We Are All in This Together: The Role of Individuals' Social Identities in Problematic Engagement with Video Games and the Internet

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Abstract

Individuals' engagement with videogames and the internet features both social and potentially pathological aspects. In this research, we draw on the social identity approach and present a novel framework to understand the linkage between these two aspects. In three samples ($N_{study1} = 304$, $N_{study2} = 160$ and $N_{study3} = 782$) of young Chinese people from two age groups (approximately 20 and 16 years old), we test the associations between relevant social identities and problematic engagement with videogames and the internet. Across studies, we demonstrate that individuals' identification as 'gamers' or 'frequent internet users' predicts problematic engagement with videogames and the internet through stronger perceived social support from such groups. Moreover, we demonstrate that individuals' identification as 'students' (Studies 2-3) is negatively associated with problematic engagement via social support from other students. Finally, in Study 3, we examine the articulation between social support from these three groups and subjective sense of loneliness. Findings indicate that, whereas perceived support from students is negatively associated with loneliness, the association between perceived support from gamers and internet users and loneliness is weaker and positive. Theoretical implications and directions for future research are discussed. Taken together, the studies highlight the importance of considering the social context of individuals' problematic engagement with technologies, and the role of different group memberships.

Keywords:

Problematic video game use; problematic internet use; social identity; social support; loneliness

When an internet gamer community discovered that one of their members, Chen Xin, was trying to raise funds for a medical treatment, many of the gamers intervened to support her. They donated money and sold equipment within the game in order to contribute. In only a few days, they were able to put together the money needed for the treatment. This episode dramatically illustrates the importance of the *social side* of young people's engagement with video games and the internet (Trepte, Reinecke, & Juechems, 2012). These activities may provide individuals with key sources of social and emotional support (Cole & Griffiths, 2007). However, they may also carry negative implications. Excessive gaming or internet use may become forms of problematic or even pathological behavior (Lee, Choo & Lee, 2017; Messias, Castro, & Saini, Usman, & Peeples, 2011; Young, 1998).

Despite the relevance of both the *social* and the (potentially) *pathological* sides of gaming and using the internet, research has yet to advance an integrative theoretical framework examining the linkage between these two aspects. Here, we propose an analysis grounded in the social identity approach to health (Haslam, Jetten, Cruwys, Dingle, & Haslam, 2018). Specifically, we test the novel idea that the extent to which young people identify as 'gamers' (Yee, 2007) and as 'frequent internet users' (Joiner et al., 2005) predicts the extent to which they perceive social support from others in these communities (i.e., the ingroup). We investigate the association between such support and individuals' problematic use of videogames and the internet (Yao & Zhong, 2014). In addition, we test the role of a different social identity relevant to young people's mental health – the student identity (Viner, et al., 2012) – in predicting support from other students and, subsequently, lower problematic engagement with technologies.

We test our hypotheses in three samples of young Chinese people from two age groups (approximantely20 and 16 years old). Generally, younger people are considered more vulnerable to technological addictions (Griffiths & Wood, 2000). Moreover, China is a key

context where to examine individuals' involvement in gaming and the internet. Since the country lifted the ban on games in 2000, China has become the 'Games Industry Capital of the World' and one of the largest video game markets with over 494 million gamers out of the 2 billion worldwide users (China Internet Network Information Center [CNNIC], 2019; Lanxon, 2017). Similarly, internet use among people has grown dramatically in China with over 854 million users out of the 3.9 billion worldwide (CNNIC, 2019). Nonetheless, the rapid development of both sectors has been accompanied by high rates of pathological use and related problems (e.g., Li, Zhang, Lu, Zhang, & Wang, 2014; Zhang, Amos, & Mcdowell, 2008). In this article, for the first time, we examine the role of different social identities in predicting young Chinese people's involvement in gaming and the internet.

Videogames and the Internet: Problematic Engagement and Social Support

For a vast (and growing) number of users, gaming and using the internet are common and enjoyable activities. However, for some users, involvement in such activities may progress in misuse, develop problematic and pathological aspects, and even addictive trajectories. *Technological addictions* are defined as "nonchemical (behavioral) addictions that involve human-machine interaction" (Griffiths, 1995, p. 211). Both problematic videogaming (e.g., Deleuze, Maurage, Schimmenti, Nuyens, Melzer, & King, 2019; Ferguson, Coulson, & Barnett, 2011; Gentile, 2009; Haagsma, Delfabbro, Gradisar, & Griffiths, 2013; Wittek, et al., 2015) and problematic engagement with the internet (e.g., Li, Zhang, Lu, Zhang, & Wang, 2014; Zhang, Amos, & McDowell, 2008; Widayanto & Griffiths, 2005) fall in this broad category.

These two addictions may have serious consequences. Research indicates that they are associated with symptoms similar to those characterizing substance abuse, including loss of control, compulsive urges, excessive focus on the activity and inability to stop (Griffiths & Hunt, 1998). Problematic engagement in these activities has been linked to lower psycho-

social wellbeing, including higher risk of depression (Gentile, et al., 2011; Young & Rodgers, 1997), suicide (Messias, Castro, & Saini, Usman, & Peeples, 2011), as well as impairment to career or interpersonal development (Lee, Choo & Lee, 2017; Young, 1998).

On the other hand, gaming and internet use are oftentimes social activities (Collins & Freeeman, 2013; Domahidi, Festl, & Quandt, 2014; Ellison, Steinfield, & Lampe, 2007; Kaye & Bryce, 2012; Kobayashi, 2010; Trepte, et al., 2012; Valkenburg & Peter, 2007; Wellman, Haase, Witte, & Hampton, 2001; Zhong, 2011). Individuals' engagement with gaming and internet use may be accompanied by the endorsement of novel social identities, such as 'gamers' (DeGrove, Courtois, and Van Looy, 2015; Grooten & Kowert, 2015; Teng, 2017; Yee, 2007) or 'internet-users' (Barker, 2009; Joiner et al., 2005; Facer, Furlong, Furlong, & Sutherland, 2003). Especially for young people, videogames and online platform may be used to access novel friendships and relationships (Mesch & Talmund, 2006).

An important research question is the extent to which technology-mediated social interactions are implicated in the onset of problematic usage (Cole & Griffiths, 2007; Mesch & Talmund, 2006). Some authors argue that social support from gamers and internet users comes at the expense of other meaningful relationships (Kraut, et al., 1999; see also Caplan, 2010). The preference for online social support might be especially accentuated in individuals who are introverted (Amichai-Hamburger & Furnham, 2007; Orchard & Fullwood, 2010), and feel lonely or socially isolated. Indeed, loneliness is an important predictor of problematic gaming and internet use (Caplan, 2006; Morahan-Martin & Schumacher, 2000; Nalwa & Anand, 2003; Kim, LaRose, & Peng, 2009; Lemmens, Valenburg, & Peter, 2009).

However, whether online social support is linked to problematic outcomes is not clear. Some studies focusing on individuals' internet usage have reported that problematic engagement is associated with individuals' overreliance on online interactions (e.g., Caplan, 2005, 2003; Morahan-Martin & Schumacher, 2000; Rotondi, Stanca, & Tomasuolo, 2017;

Young, 1998). Yet, in other studies this association did not emerge. For instance, in a longitudinal study of Chinese online players, Zhong (2011) reported a positive association between involvement in online social videogames and perceived social support (operationalized as online social capital; see Williams, 2006). However, in this study, there was no significant negative association between online involvement and offline social capital.

Moreover, it is not clear whether technological engagement is associated with perceived social support. For instance, Dupuis and Ramsey (2011) found no association between time spent playing online social games and a measure of generalized social support in a sample of American students. In addition, Domahidi, Breuer, Kowert, Festl, and Quandt (2018) examined a large sample of online players in Germany and found that online involvement in videogames had no significant association with a generalized measure of perceived social support.

These studies operationalized engagement with videogames or the internet as time spent playing or surfing the internet, or as number of people met during these activities, i.e. *social contact*. An important limitation of this approach is that it does not consider the psychological links individuals may establish with groups when they *identify* (rather than just spending time) with them, and the impact such key form of psychological belonging has over and beyond contact (Sani, Herrera, Wakefield, Boroch, & Gulyas, 2012). For instance, Dupuis and Ramsey (2011) and Domahidi et al. (2018) used generalized measures of social support that did not specify the source of the support (i.e., support from whom). This is a very relevant issue because research indicates that identification with a group influences the way in which individuals perceive social support from others (Haslam, Reicher & Levine, 2011). It is also important to note that these studies did not assess directly the emergence of symptoms related to problematic engagement and their association with social support.

In an illustrative study, Collins and Freeman (2013) compared problematic, non-problematic and non-players on key dimensions, including personality traits of extraversion, online and offline social support (operationalized as social capital) and prosocial tendencies. These researchers found that the three groups did not differ in any of such dimensions, except for the quantity of online and offline social support. Problematic players reported higher online social support and lower offline social support than did the other groups, whereas non-problematic players reported higher online but not lower offline social support than non-players. These findings suggest the necessity of examining the social context of individuals' technological engagement. Here, to examine how social support relates to problematic outcomes, we introduce a novel framework grounded in the social identity approach to health (Haslam, et al., 2018; Jetten, Haslam and Haslam, 2012; Jetten, Haslam, Cruwys, Greenaway, Haslam, & Steffens, 2017).

Social Identity, Individuals' Health and Social Support

The Social Identity Approach (encompassing both social identity theory [Tajfel & Turner, 1979] and self-categorization theory [Turner, Hogg, Oakes, Reicher, & Wetherell, 1987]) theorizes that individuals' sense of self is partially shaped by their group memberships. When individuals' social identity becomes salient, their self becomes bound to, and is defined in terms of, a group or social category (e.g., I am a gamer; I am a frequent internet user). Saliency of a specific social identity means that individuals evaluate, judge, and act towards others on the basis of whether they are perceived as belonging to the same group ('we', the ingroup) or to another group ('them', the outgroup).

The social identity approach has contributed to the scientific understanding of a vast array of group and intergroup dynamics (for reviews see Brown, 2000; Ellemers, 2012; Hogg & Abrams, 1988; Hogg, 2006; Hornsey, 2008; Postmes & Branscombe, 2010; Reicher, Spears, & Haslam, 2010). More recently, this approach has been applied to research on

mental health (Haslam, et al., 2018; Jetten, et al., 2012; Jetten, et al., 2017), including individuals' involvement in different types of addictions (Buckingham & Best, 2016).

The Social Identity Approach to mental health stresses the centrality of groups in providing individuals with meaning, purpose and a sense of social connectedness. Groups contribute to structure individuals' perception of the material and social worlds in which they live (Turner, 1991). By shaping the self, they inform individuals about who they are and what norms and beliefs are valid. Importantly, for groups to affect individuals' perceptions and behaviors, as well as to have an impact on their mental health, individuals must *identify* with them. Research shows that individuals' subjective identification with groups is a more important predictor of positive mental health than objective social contact spent with group members, or involvement in activities with the group (Sani, Herrer, Wakefield, Boroch, & Gulyas, 2012)

A key psychological mechanism through which group identification enhances mental health is by structuring the perception of social support (Haslam et al., 2018). When a social identity becomes salient, individuals are more likely to include others in the self-concept, and interpret others' actions and resources as supportive and more effective (Anabulsi & Drury, 2014; Haslam et al., 2011; Haslam, Jetten, O'Brien, & Jacobs, 2004; Haslam. O'Brien, Jetten, Vormedal, & Penna, 2005; Platow et al., 2007).

Social Identities and Addiction

Individuals' behavior is strongly influenced by the social norms considered appropriate within a salient ingroup (Oyserman, Fryberg, & Yoder, 2007; Tarrant, Dazeley, & Cottom. 2009; Terry & Hogg, 1996; Terry. Hogg & White, 1999). Some groups may have negative implications for people, sustaining toxic habits or problematic behaviors (i.e., be a 'social curse'), whereas others may provide individuals with positive psychological nourishment and promote psychological health (i.e., a 'social cure'; Kellezi & Reicher, 2012;

Wakefield, Bowe, Kellezi, McNamara, & Stevenson, 2019). Thus, group identification is not always associated with positive outcomes (DeMarco & Newheiser, 2019).

In the context of addictions (whether to substances or behavioral ones), group identification may have distinctive implications for individuals' involvement in either harmful or benign practices (Buckingham, Frings & Albery, 2013; Dingle, Stark, Cruwys, & Best, 2015; Sani, Madhok, Norbury, Dugard, & Wakefield, 2015). Research on smoking behavior, for instance, indicates that individuals who identify more strongly with those who use the same brand of cigarettes are also less likely to express the intention to quit smoking (Webb et al., 2017). In contrast, stronger identification with groups that promote healthier norms is more likely to be associated with recovery from addiction and the acquisition of healthier habits (Sani, et al., 2015; see Buckingham & Best, 2016 for an overview).

Thus, an important research priority is to examine the implications of different social identities for individuals' engagement with problematic gaming and internet use. Social identities structure and shape individuals' perception of the social world. Therefore, groups linked to problematic habits may be perceived as an important source of social support (Haslam et al., 2018). In this article, we test the novel idea that perceived social support from members of the 'gamer' and 'frequent internet user' groups mediate the association between individuals' group identification and problematic gaming and internet use. Conversely, we examine how young people's identity as students could potentially function as a 'social cure' and be associated with lower problematic engagement.

The Student Social Identity

Miller, Wakefield and Sani (2017) emphasize the importance of examining addiction trajectories in young people. Young people are more prone to unhealthy practices and risky behaviors (Miller et al., 2017). Focusing on improving their health has important consequences later in their lives (cf. Sawyer et al., 2012). This is especially relevant in

relation to individuals' problematic engagement in gaming and internet use, as young people are particularly vulnerable to these forms of addictions (Griffiths & Wood, 2005).

There is a renewed scientific focus on the *social* determinants of young people's health (Sawyer, et al., 2012; Viner, et al., 2012). Evidence indicates that a sense of connectedness and belonging to peers and school is crucial to boost perceived social support (see Osterman, 2000) and enhance health (Viner, et al., 2012). During early and late adolescence, relationships with peers in schools become increasingly important as individuals become less dependent on families (Libbey, 2004; Shochet, Dadds, Ham & Montague, 2006). For instance, individuals' sense of connectedness to their school is related to lower engagement in deviant and risky behaviors, including substance abuse (Dornbusch, Erickson, Laird, & Wong, 2001; Maddox & Prinz, 2003).

In line with the idea of social cure, the benefits of connectedness with other students may be unlocked by a stronger identification with this group (Reynolds, Subasic, Lee, & Tindall, 2014). Indeed, individuals' social identity as students has been linked to a number of important health outcomes, including lower depressive symptoms, higher self-esteem and wellbeing and lower loneliness (Bizumic, Reynolds, Turner, Bromhead, & Subasic, 2009; Cameron, 1999; Hoyle and Crawford, 1994; Iyer, Jetten, Tsivrikos, Postmes, & Haslam, 2009). Nevertheless, research has yet to examine how individuals' *identification* with fellow students is associated with problematic gaming and internet addiction. We test this association in this research.

Student identity, social support and loneliness. Loneliness and social isolation are key risk factors in the development of a vast range of mental health problems (e.g., Beutel et al., 2017; Mushtaq, Shoib, Shah, & Mushtaq, 2014), including technological addictions (e.g., Caplan, 2006; Nalwa, & Anand, 2003). Loneliness has strong implications for individuals' mental health also in the school and university settings (Krause-Parello, 2008; McIntyre,

Worsley, Corcoran, Harrison Woods, & Bentall, 2018; Nalwa, & Anand, 2003). Conversely, schools and universities provide individuals with the opportunity to forge meaningful social connections that may function as an important psychological resource vis-à-vis loneliness (Shochet, et al., 2006).

In a recent study, McIntyre, et al., (2018) examined the prevalence and determinants of poor mental health outcomes in a large sample of British students. Their results indicated that feelings of loneliness were the strongest predictor of depression, anxiety and paranoia. Drawing on the social cure model, the authors also proposed and demonstrated that individuals' identification with university friends was associated with improved mental health conditions. Importantly, the association between social identity and improved mental health was explained by lower feelings of loneliness. This finding highlights the importance for individuals' mental health of feeling connected with other students.

A plausible mechanism explaining the linkage between identification with students and lower loneliness is that individuals may perceive social interactions with ingroup members as more supportive when they identify more strongly with the group (McIntyre, et al., 2018; cf. Haslam et al., 2011). In this research, we test this proposition in the context of technological addiction. Specifically, we examine the association between social support from different group memberships, loneliness and individuals' problematic gaming and internet use.

Overview of the Studies, Hypotheses, and Analytical Strategy

In this article, we draw on three different samples of university (Studies 1 and 2) and high school students (Study 3) in the Chinese context to test our hypotheses. Across studies, in line with previous research and theorizing (e.g., Alnabulsi & Drury, 2014; Haslam et al., 2011; Platow et al., 2007), we hypothesize that the more individuals identify as gamers ($H1_a$), or frequent internet users ($H1_b$), the more likely they should be to perceive social

support from ingroup members (i.e., other gamers or internet users). In turn, in line with the idea that social support might motivate further problematic engagement (e.g., Caplan, 2006), we hypothesize that social support from gamers (**H2$_a$**) and frequent internet users (**H2$_b$**) should predict problematic engagement in gaming and internet use (i.e., social curse), respectively. Thus, we predict that individuals' social identities will be associated with the two forms of problematic engagement indirectly through social support from each of these groups (**H3$_a$** and **H3$_b$**).

In Studies 2 and 3, we also examine the role of young people's identity as students in problematic engagement in gaming and internet use. Following research on the importance of young people's social connection to other students, we contend that the more younger people identify with this group, the more likely they will be to perceive social support from other students (**H4**). Social support from students should, in turn, be associated (i.e., social cure) with both lower problematic gaming (**H4$_a$**) and internet use (**H4$_b$**). Thus, we expect that individuals' social identity as student will predict lower problematic engagement indirectly via perceived social support (**H5$_a$** and **H5$_b$**).

Finally, in study 3, we also introduce a measure of individuals' perceived loneliness to examine the association between social support from different group memberships and individuals' sense of loneliness, as well as the subsequent relationship between loneliness and problematic gaming and internet use. In line with previous evidence (McIntyre, et al., 2018), we expect that perceived social support from students will be associated with lower loneliness (**H6**). However, because of the absence of prior research on the topic, it is less clear how social support from gamers and internet users might relate to loneliness in the context of shared social identities. We, therefore, explore these research questions (**RQ1-2**) in this study. Finally, we expect higher loneliness to be associated with more problematic gaming (**H7$_a$**) and internet use (**H7$_b$**). Thus, loneliness should be a further mediator of the

path from identity as students to social support to loneliness to problematic gaming (**H8$_a$**) and internet use (**H8$_b$**).

Across studies, structural equation models with latent and observed variables were used to examine these hypotheses. Latent variables were estimated for all measures encompassing more than one item. Analyses were conducted using the software R and the package lavaan (Rosseel, 2012). Due to some deviations from normality in some of the variables (see Tables 1-3), robust standard error was used to analyze the data. Gender and age were added as covariate to the models to control for the influence of these variables.

Item parceling was used to for the criterion variables. Specifically, the seven items of the Game Addiction Scale (GAS; Lemmens, Valkenburg, & Peter, 2009) and the fifteen items of the Generalized Problematic Internet Use Scale (GPIUS2; Caplan, 2010) were parcelled in two and three parcels, respectively. Both scales have already been validated, and in the context of this research we focus on the relationships among latent constructs rather than testing the scales' measurement models. Parcelling items improves the reliability of scales with larger number of items, decrease measurement error and simplify the interpretation of model parameters (Little et al., 2013). Moreover, parcelled items have distributions that are more normally distributed compared to single items (Little, Cunningham, Shahar, & Widaman, 2002). Given that both the GAS and the GPIUS2 measure clinical outcomes, item-level data are more a risk of distributional violations.[1] Parcels were constructed using the item-to-construct balance method (Little, et al., 2002). According to this method, a single construct model is specified for each construct. Subsequently, the items with the highest items-to-construct loadings are averaged together with the items with the lowest items-to-construct loadings. The item-to-construct method allows for the creation of balanced parcels.

Across studies, model fit was evaluated using three indices. Specifically, we report the Comparative Fit Index (CFI; acceptable values > .95; excellent value > .97), the Root Mean Square Error of Approximation (RMSEA; acceptable values < .10; excellent values < .05) and the Standardized Root Mean Square Residual (SRMR; acceptable values < .10; excellent values < .05; (Hu & Bentler, 1998; Schermelleh-Engel, Moosbrugger & Müller, 2003). For each study, we also report χ^2, according to which non-significant values indicate a well-fitting model. However, χ^2's dependence on sample size and rigid assumptions of multivariate normality makes it a less reliable index (e.g., Schermelleh-Engel et al., 2003).

Study 1

Method

Participants and procedure

Three hundred and four participants (96 males and 208 females; $M_{age} = 20$, $SD = 1.17$) from a university in Southern China were invited to take part in a study about 'how people view different aspects of their personal and social life.' Data were collected using the survey platform Qualtrics. The link of the study was distributed to participants via mass email to a course. Items were prepared in English, and subsequently translated into Mandarin and back translated by two people fluent in both languages. The minimum recommended sample size to detect moderate effect sizes ($\delta = 0.3$) in models with 5 latent variables and 12 observed variables is $N = 150$, whereas the recommended sample size given the model structure is $N = 308$ (Soper, 2019; Westland, 2010).

Materials

Gamer identification. Participants' identification with the gamer group was measured using a two-item scale adapted from Dingle et al. (2015), 'I identify with other people who play video games' and 'I see myself as a gamer' (1 = *completely disagree*, 7 = *completely agree*; α = .83).

Frequent internet user identification. Participants' identification with the internet user group was measured using a one-item measure (Dingle et al., 2015), 'I see myself as a person who uses the internet frequently' (1 = *completely disagree*, 7 = *completely agree*).

Perceived social support from gamers. Participants' perceived social support from other gamers was measured using two items drawn from a scale developed by Haslam, et al. (2005). The items were 'Do you get the emotional support you need from other people who play video games like you' and 'Do you get the help you need from other people who play video games like you' (1 = *not at all*, 7 = *very much*; α = .98).

Perceived social support from internet users. Participants' perceived social support from other internet users was measured using two items (Haslam, et al., 2005). Items were 'Do you get the emotional support you need from other people you meet on the internet' and 'Do you get the help you need from other people you meet on the internet' (1 = *not at all*, 7= *very much*; α = .94).

GAS. Participants' problematic gaming was measured using the short (seven-item) version of the scale developed by Lemmens, et al. (2009). Sample items are 'Did you think about playing a game all day long?' and 'Have you neglected other important activities (e.g., school, work, sports) to play games?' Items were preceded by 'How often during the last six months…' (1= *rarely*, 5 = *very often*; α = .96).

GPIUS2. Participants' generalized problematic internet use was measured using a fifteen-item scale developed by Caplan (2010). Sample items are 'I prefer online social interaction over face-to-face communication' and 'When I haven't been online for some time, I become preoccupied with the thought of going online' (1 = *strongly disagree*, 7 = *strongly agree*; α = .97).

Results and Discussion

To test hypotheses **H1-H3**, we specified a latent variable model in which individuals'
identification as gamers and frequent internet users predicted social support from the gamers
group and the frequent internet users group, respectively. In turn, support from these groups
predicted a higher degree of problematic engagement in gaming and internet use (see Figure
1). Overall the model fit the data adequately, with CFI = .973 and RMSEA = .067 indicating
an excellent and adequate fit, respectively. However, it should be noted that SRMR = .104
was slightly over the threshold of acceptability and chi-square was significant, χ^2 (60, N =
298) = 139.973, $p < .001$.

In line with **H1$_{a-b}$**, individuals' identification as gamers predicted social support from
other gamers, $\beta = .75$, $SE = .08$, $p < .001$, and identification as frequent internet users predicts
social support from other internet users, $\beta = .47$, $SE = .05$, $p < .001$. In line with **H2$_{a-b}$,**
individuals' perceived support from gamers predicted stronger problematic gaming, $\beta = .43$,
$SE = .033$, $p < .001$, and individuals' perceived support from internet users was associated
with stronger problematic involvement with the internet, $\beta = .34$, $SE = .06$, $p < .001$. In line
with **H3$_a$,** the indirect effect of individuals' identification with the gamer group on
problematic engagement with videogames via perceived support from gamers was significant
and positive, $\beta = .25$, $SE = .04$, 95% CI = [.175,.32]. Supporting **H3$_b$,** the indirect effect of
individuals' identity as frequent internet user on problematic engagement with the internet
via perceived support from internet users was significant and positive, $\beta = .15$, $SE = .03$, 95%
CI = [.09, .21].

In sum, this model provides support for the idea that individuals' social identities as
gamers and frequent internet users predict perceived support from ingroup members. Further,
we found that perceived support from each group was, in turn, linked to higher scores on the
GAS and GPIUS2 measures. In the next study, we attempt to replicate these findings using a

different sample. In addition, we test the social cure potential of young people's student identity.

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Study 2

Method

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Participants and Procedures

Participants were one hundred sixty students (M_{age} = 19.76, SD_{age} = 2.43; 109 were female, 45 were male, 6 unreported) from a different southern Chinese university. Data were collected using the survey platform Qualtrics. The link of the study was distributed to participants using emails and we-chat groups (a local instant-messaging app). The sample achieved enabled us to detect a moderate effect sizes (δ = 0.3) in models with 7 latent variables and 20 observed variables (recommended N = 157). However, it should be noted that the recommended sample size given the model structure is N = 223 (Soper, 2019).

Materials

Measures were the same as in Study 1. Specifically, we measured individuals' identification as gamers (two items, α = .73) and frequent internet users (one item), individuals' perceived support from gamers and internet users (each scale included two items, α = .91 and α = 81, respectively; Dingle et al., 2015)). The GAS (seven items; α = .87) and the GPIUS2 (fifteen-items; α = .90) were used to measure participants' problematic engagement with gaming and internet use, respectively. The following two new measures were included:

Identification with students. To measure to what extent individuals identified with other students, we used four items (Dingle et al., 2015). Participants were asked the extent they agreed or disagreed with each of the following items, 'I identify with students of the [University]', 'I see myself as a student of the [University]', 'I am pleased to be a student of the [University]' and 'I feel strong ties with students of the [University]' (α = .87). The word

'University' was substituted by the actual name of the university. Items were measured on a 1 = *completely disagree*, 7 = *completely agree* scale.

Perceived support from students. To measure participants' perceived support from other students, we used two items: 'Do you get the emotional support you need from other students at the [University]' and 'Do you get the help you need from other people at the [University]' (1 = *not at all*, 7 = *very much* α = .82; Haslam et al. 2005).

Results and Discussion

We tested **H1-H5** using a latent variable model in which individuals' identification as gamers, frequent internet users and students predicted social support from each of these groups. In turn, social support from gamers predicted individuals' problematic use of videogames, perceived support from internet users predicted individuals' problematic engagement with the internet, and support from other students predicted problematic engagement with both technologies. The model and the results are summarized in Figure 2. Table 2 summarizes means, standard deviations and correlation among variables.

RMSEA = .062 and SRMR = .079 indicated an acceptable model. However, CFI = .94 was slightly below the threshold of acceptability, and Chi-square was significant, χ^2 (142, $N = 154$) = 226.156, $p < .001$. Supporting **H1-2** and **H4**, individuals' identification as gamers significantly predicted perceived support from gamers, β = .82, $SE = .16$, $p < .001$. Individuals' identification as frequent internet users significantly predicted perceived support from internet users, β = .21, $SE = .14$, $p = .02$. Individuals' identification with university students predicted perceived support from university students, β = .65, $SE = .08$, $p < .001$.

Replicating results from the previous study, and supporting **H2$_{a-b}$**, perceived support from gamers was significantly and positively associated with individuals' problematic gaming behavior, β = .35, $SE = .04$, $p = .003$, and perceived support from other internet users positively predicted individuals' problematic internet behavior, β = .42, $SE = .065$, $p < .001$.

In addition, consistent with the social cure perspective and **H4$_{a-b}$**, individuals' perceived support from other students was negatively associated with problematic gaming, $\beta = -.27$, *SE* $= .057$, $p = .036$, and problematic engagement with the internet, $\beta = -.28$, *SE* $= .07$, $p = .001$.

Finally, to test hypotheses **H3$_{a-b}$** and **H5$_{a-b}$**, we examined the indirect effects of perceived support from different group memberships on individuals' technological addictions. Replicating Study 1, there was a significant indirect effect of individuals' identification as a gamer on individuals' problematic gaming via support from gamers, $\beta = .29$, *SE* $= .05$, 95% CI $= [.04, .22]$. In addition, there was a significant indirect effect of individuals' identification as internet users on individuals' problematic internet behavior, $\beta = .09$, *SE* $= .05$, 95% CI $= [.002, .19]$. Finally, there were significant negative indirect effects of individuals' identification with other students on both problematic gaming, $\beta = -.17$, *SE* $= .03$, 95% CI $= [-.13, -.007]$, and internet use, $\beta = -.18$, *SE* $= .04$, 95% CI $= [-.22, -.052]$.

This pattern of results shows the importance of considering multiple group memberships in the context of problematic gaming and internet use. Specifically, whereas individuals may draw social support from different groups, such support has very different implications depending on the identity. This study replicated many of the relationships observed in Study 1. However, the study's *N* was below the recommended sample size relative to the model complexity. In the next study, we attempt to replicate these findings in a larger and gender-balanced sample of younger people from a high school. We also introduce a measure of individuals' perceived loneliness to test **H6-8** and explore **RQ1-2**, namely the relationship between social support from the student, gamers and frequent internet users, and loneliness.

Study 3

Participants and Procedure

Seven hundred eighty two participants (M_{age} = 16.68, SD_{age} = 0.91; 365 were female, 410 were male, 7 unreported) from a high school located in southern China took part in this study. Data were collected in classrooms using paper and pencil questionnaires. The minimum recommended sample sizes to detect moderate effect sizes (δ = 0.3) in models with 9 latent variables and 24 observed variables is N = 184, whereas the minimum sample size for model structure is N = 256 (Soper, 2019).

Materials

Measures were the same as in the previous two studies, except where noted below. Individuals' identification as gamers was measured using the same two items as in Studies 1 and 2 (α = .74). In this study, we used two items to measure individuals' identification as frequent internet users, 'I see myself as a person who uses the internet frequently' and 'Being an internet-user is an important part of who I am' (α = .60). The same four items as in Study 2 were used to measure individuals' identification with other students (α = .89). Individuals' perceived support from other gamers and internet users were measured using two items for each construct (as in Studies 1 and 2, α = .89 and α = .81, respectively). Perceived support from other students at the school was measured using the same items as in Study 2 (α = .85). The GAS (seven items; α = .88) and the GPIUS2 (fifteen-items; α = .91) were used to measure participants' problematic engagement with games and internet. An additional measure of loneliness was included. The measure was prepared in English, translated into Mandarin and back-translated to ensure consistency.

Loneliness. The three-item version of the Loneliness scale (Russell, 1996; see Hughes, Waite, Hawkley, & Cacioppo, 2004) was used to measure participants' feelings of loneliness. Items were, 'How often do you feel that you lack companionship?', 'How often do you feel left out?', 'How often do you feel isolated from others?' (α = .60). Items were answered on a 1 = *hardly ever*, 4 = *some of the times*, 7 = *very often* scale.

Results and Discussion

We tested **H1-H8** and **RQ1-RQ2** using a latent variable model in which individuals'

social identities as gamers, frequent internet users and students predicted perceived support

from the corresponding groups. Perceived support from gamers predicted individuals'

problematic use of videogames, perceived support from internet users predicted individuals'

problematic internet use, and support from students predicted both forms of problematic

engagement in technologies. The measure of loneliness was added as a further mediator

between perceived support from the three groups and problematic engagement. Figure 3

presents a summary of the model, and means, standard deviations and correlations among

variables are presented in Table 3.

The model fit the data well, CFI = .97, RMSEA = .04, SRMR = .05, although χ^2 (218,

$N = 754$) = 519.733, $p < .001$ was significant. As predicted (**H1 and H4**), individuals'

identification as gamers predicted perceived support from gamers, $\beta = .77$, $SE = .06$, $p < .001$,

individuals' identification as frequent internet users predicted perceived support from internet

users, $\beta = .55$, $SE = .08$, $p < .001$, and individuals' identification as students predicted

perceived support from students, $\beta = .68$, $SE = .07$, $p < .001$.

In line with **H6** perceived support from students negatively predicted loneliness, $\beta = -$

.38, $SE = .05$, $p < .001$. Replicating previous studies (Hoyle & Crawford, 1994), the more

individuals perceived support from students the less likely they were to feel lonely.

Interestingly (**RQ1-RQ2**), perceived support from gamers, $\beta = .09$, $SE = .04$, $p = .043$ and

internet users, $\beta = .07$, $SE = .04$, $p = .097$, were only weakly (and positively) associated with

perceived loneliness. This suggests that those two forms of social support are not effective in

relieving individuals' sense of loneliness.

Supporting **H2$_a$**, perceived support from other gamers positively predicted

individuals' problematic gaming, $\beta = .39$, $SE = .02$, $p < .001$. In line with **H4$_a$** and **H7$_a$**,

problematic gaming was negatively predicted by perceived support from students, $\beta = -.22$, $SE = .03$, $p < .001$, and positively predicted by individuals' sense of loneliness, $\beta = .21$, $SE = .03$, $p < .001$. Thus, loneliness may partially mediate the association between support from students and problematic gaming.

Problematic internet engagement was positively predicted by support from internet users, $\beta = .24$, $SE = .02$, $p < .001$, supporting **H2$_b$**. Loneliness was positively and significantly associated with problematic internet engagement (**H7$_b$**), $\beta = .36$, $SE = .03$, $p < .001$. However, in this study, support from other students was not significantly related to problematic internet use (contra **H4$_b$**). $\beta = .06$, $SE = .03$, $p = .11$, suggesting that loneliness may fully mediate the association between perceived support from students and problematic internet use.

We proceeded to inspect the indirect effects of individuals' social identities on individuals' problematic engagement with gaming and the internet via support from the respective groups. Individuals' identification with other gamers predicted individuals' problematic use of videogames via support from other gamers (**H3$_a$**), $\beta = .30$, $SE = .02$, 95% CI = [.15, .24]. In addition, identification with frequent internet users predicted individuals' problematic internet use via perceived support from internet users (**H3$_b$**), $\beta = .13$, $SE = .02$, 95% CI = [.08, .17]. Individuals' identification with other students was negatively associated with higher levels of problematic gaming (**H4$_a$**), $\beta = -.15$, $SE = .03$, 95% CI = [-.15, -.05], but not significantly with problematic internet use (contra **H4$_b$**), $\beta = -.04$, $SE = .02$, 95% CI = [-.087 to .008], via perceived support from students. However, the indirect effects of identification through support and subsequently loneliness on problematic gaming (**H8$_a$**), $\beta = -.054$, $SE = .009$, 95% CI = [-.054, -.02], and internet use (**H8$_b$**), $\beta = -.094$, $SE = .02$, 95% CI = [-.12, -.06] were significant, indicating partial and full mediation, respectively.[3]

General Discussion

In this research, we examined for the first time the role of the social identities as gamers, frequent internet users and students in individuals' problematic gaming and internet use. We proposed that individuals' perception of social support from gamers, internet users or students may be predicted by the extent to which they identify as members of these groups. Moreover, we proposed that identification with these groups might predict higher (or lower, for the student identity) problematic use of technologies via perceived social support.

Across three different studies, in two different age groups, results offered support for these hypotheses. Individuals' identification with gamers and internet users consistently predicted social support from ingroup members (**H1**). Social support from gamers and internet users, in turn, predicted problematic gaming and internet use, respectively (**H2**). Thus, social support from these groups mediated the relationship between group identification and problematic engagement (**H3**). Previous studies that relied on measures of either social contact (i.e., time spent playing) or generalized measures of social support (e.g., Dupuis & Ramsey, 2011; Domahidi, et al., 2018) found no consistent relationships between social contact, social support, and problematic outcomes. However, in line with the social identity approach, findings from this research illustrate the importance of considering individuals' identification with groups, as well as whether social support comes from ingroup members. Specifically, these findings indicate that individuals are more likely to perceive as supportive interactions with members of a group they identify with (e.g., Alnabulsi & Drury, 2014; Platow, et al., 2007).

We also examined the role of the social identity as students in predicting problematic involvement in gaming and the internet. Previous research indicates that the perception of belonging to the group of peers in school has important implications for young people's health (Viner, et al., 2012; McIntyre, et al., 2018). Here, we demonstrated that identifying with either university (study 2) or high-school (study 3) students is associated with stronger

perceived social support from other students (**H4**). We also show for the first time that, in line with the 'social cure' idea, social support mediated the association between student identity and problematic engagements with videogames and the internet (**H4$_{a-b}$** and **H5**).

Study 3 also provides evidence for another potential psychological mechanism explaining the implications of different social identities in the context of problematic use of technologies. Specifically, in Study 3 we included a measure of individuals' subjective sense of loneliness. Previous research indicated that loneliness is a predictor of negative mental health outcomes among students (McIntyre, et al., 2019). Loneliness is also implicated in students' problematic use of games and the internet (e.g., Nalwa, & Anand, 2003). Conversely, identification with peers in the school context is associated with lower feelings of loneliness (e.g., McIntyre, et al., 2019). Here, we extend these findings by demonstrating that social support from students was linked to lower sense of loneliness (**H6**). This created an indirect effect of student identity, via social support and subsequently loneliness on gaming and the internet (**H7**-**H8**). In contrast, the gamer and frequent internet user identities were not strongly associated with loneliness and the coefficients were positive (**RQ1-2**).

Overall, the pattern of results emerging from this research highlights the importance of considering the interplay between different identities in the context of negative health outcomes (Wakefield et al., 2019), such as technological addictions. Whereas identification with students and the associated social support may function as a social cure, social support deriving from the gamer and internet identities had no significant association with feelings of loneliness. Potentially more problematic is the possibility that these groups may function as a social curse because the feelings of support derived by these group memberships are linked to stronger problematic usage of games and the internet.

In other words, the present findings highlight the way in which some memberships may protect individuals from harm, whereas others may play a detrimental role. Generally,

individuals who identify with a larger number of groups also adopt healthier behaviors and experience better mental health (Sani et al., 2015; Miller, Wakefield, & Sani, 2016). However, groups are characterized by different social norms and, in some circumstances, may promote negative habits and behaviors (e.g., Terry & Hogg, 1996). Thus, as our results indicate, identification with problematic groups may be associated with negative outcomes and addictive trajectories (see also Cruwys & Gunaseelan, 2016; see Wakefield et al., 2019 for a recent review).

A challenge often encountered by practitioners whose aim is to assist people in reducing or eliminating addictions is that groups characterized by problematic values and norms might still be perceived as an important source of valuable social support (Haslam et al., 2018). Perceiving social support from such groups means that individuals are less likely to embrace a healthier lifestyle or reduce harmful behaviors. This is especially true when problematic identities carry a stigma that disrupts individuals' ability to engage in other, perhaps more positive, relationships.

Research analyzing discourses about technological addictions in contemporary China suggests the emergence of deep anxieties about ongoing societal transformations, waves of moral panic equating videogames and the internet to the opium-related issues of the late Qing empire, and a focus on personal failures of self-control linked to consumerism (Golub and Lingley, 2008). Future research should examine how these stigmatizing attitudes might affect individuals' ability to depart from these group memberships or find alternative source of social support, thus sustaining problematic engagement.

Limitations and Future Directions

This research is affected by some limitations. First, in this research we examined theoretically derived propositions concerning causal relationships between variables. Nonetheless, the cross-sectional nature of the data does not allow us to draw firm causal

inferences. Other models that fit the data are possible, for instance a model in which social support predicts identification with the group, or a recursive model in which perceived social support from the ingroup may subsequently reinforce individuals' identification with the group. Additional longitudinal studies and experimental manipulations are needed to provide further support for the causal links hypothesized in these studies. For instance, future research could prime the salience of different social identities in order to examine their impact on individuals' intentions to reduce time spent playing games or surfing the internet (cf. Oyserman et al., 2007). It should also be noted that Study 2' sample size was lower than the minimum recommended in relation to the model's structure. Nonetheless, Study 2 replicated results from Study 1 and was replicated in Study 3. Convergence in results among studies strengthens our confidence in the findings.

Another limitation of this research is that a single item was used to measure individuals' identification as frequent internet users in Studies 1 and 2. Single item measures are generally subject to stronger measurement error and may be less reliable than longer scales, although time and other practical constrains may make the use necessary. It should, however, be noted that we obtained consistent results in all three studies, including Study 3 where two items were used to measure this construct in a larger sample of high school students. Moreover, results were virtually the same were only a single (similar) item was used across all studies. [2,3] Nonetheless, future research should examine individuals' identification as internet user using a larger number of items (cf. Joiner et al., 2005).

A further important direction for future research concerns potential moderators of the relationship between social support from gamers and internet users and individuals' problematic engagement in such activities. It is conceivable that this relationship might be attenuated, and perhaps even reversed, in circumstances where individuals are able to integrate online and offline social contacts. For instance, individuals who interact with people

both online and in other settings might be able to enjoy the benefit of social support and experience lower levels of loneliness, without incurring in higher risk of developing problematic engagement with the technologies (e.g., Trepte, et al., 2012). Relatedly, future research should examine whether the ability to integrate online and other contacts is a function of an 'optimal' level of identification that enables individuals to enjoy the activity without the emergence of problematic engagement. An alternative hypothesis is that different identities characterized by distinct norms may be involved in the integration of online and offline contacts (e.g., 'casual' gamers vs. 'hardcore' gamers).

Importantly, future studies should also examine the role of different social identities in enhancing individuals' ability to avoid problematic involvement in technologies. For instance, important identities might be those of family and friends (Miller et al., 2017). In addition, the content of specific social identities' norms and values may vary across cultures, and thus the weight of different identities in providing support to individuals might also change across settings. From this standpoint, it is important to further specify how a student social identity functions as a social cure in China. Decades of research in cultural psychology have shown that China is a typical place where people are socialized into an interdependent form of selfhood (see Kitayama, Dufy, & Uchida, 2007). Given that this form of self-concept emphasizes the roles and responsibilities of individuals, it is conceivable that a strong student social identity amongst young Chinese accompanies their perceptions of duties and role responsibilities as a student. And this heightened perception of student roles may have guarded them against problematic game use.

It remains an empirical question whether individuals' identification as students, along with support from other students, predicts lower problematic engagement with technologies also in Western societies, where individuals are generally characterized as having an independent form of self-concept. The role played by loneliness in mediating the relationship

between social support from students and lower problematic engagement suggests that this might be the case. Indeed, the relationships between individuals' connectedness with other students, lower loneliness and, subsequently, improved health outcomes emerge also in research examining Western samples (McIntyre, et al., 2018). It is also worth noting that social identification and independence/interdependence in self-concept are conceptually distinct, the former refers to psychological attachment to a specific social group, whereas the latter reflects the person's self-views in relation to significant others. Nonetheless, future research should consider the importance of competing, potentially unhealthy norms linked to the student identity in other contexts (Livingstone, Young, & Manstead, 2011).

Finally, in the context of addiction, research should examine when a specific identity takes precedence over the others. For instance, an important question stemming from this research is under which circumstances individuals' identity as students becomes more important than their identities as gamers, or vice versa.

Conclusions

In this article, we have introduced a social identity framework to the study of individuals' problematic engagement in gaming and internet use. The social identity approach provides a solid theoretical foundation to analyze the relationship between different group memberships and individuals' misuse of technologies. Conversely, the study of these activities might enable social identity theorists to further the understanding of the factors implied in the onset of and remission from addictions with fewer research constrains compared to those normally associated with studying other forms of (mis)use (e.g., abuse of illegal substances).

This research's focus on group memberships, and on the perceived social support from ingroup members, indicates the importance of augmenting individuals' sense of belonging and connectedness to relevant others in the context of shared and valued social

identities. Incidentally, this is a rather different approach from focusing on individuals'
alleged moral faults, spiritual decadence (Golub and Lingley, 2008) or psychological
'weaknesses'. This is also the opposite of the current practice in some areas of China to
'intern' young people in education camps. These approaches may be counterproductive and,
in line with the perspective adopted in this research, might have negative effects because they
foster isolation, disempower young people, and sever social relationships and forms of social
support. Further research using different methodologies and approaches is needed to
strengthen these conclusions and develop interventions that consider the importance of
individuals' social identities in order to help young people embrace healthier engagement
with technologies.

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Footnotes

[1] Reanalysing data without parcelling GSA somewhat reduced model fit only in Study 2
(CFI = .92, RMSEA = .062, SRMR = .08, χ^2 [247, N = 154] = 365.503, p < .001), but not

Study 1 (CFI = .97, RMSEA = .05, SRMR = .06, χ^2 [135, N = 298] = 249.680, p < .001) or

Study 3 (CFI = .95, RMSEA = .04, SRMR = .05, χ^2 [343, N = 745] = 815.489, p < .001).

Instead, not parcelling GPIUS2 affected the model fit across all three studies (Study 1 [CFI =

.93, RMSEA = .089, SRMR = .094, χ^2 [282, N = 298] = 661.668, p < .001]; Study 2 [CFI =

.77, RMSEA = .091, SRMR = .101, χ^2 [436, N = 154] = 989.307, p < .001]; Study 3 [CFI =

.78, RMSEA = .085, SRMR = .097, χ^2 [560, N = 746] = 3564.237, p < .001]).

[2] We reanalyzed the data in studies 1-3 using only the item 'I see myself as a …' as indicator
of identity. This item was shared across all types of identities (students, gamers and frequent
internet users). The pattern of regression reported here is virtually unchanged if only this item
is used as an indicator of individuals' identification, with the exception of Study 2 where the
indirect effect of students' identity on problematic gaming (β = - .07; p = .057; 95% CI = [-
.072, .001]) and internet identity on problematic use of the internet via support become
marginally significant (β = .08, p = .065; 95% CI = [-.006, .018]).

[3] For consistency with previous studies, we re-analyzed the model using only the following
item to measure individuals' identification as frequent internet user, 'I see myself as a person
who uses the internet frequently'. Results are virtually unchanged when the single-item
measure is included in the model, and are reported in the Appendix.

Table 1. *Means, standard deviations and correlations between variables in Study 1*

Measures	M	SD	2	3	4	5	6	7	8
1. Gamer identification	3.71	1.59	.31***	.75***	.50***	.52***	.35***	.05	-.34***
2. Frequent internet user identification	5.09	1.43		.21***	.45***	.02	.28***	-.05	-.00
3. Social support from gamers	3.58	1.79			.56***	.53***	.32***	.02	-.31***
4. Social support from internet users	4.16	1.47				.31***	.36***	-.08	-.13*
5. GAS	2.10	1.01					.61***	-.01	-.28***
6. GPIUS2	3.51	1.35						-.01	-.14*
7. Age	20	1.17							-.06
8. Gender	-	-							

Notes. *** $p < .001$, **$p < .01$, * $p < .05$. GAS = Game addiction scale, GPIUS2 = generalized problematic internet use scale 2

Table 2. *Means, standard deviations and correlations between variables in Study 2.*

| Measures	*M*	*SD*	2	3	4	5	6	7	8	9	10
1. Gamer Identification	3.34	1.73	.14	.03	.63***	.03	.02	.50***	-.03	-.01	-.39***
2. Frequent Internet User Identification	6.19	.98		.09	.29***	.21**	.13	.19*	.30***	.12	.00
3. Student Identification	5.41	1.20			.26**	.04	.63***	.02	-.08	-.06	-.04
4. Social support from gamers	2.90	1.88				.24**	.24**	.29***	.12	-.10	-.28**
5. Social support from internet users	4.00	1.60					.02	-.05	.36***	.13	.19*
6. Social support from students	5.01	1.27						-.15	-.25**	.04	-.01
7. GAS	1.53	.71							.20*	-.06	-.33***
8. GPIUS2	3.43	1.19								-.03	.20*
9. Age	19.76	2.44									.05
10. Gender	-	-									

Notes. *** *p* < .001, ***p* <.01, * *p* < .05. Gender male = 1, female = 2. GAS = Game addiction scale, GPIUS2 = generalized problematic internet use scale 2.

Table 3. *Means, standard deviations and correlations between variables in Study 3.*

| Measures	M	SD	2	3	4	5	6	7	8	9	10	11
1. Gamer Identification	4.29	1.68	.35***	-.05	.67***	.30***	.01	.09*	.47***	.19***	-.01	-.33***
2. Frequent Internet User Identification	5.01	1.32		.06	.29***	.36***	.05	.15***	.22***	.34***	.00	-.07
3. Student Identification	5.70	1.20			.04	.01	.58***	-.20***	-.21***	-.07*	.05	.03
4. Social support from gamers	3.68	1.79				.43***	.13***	.05	.40***	.21***	.01	-.29***
5. Social support from internet users	3.66	1.74					.10**	.06	.18***	.26***	-.03	.00
6. Social support from students	5.21	1.31						-.33***	-.18***	-.14***	.01	-.05
7. Loneliness	3.37	1.65							.27***	.38***	.06	.03
8. GAS	1.93	.79								.46***	.03	-.27***
9. GPIUS2	3.21	1.20									.04	.08*
10. Age	16.68	.91										-.04
11. Gender	-	-										

Notes. *** *p* < .001, ** *p* < .01, * *p* < .05. Gender male = 1, female = 2. GPIUS2 = generalized problematic internet use scale 2, GAS = Game addiction scale

Figure 1: Simplified structural equation model of the effects of the gamer and frequent internet user identities on problematic engagement with gaming and internet use via social support from each group.
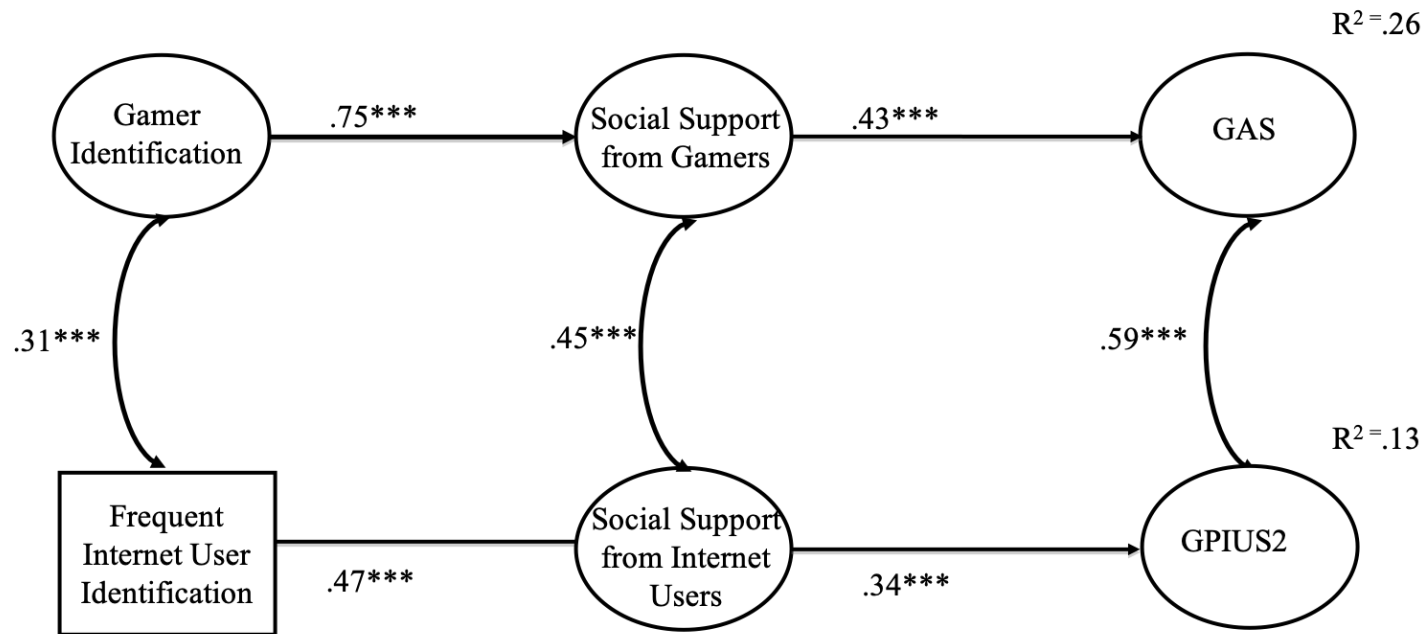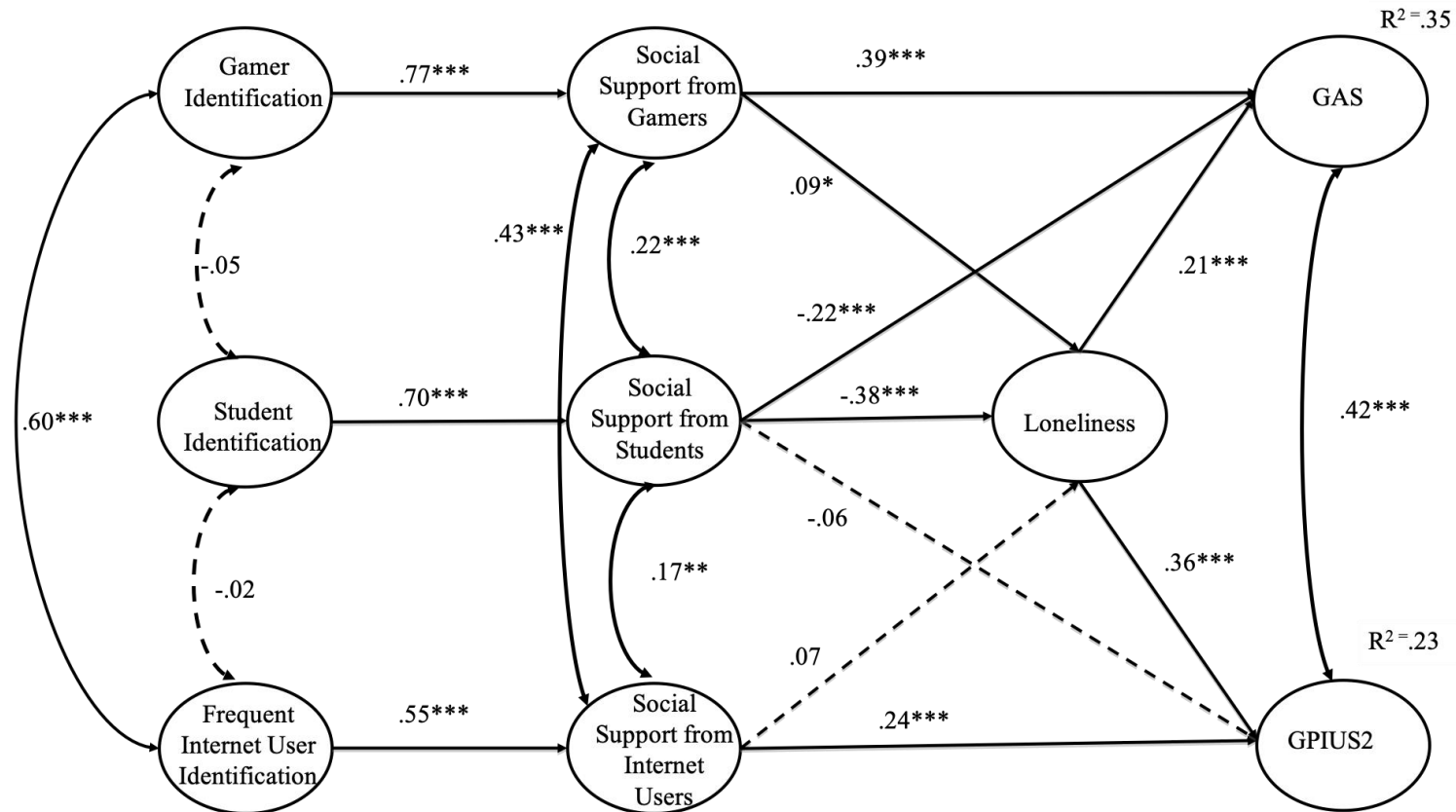

*Notes: *p ≤ .05, **p ≤ .01, ***p ≤ .001. Gender and Age are covariates in the model. The measurement model for the latent variables is not included in the figure.*

Figure 2: Simplified structural equation model of the effects of the gamer, frequent internet user, and student identity on problematic engagement with gaming and internet use via social support from each group.
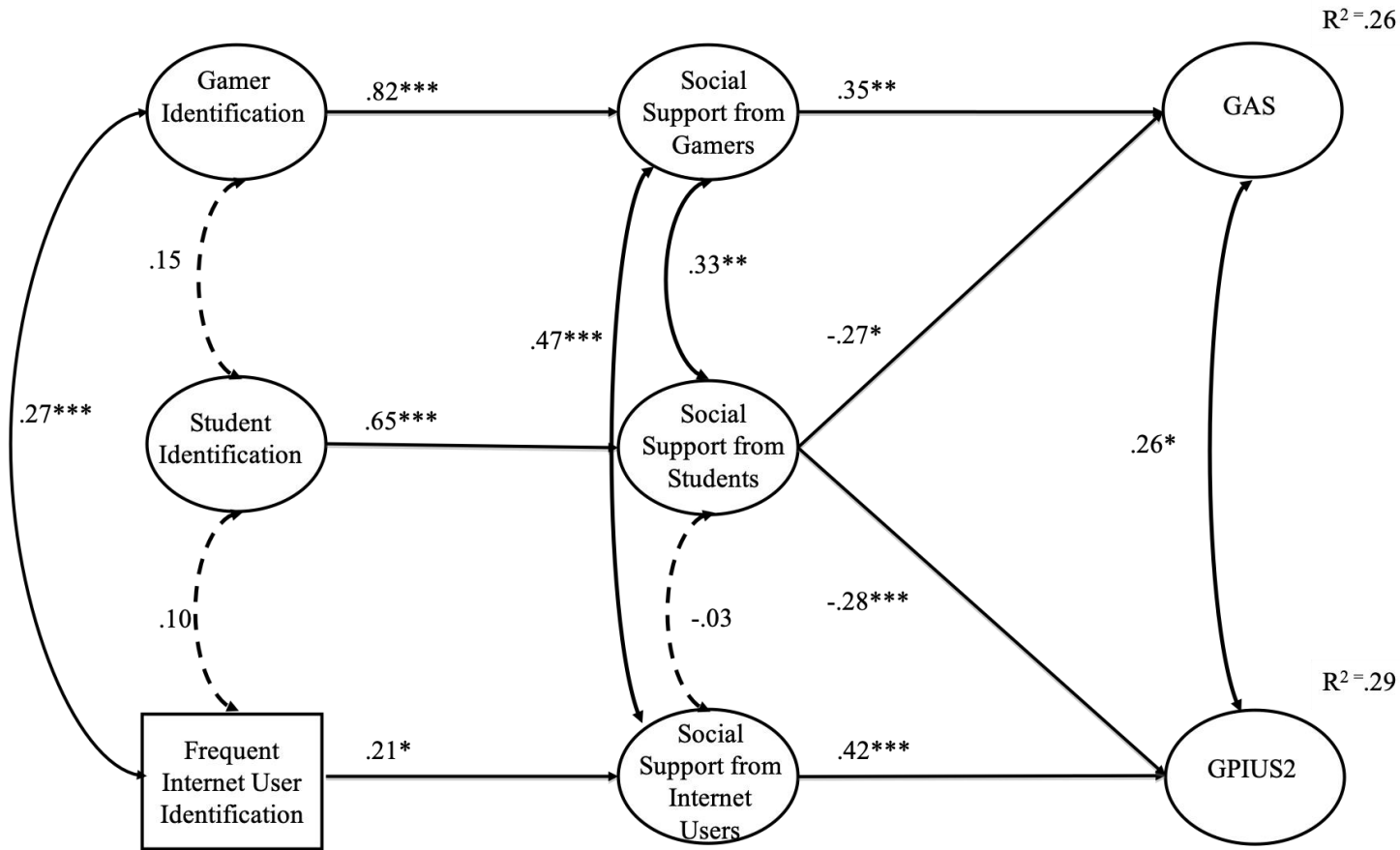
Notes: *p ≤ .05, **p ≤ .01, ***p ≤ .001. Dashed arrows represent non-significant paths. Gender and Age are covariates in the model. The measurement model for the latent variables is not included in the figure.

Figure 3: Simplified structural equation model of the effects of the gamer, frequent internet user, and student identity on problematic engagement with gaming and internet use via social support from each group and loneliness.

*Notes: *p ≤ .05, **p ≤ .01, ***p ≤ .001. Dashed arrows represent non-significant paths. Gender and Age are covariates in the model. The measurement model for the latent variables is not included in the figure.*