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RUNNING HEAD: Mobile phone involvement

Needing to Connect: The Effect of Self and Others on Young People's

Involvement with their Mobile Phones

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Abstract

The present research was a preliminary examination of young Australians' mobile phone behaviour. The study explored the relationship between, and psychological predictors of, frequency of mobile phone use and mobile phone involvement conceptualised as people's cognitive and behavioural interaction with their mobile phone. Participants were 946 Australian youth aged between 15 and 24 years. A descriptive measurement tool, the Mobile Phone Involvement Questionnaire (MPIQ), was developed. Self-identity and validation from others were explored as predictors of both types of mobile phone behaviour. A distinction was found between frequency of mobile phone use and mobile phone involvement. Only self-identity predicted frequency of use whereas both self-identity and validation from others predicted mobile phone involvement. These findings reveal the importance of distinguishing between frequency of use and people's psychological relationship with their phone and that factors relating to one's self-concept and approval from others both impact on young people's mobile phone involvement.

Keywords: mobile phone; psychology; self-identity; social influence; youth; Australia

Needing to Connect: The Effect of Self and Others on Young People's Involvement with their Mobile Phones

Mobile phones are an integral part of society with young people, in particular, embracing the technology. In Australia, youth have the highest levels of mobile phone ownership amongst all demographic groups and are prolific users of the technology (Australian Communications and Media Authority, 2008) with younger mobile phone users more likely than older users to engage in high level and problematic mobile phone use (Bianchi & Phillips, 2005; Walsh & White, 2006). For instance, younger drivers use a mobile phone while driving, particularly to send and receive text messages, more often than older drivers (Pennay, 2006; Walsh, White, Watson, & Hyde, 2007) and mobile phone debt, sometimes leading to bankruptcy, is an increasing problem for many young users (Griffiths & Renwick, 2003). Additionally, reports of 'addictive' forms of mobile use are emerging in the literature (see for example, Bianchi & Phillips, 2005; Ehrenberg, Juckes, White, & Walsh, 2008; James & Drennan, 2005; Jenaro, Flores, Gomez-Vela, Gonzalez-Gil, & Caballo, 2007; Walsh, White, & Young, 2008; Wilska, 2003).

Mobile Phone Behaviour

One of the difficulties in researching mobile phone behaviour is due, in part, to the way in which mobile phones are used. The majority of previous

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research has focussed on level of mobile phone use, assessing the amount of time spent using the mobile phone or the number of times a day a person uses their phone for calling or text messaging. However, it has been found that level of use measures may be unreliable as people tend to over or under-estimate their amount of mobile phone use, particularly the time they spend using their mobile phone when compared to their calling records (Cohen & Lemish, 2003). As Cohen and Lemish (2003) found people were more accurate in recalling the number of times per day that people used their mobile phone (frequency of use) and that combining specific measures can improve the reliability of self-report data (Kazdin, 2003), the present research used a composite measure to gauge frequency of young people's mobile phone use.

An additional consideration is that many people check their mobile phone regularly for missed messages or calls (Walsh et al., 2008~~a~~) and keep their phone in close proximity (Walsh & White, 2006) without actually using their phone; behaviours ~~which-that~~ are unlikely to be captured in measures of mobile phone use. Thus, measures relying on time or frequency of mobile phone use alone may not gauge adequately the extent to which people interact with their phones. To overcome this limitation, some recent research has developed alternative measures of mobile phone behaviour drawn from addiction literature which capture broader aspects of mobile phone behaviour

than level of use alone (see for example, Bianchi & Phillips, 2005; Jenaro et al., 2007).

Technological addictions, a subset of behavioural addictions, develop when people depend on a technological device to produce favourable outcomes (Griffiths, 1998). Over time, the activity becomes a primary source of pleasure and a major focus in the individual's life (Loonis, Apter, & Sztulman, 2000). As the dependence on the behaviour increases, the range of activities engaged in to produce positive outcomes decreases (Loonis et al., 2000) and the behaviour impacts negatively on the individual's life (Brown, 1997; Orford, 2001). Similar to other addictions, behavioural addictions are characterised by a number of symptoms including withdrawal, euphoria, conflict with other people and daily activities, cognitive and behavioural salience, and relapse and re-instatement.

Symptoms of addiction were included in a mobile phone problem use scale (MPPUS) developed by Bianchi and Phillips (2005). Problematic mobile phone use was defined as continued mobile phone use in spite of negative outcomes and societal restrictions. The MPPUS, a 27-item measure, included widely accepted addiction criteria such as tolerance, withdrawal, and euphoria. However, a number of items in the scale assessed motivational constructs (such as influences of friends). Thus, the conclusions of Bianchi and Phillips' study

may have been affected by including measurement of the influences on, rather than only symptoms reflecting, problematic use. The results of Bianchi and Phillips' study, however, provide a foundation for understanding factors impacting on people's mobile phone behaviour. For instance, younger people, extraverts, and people with lower self-esteem were more likely to engage in problematic mobile phone use. In contrast, low self-esteem did not predict amount of mobile phone use whilst age (younger) and extraversion did. The finding that self-esteem impacted on problematic use, but not amount of use, suggests that problematic users, as defined by Bianchi and Phillips (2005), may be using the mobile phone as a form of self-esteem enhancement.

More recently, Jenaro et al. (2007) assessed the effect of depression, anxiety, and unhealthy behavioural patterns, such as not sleeping well, on cell-phone (mobile) over use. These authors developed a cell-phone over-use scale (COS) based on the DSM-IV pathological gambling criteria (American Psychiatric Association, 2000) and posited that people who demonstrated symptoms of pathological phone use may also engage in other pathological behaviours (substance abuse and dependency and pathological gambling). A lack of association was found between the COS and the other pathological behaviours measured leading the authors to conclude that criteria pertaining to pathological disorders may not be transferable to behavioural addictions.

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Additionally, it may be premature to categorise mobile phone over- use or over-involvement as a pathological behaviour.

Pathological addictions are generally associated with significant harms to the self and others with the person's daily activities being severely impacted (Lemon, 2002; Orford, 2001). Thus, the terminology 'pathology' may be more appropriate to substance addictions or severe behavioural addictions, such as gambling. Although some mobile phone users are experiencing negative consequences (e.g., debt) and use their phones at inappropriate and sometimes dangerous times (e.g., when driving), it is not, as yet, evident that these negative consequences are sufficiently debilitating to warrant the behaviour being labelled pathological. Many mobile phone users report significant lifestyle benefits (such as improved social inclusion) (Ling, 2004; Peters & ben Allouch, 2005; Walsh & White, 2006) and, whilst some people may demonstrate signs of addiction, it is not clear whether problematic outcomes outweigh the benefits of the behaviour. Thus, rather than pathologising what may be an adaptive behaviour for some young adults or categorising such behaviour as problematic, it may be more appropriate to adopt Orford's (2001) approach of viewing behavioural addictions as an over-attachment to an activity which is psychological in nature.

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Some evidence for this approach was demonstrated by a recent qualitative study reporting symptoms of behavioural addiction in a sample of young Australian mobile phone users (Walsh et al., 2008a). Using Brown's (1993, 1997) behavioural addiction components as the data analysis framework, varying levels of withdrawal, salience, loss of control, euphoria, and conflict were revealed. For instance, participants demonstrated conflict with other activities when describing how they used their mobile phone when they were meant to be performing other activities, such as working or listening to lectures. This finding is also supported by other studies in which many mobile phone users' reported using their phone while driving (Pennay, 2006; Walsh et al., 2007). Additionally, withdrawal or psychological distress (such as feeling lost, depressed) when unable to use the mobile phone was also noted. Most participants, however, ensured that the opportunity for withdrawal did not occur by ensuring that the mobile phone was always usable suggesting that it is the thought of being without their phone which may cause distress (Walsh et al., 2008a). In addition to symptoms similar to an addictive behaviour being revealed in Walsh et al.'s (2008a) study, some users reported that their mobile phone was like an appendage and an important part of their self-concept. Additionally, the phone was believed to be a vital tool for remaining in contact

with others. These results indicate that both self-identification and the influence of others may be associated with mobile phone behaviour.

Self-identity and Validation from Others

Self-identity develops over time as externalised roles and behaviours become an internalised part of the person's self concept (Gergen, 1971; Stryker, 1987). Behaviours which are positively reinforced and perceived as beneficial are more likely to become a valuable part of people's self-identity. Additionally, the notion of the extended self allows for the incorporation of objects into our self-identity if such objects are believed to reflect our self-concept (Belk, 1988). Younger people have been found more likely to have a materialistic orientation which leads them to develop addictive patterns of behaviour as they seek to own and use objects which represent their attitudes, values, and societal position (Dittmar, 1992, 2004, 2005). Mobile phones have been recognised as a form of self-expressive identity (Mannetti, Pierro, & Livi, 2002; Walsh & White, 2007) with many mobile phone users personalising their phones to express their identity by decorating their phones and having unique ring-tones (Goggin, 2006; Katz & Sugiyama, 2005). Self-identity has also been found to predict level of mobile use, with use increasing as self-identification as a mobile phone user increases (Walsh & White, 2007). These findings suggest it may be worthwhile to assess whether self-identity is related to the level of

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involvement that people have with their mobile phone to improve our understanding of the connection between material objects and behaviour.

In addition to the effect of self-identity, it is likely also that the level of involvement people have with their mobile phones is related to their motivation for the behaviour. People are more likely to develop an over-attachment to an activities or behaviours which produce positives outcomes and are socially reinforced (Orford, 2001). One fundamental human motivation is belonging or having strong attachments to others (Baumeister & Leary, 1995). People who feel valued and cared about by others have enhanced self-esteem and psychological well-being (Baumeister & Leary, 1995). These positive outcomes may be particularly applicable to people whose self-worth is contingent on approval from others as they place stronger emphasis on relationships with other people for external validation of their self-worth than people whose self-worth is intrinsically derived (Crocker & Wolfe, 2001).

Research has consistently shown that many young people believe mobile phone use enhances social inclusion by allowing them to remain in contact with friends and peers at all times (see for example, Ling, 2004; Peters & ben Allouch, 2005; Wei & Lo, 2006). Additionally, some mobile phone users report feeling loved and valued when they receive contact on their mobile phone (Walsh, White, & Young, 200~~986~~) and that positive messages are stored

on mobile phones so they can be re-read when the user is feeling low (Srivastava, 2005). In contrast, not receiving contact can result in people feeling uncared for by others (Geser, 2004; Walsh et al., 2008~~b~~⁹) with ostracism from text messaging reducing self-esteem (Smith & Williams, 2004). The above findings suggest that validation from others, which potentially enhances feelings of self-worth (Crocker & Wolfe, 2001), is a positive outcome for some mobile phone users. As people's level of involvement with an activity increases when positive outcomes are associated with performance of the behaviour (Loonis et al., 2000; Orford, 2001), it may be that people who receive validation from others via their mobile phone are more likely to engage in highly frequent use and become over-involved with their mobile phone in a manner similar to an addictive pattern of behaviour.

The Present Research

The present study sought to build on previous mobile phone research by exploring 1) young people's mobile phone behaviour, specifically, the relationship between their frequency of mobile phone use and their mobile phone involvement and 2) psychological factors influencing each behaviour. Similar to other studies ~~which~~that have sought to develop alternative measures of technological engagement, we used the framework of Brown's (1993, 1997) behavioural addiction components as the basis for measuring mobile phone

involvement. Brown's (1993, 1997) components have been adapted to measure engagement with technologies such as computers (Charlton, 2002; Giles & Price, 2008) and online games (Charlton & Danforth, 2007) and include symptoms such as cognitive and behavioural salience, withdrawal and loss of control (see Table 1). As the number of behaviours which can have addictive qualities is quite broad, Lemon (2002) argues that measures specific to the behaviour being examined must be developed. Thus, we used the participants' descriptions of mobile phone use, reported in Walsh et al.'s. (2008~~a~~) study, that reflected Brown's (1993, 1997) behavioural addiction components for the wording of items measuring mobile phone involvement.

Insert Table 1 about here

The research used a population of Australian youth aged between 15 and 24 years. Youth are the first generation to have grown up with mobile technology and, thus, provide a unique cohort to monitor the emergence of new patterns of mobile phone behaviour. In contrast to older Australians, youth have integrated mobile phone use into their daily lives with some young Australians engaging in excessive and/or problematic mobile phone use (Bianchi & Phillips, 2005; James & Drennan, 2005; Mathews, 2004; Walsh & White, 2006). As

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such, it would be expected that youth are the most likely group to show signs of high involvement with their mobile phone. Youth are also at a developmental stage in life where they are developing their own self-concept and are highly dependent on the approval of friends and peers to maintain their self-esteem (Arnett, 2004; Smetana, Campione-Barr, & Metzger, 2006). Thus, we included two psychological factors, self-identity and validation from others, to explore the effect of these influences on young people's mobile phone behaviour.

Three additional factors, age, gender, and mobile phone payment method, were entered into the model as control factors. Although the age range in the present research was restricted to youth aged between 15 and 24 years, Australians in this age range are at different stages of development. Younger people are more likely to be living at home and attending school, and, as such, their mobile phone use may be influenced by parental and school rules (Mathews, 2004) whilst older youth who live out of home may have fewer restrictions on their mobile phone use (Walsh & White, 2006). Similarly, gender differences may impact mobile phone use. Whilst some authors have found no differences in the amount that each gender uses their mobile phones (Peters, Almekinders, van Buren, Snippers, & Wessels, 2003; Rees & Noyes, 2007), others report that differences exist in the way genders use their mobile phone (Lemish & Cohen, 2005; Leung & Wei, 2000). Given these previous

findings, both age and gender effects were controlled for in this study. The final control variable in the present study was type of mobile phone payment method. Many young people are on limited incomes with cost of mobile phone use impacting on how much they use their phone (Walsh & White, 2006). There are now a large range of mobile phone payment methods with many options offering high levels of use for a fixed cost. As such, payment method may influence mobile phone use and, thus, this factor was controlled for in the current study.

In summary, the present research was a preliminary investigation of psychological factors influencing young people's mobile phone behaviour. The study explored the relationship between frequency of mobile phone use and mobile phone involvement and gauged the effect of self-identity and validation from others on young people's mobile phone behaviour to explore whether the predictors of each behaviour differed. To achieve these goals, a descriptive measure of mobile phone involvement, based broadly on Brown's (1993, 1997) behavioural addiction components was developed.

Method

Design and Procedure

The study was a cross-sectional design using a self-report questionnaire. Prior to commencement of the study, ethical approval was obtained from the

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university's human ethics research committee. Public and private high schools, universities, and youth organisations (such as church youth groups) were emailed the details of the study. These organisations either arranged for the researcher to visit the location to distribute hard copies of the questionnaire to ~~students-participants~~ or forwarded details of the research on to ~~their~~ ~~students~~their members who contacted the researcher for copies of the questionnaire. Parental consent was obtained for participants under 16 years of age.

The majority of participants (83%) completed hard copies of the questionnaire during testing sessions conducted at schools and universities in Brisbane, Queensland. The remaining participants were emailed or posted copies of the questionnaire, which they returned to the researcher. All contact details and email addresses were deleted to maintain anonymity of participants. No other identifying information was collected. A participation incentive of an entry to win one of ten AUD\$20 shopping vouchers or double movie passes was offered.

Participants

Nine hundred and forty-six participants, 387 (40.9%) males and 557 (58.9%) females, (2 failed to report gender) aged between 15 and 24 years ($M = 18.27$, $SD = 2.57$) took part in the study. The majority of participants (82%)

were full-time students with the remainder working in a wide variety of occupations ranging from hospitality to professional positions.

Measures

The questionnaire measured demographics, frequency of mobile phone use, mobile phone involvement, self-identity, and validation from others.

Frequency of mobile phone use.

Four open response items assessed the average number of calls made, calls received, texts sent, and texts received by participants on their mobile phone each day. An example item was “On average, how many calls would you make on your mobile phone per day?” The four items: text messages received; text messages sent; calls received; and calls made; were summed forming a scale reflecting average daily frequency of mobile phone use ($\alpha = .80$). Participants also indicated their mobile phone payment method (e.g., pre-paid, monthly account).

Mobile phone involvement questionnaire (MPIQ).

An 8-item measure of mobile phone involvement based broadly on Brown’s behavioural addiction components (1993, 1997) was developed. The descriptions of mobile phone behaviour reported by participants in Walsh et al.’s (2008) study were adopted to form an initial pool of 25 items, scored on a

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7-point Likert scale, 1 (*strongly disagree*) to 7 (*strongly agree*). Multiple items assessing each of the eight symptoms described in Table 1 were created.

First, data were inspected for breaches of normality. Seven items had bimodal or extremely skewed distributions and were removed from further analysis. The majority of the remaining items were mildly skewed; however, as skewness is less problematic with a large sample size (Tabachnick & Fidell, 2007), raw distributions were retained. Correlations were then conducted between the remaining 18 items. Three items had extremely low correlations (from $r = .0 - .25$) with other items in the analysis. As correlations of below .30 are difficult to interpret (Tabachnick & Fidell, 2007) and it would be expected that symptoms would be related to each other, these items were removed.

Items were then selected on the basis of previous research and normality statistics. For instance, two items measuring euphoria assessed feelings of connection and excitement, respectively. As previous research has found that connectedness to others is a positive emotion valued by many mobile phone users (Peters & ben Allouch, 2005; Walsh et al., ~~2008~~2009; Wei & Lo, 2006) and the connectedness item had a less extreme skew (.33) than the item asking whether participants felt excited when contacted on their mobile phone (-.66), the item “I feel connected to others” was retained in the scale. This process proceeded until the final eight items, shown in Table 2, were selected.

A principal components analysis revealed that the eight items were assessing a unitary construct. One component, explaining 39.62% of the variance, emerged. Items were then summed and averaged with reliability analyses revealing that the MPIQ had moderate reliability ($\alpha = .78$).

Insert Table 2 about here

Self-identity.

Three items (based on Terry, Hogg, & White, 1999) assessed self-identity or the value of the behaviour to an individual's self-concept. These items were "Using a mobile phone is very important to me"; "I feel as though a part of me is missing when I am without my mobile phone"; and "I cannot imagine life without my mobile phone", scored *strongly disagree* (1) to *strongly agree* (7). Principal component analysis revealed the items were unidimensional explaining 68.70% of the variance. A reliable scale ($\alpha = .78$) was formed by summing and averaging the items.

Validation from others.

Three items, "I feel valued when I receive lots of mobile calls or messages"; "Receiving mobile phone calls or messages does not make me feel special" (reversed); "Receiving a mobile phone call makes me feel loved",

scored *strongly disagree* (1) to *strongly agree* (7), were developed to measure validation from others. These items were developed after reviewing previous mobile phone research (e.g., Walsh et al, 2009~~88~~; Wei & Lo, 2006), which reported these commonly cited positive outcomes of mobile phone use.

Principal component analysis revealed the items measured a unitary construct explaining 72.69% of the variance. The items were then summed and averaged to form a reliable measure ($\alpha = .81$).

Results

Frequency of Mobile Phone Use

As shown in Table 3, text messaging was the most common form of mobile phone use. Additionally, participants reported that they were more likely to receive, rather than make, text messages and calls on their phone. In total, participants used their phone for calls or text messages an average of 18.10 ($SD = 20.30$) times per day.

Insert Table 3 about here

With respect to type of mobile phone payment method, most participants (61.3%) pre-paid for their use with the remainder using monthly

plans. Payment method was dichotomised as pre-paid vs not pre-paid in the following regression analyses.

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As shown in Table 2, the most commonly endorsed item on the MPIQ was withdrawal, followed by euphoria. Cognitive salience was least likely to be reported by participants. The average score on the MPIQ was 3.46 ($SD = 1.1$) and data were distributed normally.

~~Data were analysed further to gauge whether the MPIQ adequately identified people who were highly involved with their mobile phone. Participants who scored five or higher (out of a possible seven) on the MPIQ were classified as being highly involved with their mobile phone ($n = 84$, 8.87%) whilst participants who scored less than 3 were not ($n = 192$, 15.43%). Examination of the raw data revealed that participants classified as highly involved had positively endorsed at least five out of seven of the items in the measure indicating that those participants reporting high mobile phone involvement reported that they experienced the majority of symptoms measured by the MPIQ.~~

Frequency of Use and Involvement

A low, but significant, correlation was found between frequency of use and mobile phone involvement, $r = .30$, $p < .01$. ~~To examine this finding further,~~

~~the data for participants who scored high on the MPIQ were compared with low scorers. High scorers used their mobile phone significantly more times per day ($M = 34.84, SD = 26.25$) than low scorers ($M = 14.54, SD = 13.71$), $t(397) = 9.665, p < .001$.~~ Thus, although the relationship between mobile phone involvement and daily frequency of mobile phone use is relatively weak, people who are highly involved with their phone use their phone more frequently than those who are not highly involved.

Self-identity and Validation from Others

Hierarchical regression analyses were conducted to examine the role of self-identity and validation from others on frequency of mobile phone use and the MPIQ. Age, gender and payment method were entered at Step 1, with self-identity and validation from others entered at Step 2. Due to the large sample size, a cut-off value of .001 was used to reduce the potential for Type I error (Tabachnick & Fidell, 2007).

As shown in Table 4, ~~self-identity and validation from others~~the Step 2 variables significantly improved prediction of both frequency of use and mobile phone involvement over the control variables. Self-identity and validation from others accounted for a relatively small amount of variance (7%) in frequency of mobile phone use, compared to the 56% of variance explained in scores on the MPIQ. Self-identity was the only significant predictor of frequency of mobile

phone use, whilst both self-identity and validation from others predicted mobile phone involvement. Thus, the effect of self-identification and validation from others differs according to the type of mobile phone behaviour being assessed, with validation from others only being associated with mobile phone involvement.

Discussion

The present research comprised a preliminary investigation of psychological factors influencing young people's mobile phone behaviour. The study explored the relationship between frequency of mobile phone use and mobile phone involvement, people's cognitive and behavioural interactions with their mobile phone. Additionally, the study explored the ~~effect~~ of association between self-identity and validation from others on frequency of mobile phone use and mobile phone involvement. A parsimonious measure of mobile phone involvement, the MPIQ, was developed. Preliminary evidence suggested that the MPIQ was a reliable measure for this initial investigation into the relationship between frequency of mobile phone use and mobile phone involvement and the predictors of these behaviours. Findings revealed that self-identity predicted frequency of mobile phone use whilst both self-identity and validation from others predicted mobile phone involvement. These results

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indicated that different psychological influences are associated with each form of young people's mobile phone behaviour.

Results in this study reveal that high frequency of mobile phone use differs from involvement with mobile phones as the association between frequency of use and MPIQ scores was relatively small (.30). Additionally, the predictors of each behaviour differed. This finding may be due, in part, to the way mobile phones are used. Measures of frequency of mobile phone use (including in this study) generally assess the number of times a day a person uses their phone for calls or text messages. As stated previously, many people check their phone for missed messages or calls without actually using it. Thus, measures of frequency of use may not adequately gauge the extent to which people are involved with their phones. To overcome this conceptual confusion, we developed a mobile phone involvement questionnaire which included both the cognitive and behavioural aspects of mobile phone use. Participants in this study reported symptoms such as cognitive and behavioural salience, withdrawal, euphoria and tolerance to varying degrees. The findings in this study suggest that mobile phone involvement has some similarity to a behavioural addiction and is qualitatively different ~~to~~from the frequency or amount that people use their mobile phone. Therefore, mobile phone involvement appears to warrant investigation as a unique phenomenon.

~~Approximately 8% of participants in this study positively endorsed the majority of items in the MPIQ. Results in this study~~ indicating that some Australian youths' mobile phone behaviour is impacting on their daily functioning. Although symptoms in the MPIQ were based on behavioural addiction components, this finding does not necessarily indicate the presence of a new pathological or problematic condition but signals that some young people are demonstrating an excessive attachment to their mobile phone similar to the definition of a behavioural addiction (Orford, 2001). Further investigation is required to gauge the relationship between scores on the MPIQ and the extent of negative consequences, such as significant interruption to daily activities including work, driving, and sleep; anxiety when unable to use their phone; and problematic outcomes including inability to pay mobile phone bills; before stronger conclusions about any pathology can be made.

With respect to the influences on young people's mobile phone behaviour, it was found that self-identity predicted both frequency of mobile phone use and mobile phone involvement in this study. These findings support previous research indicating that self-identity influences level of mobile phone use (Walsh & White, 2007) and behavioural addictions (Dittmar, 2004; Koski-Jannes, 2002). In contrast, validation from others predicted mobile phone involvement but not frequency of use. Thus, whilst self-identification

influenced both frequency of use and involvement with mobile phones, validation from others was only associated with young people's level of mobile phone involvement in this study. This finding supports claims that over-attachment to activities, as measured by involvement in this study, is related to the positive expectancies of behaviours and that psychological factors underlie addictive patterns of behaviour (Orford, 2001). Results in this study suggest that young people who reported high involvement with their mobile phone obtain feelings of validation from others (such as feeling valued, loved) indicating that mobile phone use may enhance one's self-esteem.

This link between validation from others and mobile phone involvement is particularly concerning for youth who are at a life stage in which they are developing their self and social identities (Arnett, 2004). Although feelings of connection and belonging promote self-esteem and enhance psychological well-being (Baumeister & Leary, 1995), if young people become reliant on the mobile phone for these positive outcomes, they may not develop alternate strategies (Loonis et al., 2000) to facilitate social connection and their ability to self-manage their self-esteem may be reduced. It may be also that a positive feedback loop develops with mobile phone behaviour leading to positive outcomes (e.g., feeling valued by others) which subsequently reinforce continued behaviour. Thus, over time the benefits of positive feelings may be

negated by a reliance on the device as the primary method to produce this outcome. As addictive patterns of behaviour which develop in adolescence often continue into adulthood (Piko, 2006), further research is required to understand fully the developmental trajectory of this newly identified behaviour and whether similar processes underlie people's use of other mediated communication technologies, such as social networking sites.

Although the study comprised a novel approach to examine a young people's mobile phone behaviour, there were a number of limitations and future research directions that should be noted. It was not possible to explore the effect of all demographic factors, such as living environment, in this study. Youth who live at home are likely to be subjected to parental restrictions (Giles & Price, 2008; Mathews, 2004) which may impact on their mobile phone behaviour. Additionally, the majority of participants (83%) completed the questionnaire during testing sessions in schools and universities in Brisbane, Queensland. As youth are highly responsive to social pressures (Smetana et al., 2006) it may be that the presence of friends and peers influenced responses. Future research should adopt a data collection method that reduces the potential for response bias and broadens the participant pool to a wider community of Australian youth.

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It should also be noted that the amount of total variance in frequency of use explained by the predictors was relatively small (8%). It may be that the frequency of use measure employed in this study did not adequately capture this construct as people's frequency of mobile phone use may vary in different circumstances. Closer examination of the reason for, and type of, mobile phone use (e.g., business, personal, romantic partners) may improve the reliability of the frequency of use measure and enable a more specific examination of the role of various predictors on different types of mobile phone behaviour. Further research is also required to examine the relationship between problematic outcomes and the mobile phone behaviours explored in this study.

Additionally, only two predictors were included in this study as the research was a preliminary examination of psychological factors influencing young people's mobile phone behaviour. It is likely that other factors may affect young people's mobile phone use. Youth are developing their social networks and are highly responsive to normative pressures from friends and peers (Smetana et al., 2006) and thus, social influences, such as referent group norms, may influence young people's mobile phone use. Additionally, validation from others was found to predict mobile phone involvement suggesting that people for whom approval from others is important may be more likely to develop a reliance on the mobile phone. It is possible, then, that

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young people low in self-esteem or with a strong need for attachment to others may be most at risk of developing a pattern of behaviour similar to an addiction. Future research could include specific measures of self-esteem, social identification, and relevant behavioural motivations, such as belonging, to compare which factors are most strongly associated with young people's mobile phone behaviour and to investigate the possible development of a positive feedback loop among the constructs.

Overall, this study provided a preliminary examination of the psychological underpinnings of young people's mobile phone behaviour. A small, but significant, relationship was found between frequency of mobile phone use and mobile phone involvement, with mobile phone use increasing as involvement increased. Importantly, however, different factors influenced each behaviour. Whilst self-identification predicted both frequency of use and mobile phone involvement, validation from others only predicted youth's involvement with their mobile phone. The results of this study suggest that it is young people for whom mobile phone use positively reinforces their self-concept and who perceive they are valued by others, based on their mobile phone contact, who are most likely to become highly involved with this communication technology tool. Given the prevalence of mobile phone behaviour, particularly amongst Australian youth, results in this study provide a

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solid foundation for future research investigating the psychological factors underlying this pre-dominant behaviour by revealing the relationship between self and social factors on young people's mobile phone behaviour.

Table 1

Brown's (1993, 1997) Behavioural Addiction Components

Salience - cognitive	The activity dominates the person's thinking.
- behavioural	The activity dominates the person's life.
Conflict - interpersonal	Performance of the activity leads to conflict with other people.
- other activities	Performance of the activity conflicts with other aspects of the person's life.
Relief/ euphoria	Positive emotions result from engaging in the activity
Loss of control/ tolerance	The person loses control of how much they perform the activity as the behaviour needs to be engaged in a greater extent to experience euphoria.
Withdrawal	Unpleasant emotions are experienced when the person is unable to perform the activity.
Relapse and reinstatement	The activity is resumed at the same level following attempts to reduce it.

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Table 2

Mobile Phone Involvement Questionnaire (MPIQ): Item Means, Standard Deviations, and Component Loadings

Item	Mean	SD	Component loading
I often think about my mobile phone when I am not using it (cognitive salience)	2.54	1.58	.66
I often use my mobile phone for no particular reason (behavioural salience)	3.61	1.83	.71
Arguments have arisen with others because of my mobile phone use (interpersonal conflict)	2.51	1.73	.54
I interrupt whatever else I am doing when I am contacted on my mobile phone (conflict with other activities)	3.81	1.79	.61
I feel connected to others when I use my mobile phone (euphoria)	4.15	1.71	.66
I lose track of how much I am using my mobile phone (loss of control)	4.03	1.79	.58
The thought of being without my mobile phone makes me feel distressed (withdrawal)	4.43	1.89	.62
I have been unable to reduce my mobile phone use (relapse and reinstatement)	2.86	1.70	.65

Mobile phone involvement

Table 3

Frequency of Mobile Phone Use (per day)

	Mean	SD	Median	Range
Text messages received	7.41	9.31	5.00	0 - 100
Text messages sent	6.93	8.30	5.00	0 - 80
Calls received	3.13	3.82	2.00	0 - 55
Calls made	2.53	3.20	2.00	0 - 55

Mobile phone involvement

Table 4

Regression Analyses: Self-identity and Validation from Others on Frequency of Mobile Phone Use and Mobile Phone Involvement

Variable	<i>R</i>	<i>R</i> ²	<i>R</i> ² Δ	<i>F</i>	<i>df</i>	<i>B</i>
Prediction of frequency						
Step 1	.08	.01	.01	1.81	3,923	
Age						-.01
Gender						.04
Payment method						-.06
Step 2	.28	.08	.07	36.50*	2,921	
Self-identity						.29*
Validation from others						-.06
Prediction of involvement						
Step 1	.14	.02	.02	6.35*	3,928	
Age						-.06
Gender						.02
Payment method						.01
Step 2	.76	.58	.56	621.49*	2,926	
Self-identity						.67*
Validation from others						.19*

* $p < .001$ NB: Weights are at the final step of the analyses

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