellbeing. H1-H4 represent the partially mediated relationship between self-concealment and wellbeing, such that individuals who are prone to self-concealment can still experience positive wellbeing, if driven to online mechanisms for communication and relationships building (e.g., social capital), even in the context of "addiction."

2. Empirical work

2.1. Sample and procedure

We recruited 240 college students from undergraduate communication courses at a large northeastern university in the United States. Students received extra credit for participation, and the study was conducted outside of class time. After providing written consent, participants were placed in a room with up to 10 other people and individually completed a survey as part of a larger project on use of non- face-to-face channels in self-disclosure (~ twenty-five minutes). Upon completion, all participants were thanked and debriefed. After removing participants due to missing data, the final sample consisted of 238 undergraduate students. Of these participants, 93 (39%) were male and 145 (61%) were female.

First year students comprised 16% of the study participants, sophomores 21%, juniors 32% and seniors 29%. The sample was 55.5% White, 18.5% Asian, 6.7% Black, 6.7% Hispanic, and 4.2% Indian.

2.2. Measures

2.2.1. Measures

Variables measured include *self concealment, communication technology addiction, online social capital,* and, *wellbeing.* We chose scales that were a good fit for study goals and had been psychometrically validated in previous research.

Confirmatory factor analyses were conducted on multi-item scales to ensure that they met the criteria of face validity, internal consistency, and parallelism (Hunter & Gerbing, 1982). Three goodness-of-fit indices estimated the fit of the CFA models. The *relative* χ^2 (χ^2/df) adjusts the χ^2 statistic for sample size (Kline, 1998). The CFI calculates the ratio of the noncentrality parameter estimate of the hypothesized model to the noncentrality parameter estimate of a baseline model (Bentler, 1990). The RMSEA accounts for errors of approximation in the population (Browne & Cudeck, 1989). I determined that the model fit the data if the *relative* χ^2 was less than 3, CFI was greater than .90, and RMSEA was less than .10 (Browne & Cudeck, 1989; Kline, 1998). Reliability was calculated for composite measures. Finally, measurement statistics were calculated within both sets of data (friend, F; romantic partner, RP).

2.2.2. Self-concealment

Larson and Chastain's (1990) Self-concealment Scale (SCS) contains ten Likert-type items with five point responses ranging from "*Strongly Disagree*" to "*Strongly Agree.*" Sample items include "I have an important secret that I haven't shared with anyone" and "I'm often afraid I'll reveal something I don't want to." The initial CFA did not fit, $\chi^2(35) = 191.27$, *relative* $\chi^2 = 5.45$, $p = .001$, *CFI* = .82, *RMSEA* = .14. After removing three items, a CFA revealed that seven items loaded onto one latent construct, $\chi^2(14) = 33.64$, *relative* $\chi^2 = 2.4$, $p = .002$, *CFI* = .96, *RMSEA* = .08. The items had good reliability ($M = 3.04$, $SD = .89$, $\alpha = .83$). The items were summed and averaged with a higher score indicating more self-concealment.

2.2.3. Communication technology addiction

Technology addiction was measured using an adapted version of the Computer Apathy and Anxiety Scale (Charlton & Birkett, 1995; Charlton, 2002), a three-factor scale to measure computer 'addiction' and engagement. Eight five point Likert-type items were adapted from the 'computer addiction' subscale, and altered to reflect communication technology addiction ("My social life had sometimes suffered because of communication technologies, such as mobile phones, internet, email.") with responses ranging from *strongly disagree* (1) to *strongly agree* (5). A CFA revealed that eight items loaded onto one latent construct, $\chi^2(20) = 53.70$, *relative* $\chi^2 = 2.69$, $p = .001$, *CFI* = .94, *RMSEA* = .08. The items had good reliability ($M = 2.64$, $SD = .83$, $\alpha = .84$). The items were summed and averaged with a higher score indicating more reported addiction to technology.

2.2.4. Online social capital

Online social capital was measured using an adapted version of Cohen and Hoberman's ISEL measure (1983). Williams (2006) adapted Cohen and Hoberman's model into a twenty-item scale to measure bridging and bonding social capital. Sample items include "There are several people online I trust to help solve my problems" and "Interacting with people online makes me interested in things that happen outside of my town," with responses ranging from *strongly disagree* (1) to *strongly agree* (5). A CFA revealed that six items loaded onto one latent construct,

$\chi^2(8) = 19.89$, *relative* $\chi^2 = 2.49$, $p = .01$, *CFI* = .98, *RMSEA* = .08. The items had good reliability ($M = 2.83$, $SD = .91$, $\alpha = .86$). The items were summed and averaged with a higher score indicating more online social capital.

2.2.5. Wellbeing

Wellbeing was measured using Tennant, et. al's Warwick-Edinburgh Mental Well-Being Scale (WEMWBS) (2007). The scale contains fourteen Likert-type items with five point responses ranging from "*None of the time*" to "*All of the time.*" Sample items include "I've been dealing with problems well" and "I've been feeling optimistic about the future." A CFA revealed that eleven items loaded onto one latent construct, $\chi^2(42) = 99.96$, *relative* $\chi^2 = 2.38$, $p = .001$, *CFI* = .95, *RMSEA* = .08. The items had good reliability ($M = 3.45$, $SD = .72$, $\alpha = .90$). The items were summed and averaged with a higher score indicating more wellbeing.

3. Results

Table 1 presents the zero-order correlation matrix for all study variables. We tested hypotheses using maximum likelihood structural equation modeling (SEM) (AMOS 21.0). The strategy accounts for measurement error in the data and makes it possible to assess hypothesized associations. Confirmatory factor analyses were conducted on multi-item scales to ensure that they met the criteria of face validity, internal consistency, and parallelism (Hunter & Gerbing, 1982). Reliability was estimated by Cronbach's alphas. Three goodness-of-fit indices estimated the fit of the CFA models. The χ^2/df adjusts the χ^2 statistic for sample size (Kline, 1998). The CFI calculates the ratio of the noncentrality parameter estimate of the hypothesized model to the noncentrality parameter estimate of a baseline model (Bentler, 1990). The RMSEA accounts for errors of approximation in the population (Browne & Cudeck, 1989). We determined that the model fit the data if the relative χ^2 was less than 3, CFI was greater than .90, and RMSEA was less than .10 (Browne & Cudeck, 1989; Kline, 1998). Results are presented next.

3.1. Structural equation model results

The first step required calculation of the error variance of each variable to account for measurement error (Bollen, 1989). Initial results indicated that our hypothesized model (see Fig. 1) adequately fit the data, $\chi^2(4) = 1.60$, *relative* $\chi^2 = 1.60$, $p = .21$, *CFI* = .99, *RMSEA* = .05. The model results are consistent with all of the hypotheses regarding associations between self-concealment, technology addiction, online social capital, and wellbeing (see Fig. 2). Self-concealment positively predicted communication technology addiction (H1 supported), as well as online social capital (H2 supported). Additionally, technology addiction positively predicted online social capital (H3 supported). While online social capital positively predicted wellbeing (H4 supported), self-concealment negatively predicted wellbeing (H5 supported).

Table 1
Bivariate zero order correlation matrix for all variables.

1	1.00			
2	.32**	1.00		
3	−.05	.17**	1.00	
4	.18**	.19**	−.29**	1.00

1 – Technology addiction; 2 – online social capital; 3 – wellbeing; 4 – self-concealment.
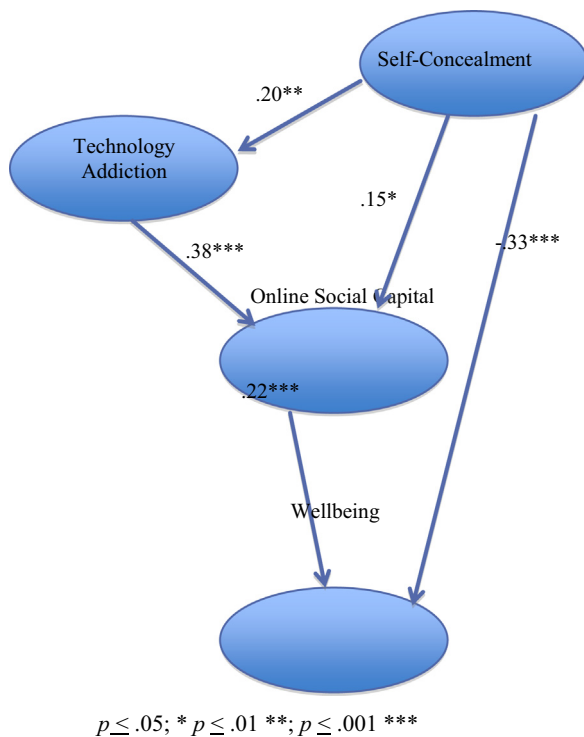$p \leqslant .05$; two-tailed.
** $p \leqslant .01$.

Fig. 2. Results of the intervening affect of technology addiction and online social capital on self-concealment and wellbeing.

4. Discussion

The Internet and its users cannot be treated and monolithic pieces because of the various types of Internet usage and users (Davis, 2001) However, online social capital developed through Internet usage and/or communication technology consumption can positively impact a particular demographic, in this study, self-concealers. The positive wellbeing implications of online social capital development, particularly regarding capital developed through SNS usage and a sense of online community, may also extend to Internet users who are shy, depressed, introverted, or suffer from a lack of communication skills, correlates of self-concealment (Kawamura & Frost, 2004).

This research uses SEM to examine a causal model of the effects of self-concealment on wellbeing with communication technology addiction and online social capital as intervening factors (estimating causal effects between variables, see Hoyle, 2012). The SEM model confirms the causal paths and hypotheses presented. Self-concealment causes reduced wellbeing. However, the SEM model indicates that when the causal paths between self-concealment and wellbeing are mediated through communication technology addiction and online social capital, the result is positive perceptions of wellbeing.

The SEM model also illustrates how addiction may serve as positive function. Self-concealment may drive individuals to increased communication technology usage, and addiction (Kawamura & Frost, 2004). Normatively, both research and colloquial opinion would suggest that addiction, in any context, is unhealthy. However, we find that the implications of frequent or even excessive online communication can, in fact, reverse the negative causal association between self-concealment and wellbeing. That is, although self-concealing individuals may be driven to non-face-to-face channels of communication, as long as the content of the communication is positive and fosters a sense of social interaction, builds relationships, or fosters a sense of community,

then increased communication through these channels (and even addiction) may ultimately have positive outcomes. Thus, it is through the development of this online social capital that technology addiction's normally negative impact can (in some instances) result in positive wellbeing outcomes for individuals who are self-concealers and engage in Internet behaviors (e.g., connecting through social networks, building/maintaining interpersonal relationships, etc.) that help to develop this social capital.

Technology addiction is regularly analyzed by the negative impacts upon individual's marital, academic, and career related problems (e.g., Young, 2004), and social isolation (Kraut et al., 1998). However, the increased time spent online can result in an increase of social interaction and integration. This social interaction can contribute to the development of online social capital that can positively impact both online and offline social interactions. For example, the design of social networking components on the Internet encourages interpersonal connections and thus has a strong potential to positively influence users' social capital and the psychological wellbeing that derives from their usage (Burke et al., 2011). Thus, heavy Internet usage, and even addiction, may facilitate more communicative, relational, and mental health benefits for particular individuals rather than negative impacts discovered in previous research. In fact, current research calls for a reexamination of the influence of the individual personality on Internet use, and how Internet use itself may both harm and benefit personalities on an individual level (Amichai-Hamburger & Ben-Artzi, 2003).

Some scholars have examined personality factors influence on Internet use. For example, Davis' (2001) model of Pathological Internet Use (PIU) identifies the source of PIU as derived from maladaptive (or problematic) cognitions and behaviors that seek to maintain or increase them. Davis' (2001) use of a cognitive-behavioral approach of generalized PIU informed this study (e.g., the effects of personality based orientation to information management on Internet social capital development). However, we extended the PIU Davis (2001) focus as a primarily destructive and "vicious cycle" that can result in offline isolation to also examine how bridging and bonding social capital can positively influence the normally negative outcomes of technology addiction. We also extended the conceptualization of Internet addiction to take into consideration the many platforms and channels through which individuals may access the Internet and other media lean communications.

5. Limitations and future direction

The Internet is used by a substantial subset of the population (e.g., Young, 2004) where younger adults alone spend on average 164 min a day online (Li & Chung, 2006). Americans, and especially college students, access the Internet from a variety of communication technologies (e.g., smartphones) in addition to the traditional computers (Smith et al., 2011). Drawing from the literature and Davis (2001) PIU, this study illustrated how technology addiction and online social capital can act as intervening factors in the negative wellbeing implications of self-concealment, specifically, through the development of bridging social capital. Unlike previous work that focuses on normally negative impact of technology addiction in the context of personality traits (e.g., Davis, 2001), we identify a context in which addiction may have a positive function. However, it is important to note that not all online communication and communication technology behaviors result in the development of bridging or bonding social capital. Individuals who do not engage in communication behaviors that develop this capital will still experience the negative effects of technology addiction and self-concealment.

Additionally, there are other limitations in this study. First, females are overrepresented in the study population. Further, an analysis of the difference between the communication technologies used by women and men may contribute to a better understanding of sex differences in communication technology usage, especially as related to information management practices and wellbeing. Some research indicates sex differences in technology use (e.g., Van Volkom, Stapley, & Malter, 2013), however, research on information management has determined that although sex differences exist, meta analyses indicate that effect sizes are small (Dindia, 2002). Finally, although the measurement of communication technology addiction did include multiple mediated communication environments, "online" social capital mainly refers to communicating on the Internet (which can be accomplished through computers, smartphones, tablets, etc.).

The development of NCTs such as smartphones has contributed to an increase in individuals' use of NCTs to access the Internet, SNS, and read and respond to their email. Future research on the direct influences of the mediated context of these technologies would provide a deeper understanding of their potential effects on addiction and wellbeing compared to addiction through traditional Internet access (e.g., home computer). This would also further develop an understanding of the effects of different sources of addiction (e.g., device such as a smartphone vs. social networking site). Although the participants in this study began their interactions offline before moving to online communication, additional research has shown that the SNS are also utilized to form new friendships (Lenhart & Madden, 2007), and this type of relational development and social capital should also be examined in this context. Additionally, this study focused primarily on the impact of bridging social capital, future research that examines the influence of bonding capital on technology addiction would contribute to a clearer understanding of its impact. However, the proposed model offers qualified support for the continued analysis of communication technology addiction as a potential source for the increase of wellbeing for psychologically vulnerable users and potential communication and relational benefits and serves as a starting block for an examination of communication technology addiction beyond recognition of previously identified negative implications.

6. Conclusion

This study found that communication technology addiction and social capital can partially mediate the relationship between self-concealment and wellbeing, supporting the importance of a further examination of the potential benefits of communication technology addiction. Addiction, in any context, is normally associated with negative outcomes. However, this research has offered qualified support for the examination of communication technology addiction's potential wellbeing benefits for individuals who have a tendency to conceal their personal and/or private information from others. In fact, within certain parameters (e.g., building of social relationships, positive communication, and a sense of virtual community), increased communication through non face-to-face channels of communication (and even addiction) may ultimately have positive wellbeing outcomes. The types of Internet usage and the behaviors of individuals with communication technology addiction can impact the positive (or negative) effects their addiction may have upon their wellbeing. In essence, communication technology use, including social capital development and addiction, particularly with the rise in use of new technologies such as smart phones, tablets, provides a new forum for understanding and improving individuals' wellbeing.

References

Abfalter, D., Zaglia, M., & Mueller, J. (2012). Sense of virtual community: A follow up on its measurement. *Computers in Human Behavior, 28*, 400–404.

Amichai-Hamburger, Y., & Ben-Artzi, E. (2003). Loneliness and Internet use. *Computers in Human Behavior, 19*, 71–80.

Bentler, P. M. (1990). Fit indexes, lagrange multipliers, constraint changes and incomplete data in structural models. *Multivariate Behavioral Research, 25*, 163.

Bollen, K. (1989). A new incremental fit index for general structural equation models. *Sociological Methods & Research, 17*, 303–316.

Bond, F. W., & Bunce, D. (2000). Mediators of change in emotion-focused and problem-focused worksite stress management interventions. *Journal of Occupational Health Psychology, 5*, 156–163.

Browne, M., & Cudeck, R. (1989). Single sample cross-validation indices for covariance structures. *Multivariate Behavioral Research, 24*, 445–455.

Burke, M., Kraut, R., & Marlow, C. (2011). Social capital on facebook: Differentiating uses and users. In *Proceedings of the 2011 annual conference on human factors in computing systems* (pp. 571–580). Vancouver, BC, Canada: ACM.

Cepeda-Benito, A., & Short, P. (1998). Self-concealment, avoidance of psychological services, and perceived likelihood of seeking professional help. *Journal of Counseling Psychology, 45*(1), 58–64.

Charlton, J. P. (2002). A factor-analytic investigation of computer 'addiction' and engagement. *British Journal of Psychology, 93*(3), 329–344.

Charlton, J. P., & Birkett, P. E. (1995). The development and validation of the computer apathy and anxiety Scale. *Journal of Educational Computing Research, 13*, 41–59.

Chou, C., Condron, L., & Belland, J. C. (2005). A review of research on internet addiction. *Educational Psychology Review, 17*(4), 363–388. http://dx.doi.org/10.1007/s10648-005-8138-1.

Cohen, S., & Hoberman, H. M. (1983). Positive events and social supports as buffers of life change stress. *Journal of Applied Psychology, 3*, 99–125.

Davis, R. A. (2001). A cognitive-behavioral model of pathological internet use. *Computers in Human Behavior, 17*, 187–195.

Dindia, K. (2002). Self-disclosure research: Knowledge through meta-analysis. In M. Allen, R. Preiss, B. Gayle, & N. Burrell (Eds.), *Interpersonal communication research: Advances through meta-analysis* (pp. 169–185). Mahwah, NJ: Lawrence Erlbaum Associates.

Dutta-Bergman, M. (2006). The antecedents of community-oriented internet use: Community participation and community satisfaction. *Journal of Computer-Mediated Communication, 11*, 97–113.

Ellison, N., Steinfield, C., & Lampe, C. (2007). The benefits of facebook "friends:" Social capital and college students' use of online social network sites. *Journal Of Computer-Mediated Communication*, 1143–1168.

Finkenauer, C., & Rimé, B. (1998). Keeping emotional memories secret health and subjective well-being when emotions are not shared. *Journal of Health Psychology, 3*(1), 47–58.

Fox, S., Raine, L. (2014). The web at 25 in the U.S.: Summary of findings. Retrieved from <http://www.pewinternet.org/2014/02/27/summary-of-findings-3/>.

Goldberg, I. (1995). Internet addiction disorder. Retrieved from: <http://www.cog.brown.edu/brocures/people/duchon/humor/internet.addiction.html>.

Greene, K., Magsamen-Conrad, K. (2010). Disclosure decisions in existing relationships online: Exploring Motivations for CMC channel choice. Virtual Communities: Concepts, Methodologies, Tools and Applications (pp. 2179–2206). Hershey, PA: Information Science Reference.

Hall, A. S., & Parsons, J. (2001). Internet addiction: College student case study using best practices in Cognitive behavior therapy. *Journal of Mental Health Counseling, 23*(4), 312–327.

Hargittai, E. (2002). Second level digital divide: Differences in people's online skills. *First Monday, 7*(4).

Hinic, D., Mihajlovic, G., Spiric, Z., Dukic-Dejanvoic, S., & Jovanovic, M. (2008). Excessive internet use- Addiction disorder or not? *Vojnosanitetski pregled, 65*, 763–767.

Hoyle, R. H. (2012). *Handbook of structural equation modeling.* Guilford Press.

Hunter, J., & Gerbing, D. (1982). The metric of the latent variables in a LISREL-IV analysis. *Educational and Psychological Measurement, 42*, 423–427.

Impett, E., Gordon, A., Kogan, A., Oveis, C., Gable, S., & Keltner, D. (2010). Moving toward more perfect unions: Daily and long-term consequences of approach and avoidance goals in romantic relationships. *Journal of Personality and Social Psychology, 99*, 948–963.

Joinson, A. (2001). Self-disclosure in computer-mediated communication: The role of self-awareness and visual anonymity. *European Journal of Social Psychology, 31*, 177–192.

Jones, S. (2002). The internet goes to college: How students are living in the future with today's technology. Pew Internet and American Life Project.

Kawamura, K., & Frost, R. (2004). Self-Concealment as a mediator in the relationship between perfectionism and psychological distress. *Cognitive Therapy and Research, 28*, 183–191.

Kelly, A. E. (2002). *The psychology of secrets.* New York: Kluwer Academic/Plenum.

Kline, R. (1998). Software review: Software programs for structural equation modeling: Amos, EQS, and LISREL. *Journal of Psychoeducational Assessment, 16*, 343–363.

Kraut, P., Patterson, M., Lundmark, V., Kiesler, S., Mukopadhyay, T., & Scherlis, W. (1998). Internet paradox: A social technology that reduces social involvement and psychological well-being? *American Psychologist, 53*, 65–77.

Larson, D. G., & Chastain, R. L. (1990). Self-concealment: Conceptualization, measurement, and health implications. *Journal of Social and Clinical Psychology, 9*, 439–455.

Lee, J., & Lee, H. (2010). The computer-mediated communication network: Exploring the linkage between the online community and social capital. *New Media & Society, 12*, 711–727.

Lenhart, A., Madden, M. (2007). Teens, privacy, & online social networks. Pew Internet and American Life Project Report. Retrieved from <http://www.pewinternet.org/2007/04/18/teens-privacy-and-online-social-networks/>.

Li, S. M., & Chung, T. M. (2006). Internet function and internet addictive behavior. *Computers in Human Behavior, 22*, 1067–1071.

Magsamen-Conrad, K., Checton, M. G., & Venetis, M. K. (2013). Privacy and disclosure at work: The implications of self-concealment and anonymity. *Proceedings of the International Conference on Journalism and Mass Communications.* http://dx.doi.org/10.5176/2301-3710_JMComm13.51.

Masuda, A., Anderson, P. L., & Sheehan, S. (2009). Mindfulness and mental health among African American college students. *Complimentary Health Practice Review, 14*, 115–127.

Masuda, A., Anderson, P. L., Wendell, J. W., Chou, Y., Price, M., & Feinstein, A. (2011). Psychological flexibility mediates the relations between self-concealment and negative psychological outcomes. *Personality and Individual Differences, 50*, 243–247.

McMillan, S. J., & Morrison, M. (2006). Coming of age with the internet a qualitative exploration of how the internet has become an integral part of young people's lives. *New Media & Society, 8*(1), 73–95.

Neuhauser, L., & Kreps, G. L. (2003). Rethinking Communication in the E-health Era. *Journal of Health Psychology, 8*(1), 7–23. http://dx.doi.org/10.1177/1359105303008001426.

Norris, P. (2003). Social capital and ICTs: Widening or reinforcing social network?', paper presented at the International Forum on Social Capital for Economic and Social Research Institute, Cabinet Office, Tokyo, 24–25 March.

Orr, E. S., Sicisic, M. S., Ross, C., Simmering, M. G., Arseneault, J. M., & Orr, R. R. (2009). The Influence of shyness on the use of facebook in an undergraduate sample. *Cyberpsychology & Behavior, 12*(3), 337–340. http://dx.doi.org/10.1089/cpb.2008.0214.

Pempek, T., Yermolayeva, Y., & Calvert (2009). College students' social networking experiences on Facebook. *Journal of Applied Developmental Psychology, 30*, 227–238.

Shah, D. V., Kwak, N., & Holbert, R. L. (2001). "Connecting" and "disconnecting" with civic life: patterns of internet use and the production of social capital. *Political Communication, 18*, 141–162. http://dx.doi.org/10.1080/105846001750322952.

Smith, A. (2011). How Americans use text messaging. Pew Internet & American Life Project. Retrieved from: <http://www.pewinternet.org/Reports/2011/Cell-Phone-Texting-2011/Main-Report/How-Americans-Use-Text-Messaging.aspx?src=prc-number>.

Smith, A., Rainie, L., Zickuhr, K. (2011). College students and technology. Pew Internet & American Life Project, July 19, 2011. Retrieved from: <http://www.pewinternet.org/Reports/2011/College-students-and-technology/Report.aspx>.

Steinfield, C., DiMicco, J., Ellison, N.. Lampe, C. (2009). Bowling online: Social Networking and social capital within the organization. In: Proceedings of the fourth international conference on communities and technologies, pp. 245–254.

Suh, K. (1999). Impact of communication medium on task performance and satisfaction: An examination of media-richness theory. *Information & Management, 35*, 295–312.

Tennant, R., Hiller, L., Fishwick, R., Platt, S., Joseph, S., Weich, S., Parkinson, J., Secker, J., Stewart-Brown. (2007). Health and Quality of Life Outcomes, 5:63.

Uysal, A., Lin, H., Knee, C., & Bush, A. (2012). The association between self-concealment from one's partner and relationship well-being. *Personality and Social Psychology Bulletin, 38*, 39–51.

Van Volkom, M., Stapley, J. C., & Malter, J. (2013). Use and perception of technology: Sex and generational differences in a community sample. *Educational Gerontology, 39*(10), 729–740. http://dx.doi.org/10.1080/03601277.2012.756322.

Vogel, D., & Armstrong, P. (2010). Self-Concealment and willingness to seek counseling for psychological, academic, and career issues. *Journal of Counseling & Development, 88*, 387–396.

Walther, J. B. (2007). Selective self-presentation in computer-mediated communication: Hyperpersonal dimensions of technology, language, and cognition. *Computers in Human Behavior, 23*, 2538–2557. http://dx.doi.org/10.1016/j.chb.2006.02.002.

Williams, D. (2006). On and off the 'net: Scales for social capital in an online era. *Journal of Computer-Mediated Communication, 11*, 593–628.

Wismeijer, A., & van Assen, M. (2008). Do neuroticism and extraversion explain the negative association between self-concealment and subjective well-being? *Personality and Individual Differences, 45*, 345–349.

Woolcock, M., & Narayan, D. (2000). Social capital: Implications for development theory, research, and policy. *World Bank Research Observer, 15*(2), 225–250.

Yip, W., Subramanian, S. V., Mitchell, A., Lee, D., Wang, J., & Kawachi, I. (2007). Does social capital enhance health and well-being? Evidence from rural China. *Social Science & Medicine, 64*, 35–49.

Young, K. (2004). Internet addiction: A new clinical phenomenon and its consequences. *American Behavioral Scientist, 48*, 402–415.