COVER SHEET

Ring, ring, why did I make that call? Mobile phone beliefs and behaviour amongst Australian

university students.

Introduction

Mobile phone use is a highly prevalent behaviour, particularly amongst adolescents and young adults; however, there is little research investigating psychological factors influencing mobile phone use. This study adopted a theory of planned behaviour belief-based framework to investigate whether young adults who engaged in high and low level mobile phone use differed in their behavioural, normative and control beliefs in relation to mobile phone use.

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Young Australians have rapidly embraced mobile phone technology. Overall, the

number of Australians owning a mobile phone rose from 14 million (64% of the population) in

2002 to an estimated 19 million (94% of the population) in 2004 (see Allen Consulting Group,

2005 for a review) with adolescents and young adults being recognised as prolific users of the

technology. Although mobile phone use is widespread amongst this cohort, there is little

research, particularly from a psychological perspective, investigating mobile phone use

amongst young adults. A recent study of Australian adolescents concluded that the average

amount of mobile phone use per day was relatively low, with 97% of adolescent mobile phone

users making fewer than five calls per day and 85% using SMS fewer than five times per day

(Mathews, 2004). However, other researchers have identified that some Australian mobile

phone users engage in excessive and potentially problematic use (Bianchi & Phillips, 2005).

Not only are there wide variations in the level of mobile phone use, mobile phone use is also

impacting on young adults' social behaviour. As such, it is important to understand factors

influencing young people's decision-making in regard to mobile phone use.

Some social commentators have noticed that young people display their phone in

public, particularly if it is a new model, possibly to improve their status amongst peers (e.g.,

Carroll, Howard, Peck, & Murphy, 2002; Ozcan & Kocak, 2003). Others have commented on

the trend of young people to share text messages and mobile pictures amongst groups of

friends (e.g., Ling, 2000; Taylor & Harper, 2003). Thus, behaviour amongst groups is being

modified as no longer is a physical presence a requirement for social inclusion (and

exclusion). The presence of a mobile phone intrudes on face-to-face communication as a

recipient of a mobile call or message will often interrupt a conversation to answer their mobile

phone reducing the intimacy of many face-to-face conversations. Additionally, private conversations are often conducted in a public arena often within hearing distance of friends and associates (e.g., Geser, 2002; Srivastava, 2005). Mobile phone use is a relatively new behaviour and norms around appropriate use are still developing. As such, investigation of mobile phone use in social situations, in this study, will improve understanding of how young Australians incorporate mobile phone use into their lives.

Mobile phone use has been found to produce positive outcomes such as widening of young people's social networks due to ease of contact (Srivastava, 2005); increased feelings of safety and security, particularly for young females (Carroll et al., 2002) and improved contact between parents and children (Mathews, 2004). Similar to internet communication (such as email, chat-rooms), mobile phones have become useful in the initiation and development of romantic relationships with the relative anonymity of text messaging facilitating flirting via mobile phone (Ben-Ze'ev, 2005). In addition, geographical barriers are reduced, enhancing on-going communication (Peters, Almekinders, van Buren, Snippers, & Wessels, 2003). Recognition of the positive aspects of using a mobile phone has resulted in mobile phones being an important part of young people's lifestyles. In a study commissioned by Telstra, over 80% of Australian youth reported that their mobile phone was their second most necessary item, after a wallet, and over 30% reported that they felt naked when they are without their mobile phone (Galaxy Research, 2004) indicating the high value that young Australians place on their mobile phone.

However, negative outcomes arising from problematic use are becoming more widely acknowledged in both the media (e.g., Dowling, 2004; Rice, 2005; Sydney Morning Herald, 2005) and research community (e.g., Bianchi & Phillips, 2005). For instance, young adult mobile phone users experience the highest level of mobile phone debt leading to financial

difficulties for some users (Griffiths & Renwick, 2003). Mobile phone use whilst driving has been found to present a significant safety risk (McEvoy et al., 2005) yet up to 75% of young drivers report that they use their phone whilst driving (Telstra, 2004; Thompson, 2005). Additionally, problematic use such as cyberbullying (Campbell & Gardner, 2004) and use during lessons has been noted in schools and higher education institutions (Srivastava, 2005) resulting in guidelines being produced to promote appropriate use in these environments (Australian Mobile Telecommunications Authority, 2003). Telecommunications companies have also become aware of problematic mobile phone use and have developed strategies to limit mobile phone debt (e.g., Virgin Mobile, 2004) and promote safe driving practices (e.g., Telstra, n.d.); however, the effectiveness of these campaigns and the reasons why people continue to engage in these behaviour remains unclear.

Given that mobile phones have become entrenched in young people's daily lives and that problematic use is occurring, there is a need to determine factors differentiating young adults who engage in high and low level mobile phone use. As high level users are more likely to engage in problematic use (Bianchi & Phillips, 2005), understanding differences between high and low level mobile phone users may prove useful when designing strategies to discourage inappropriate use and encourage appropriate use amongst young Australians. Additionally, there has been little investigation, particularly in an Australian context, of young adults' mobile phone use. Thus, this paper reports a study investigating mobile phone usage patterns amongst young Australian adults and whether high and low level mobile phone users differ in their underlying beliefs in relation to mobile phone use.

The Theory of Planned Behaviour

An empirically validated theoretical framework which can be used to investigate the variation in mobile phone use is the theory of planned behaviour (TPB) (Ajzen, 1991).

According to the TPB, behaviour results from a rational, systematic evaluation of salient information. The most proximal determinant of behaviour is an individual's intentions or motivations to perform the behaviour. Behavioural intentions are believed to be directly influenced by three constructs, attitudes (an individual's overall, positive or negative, evaluations of the behaviour), subjective norms (an individual's perception of pressure from important others to perform or not perform the behaviour) and perceived behavioural control (PBC; the level of control an individual believes they have over behavioural performance).

Underlying the direct behavioural determinants are an individual's salient beliefs regarding the behaviour (Ajzen, 1991; Fishbein & Ajzen, 1975). Attitudes are formed on the basis of the individual's beliefs regarding behavioural outcomes (behavioural beliefs). Subjective norms reflect the individual's belief of how much important others expect them to perform or not perform the behaviour (normative beliefs) whilst PBC is believed to result from the individual's perception of factors that may inhibit or facilitate behavioural performance (control beliefs). A major advantage of utilizing a TPB framework is the ability to compare differences in beliefs between high and low level behavioural performers allowing for a rich understanding of fundamental behavioural influences to be gained.

The Present Study

The present study investigated mobile phone use amongst a university student population. First, the study examined young adults' mobile phone use in general and in a variety of social situations to improve understanding of mobile phone use patterns in this cohort. Second, the study investigated whether young adults who engage in high or low level mobile phone use differed in their behavioural (cost and benefits of use); normative (expectations of others regarding use); and control (factors controlling use) beliefs regarding mobile phone use. It was expected that young adults who engaged in high and low level

mobile phone use would differ in their specific behavioural, normative and control beliefs with respect to high level mobile phone use. In addition, predictive analyses allowed for the most important set of beliefs (amongst behavioural, normative and control beliefs) to then be identified.

Method

Design

The study was prospective in design with two waves of data collection, 1 week apart. Prior to the first wave of data collection, a pilot study was conducted to determine belief-based measures used in the wave 1 questionnaire. The wave 1 questionnaire tested the belief measures of TPB variables in relation to high level mobile phone use. The second wave of data collection comprised a questionnaire assessing level of mobile phone use during the previous week and mobile phone behaviour in a variety of social situations.

Participants

197 introductory psychology students, 49 (25%) males and 148 (75%) females, aged between 16 and 25 years (M=19.41 years, SD = 2.05) completed the main questionnaire in wave one of the study. 174 (88%) returned to complete the follow-up questionnaire 1 week later. Sample characteristics remained constant during the study. Participants were required to own and use a mobile phone for personal, rather than business, purposes and received partial course credit for their participation.

Measures

The target behaviour was high level mobile phone use, with mobile phone use defined as "make or receive calls, SMS [Short Messaging Service] and MMS [Multimedia Messaging Service], or other activities/uses". High level mobile phone use was operationalised as the number of days the participant used a mobile phone for all purposes "at least 5 times a day".

The level of five times per day was based in part on findings by Mathews (2004) and results of a pilot study which revealed the average level of use was 3.88 times per day amongst this cohort.

Elicitation study.

Eighteen introductory psychology students participated in an elicitation study to develop the behavioural, normative and control belief measures for the main questionnaire used in wave 1 of data collection. As specified by Fishbein and Ajzen (1975), only those beliefs which were reported by at least 10 percent of the sample were selected for inclusion in the main study.

Wave one – Main questionnaire.

The wave one questionnaire comprised items measuring behavioural, normative and control beliefs in relation to high level mobile phone use and general questions regarding mobile phone use. The majority of items were positively worded, with some negatively worded items incorporated to reduce response bias. The belief item responses ranged from *extremely unlikely* (1) to *extremely likely* (7).

For behavioural beliefs, participants were asked to rate how likely it would be that three benefits (e.g., communicating easily) and three costs (e.g., spending too much money on mobile phone bill) would occur if they used their mobile phone at least 5 times a day in the next week. Normative beliefs were measured by participants rating how likely it was that six referents (e.g., friends) would think that they should use their mobile phone at least 5 times a day in the next week. To assess control beliefs, participants rated how likely three external (e.g., cost) and three internal factors (e.g., forgetting to take phone with you) were to prevent them from using their mobile phone at least 5 times a day in the next week.

To obtain an understanding of young people's mobile phone use, participants completed a series questions such as length of ownership; type and cost of plan; and average number of calls and SMS sent and received per day.

Wave two – Follow-up questionnaire.

One week after completion of the main questionnaire, participants completed a second questionnaire examining their performance of the target behaviour, high level mobile phone use, in the past week and their mobile phone behaviour in social contexts. High level mobile phone use was assessed by participants indicating how many days in the past week they had used their mobile phone at least 5 times per day for any purposes; ranging from *not at all* (1) to *everyday* (7).

Mobile phone behaviour in a variety of social situations was assessed by eight items, such as "When you are in conversation with another person and you receive an SMS, generally speaking, how often would you immediately read the message?" scored *never* (1) to *always* (7). The full list of items is displayed in Table 1.

Results

General Mobile Phone Use

The majority of participants (54.3%) had pre-paid or no contracts on their phone. Of the participants who had mobile phone plans, the average cost was $36.11 a month (range $10 to $100 per month). Participants reported spending between $5 to $200 per month on their mobile phone ($M = 42.25$, $SD = 30.05$) indicating that the majority of young mobile phone users spent more on their phone than was covered by their mobile phone plan.

As expected, there was wide variation in average level of mobile phone use with some participants reporting there were days when they did not use their phone at all to others reporting they averaged 25 uses per day. Overall, participants reported using their phone an

average of 4.1 (*SD* = 3.22) times per day. With respect to type of use, SMS was the most popular form of use with an average of 4.06 (*SD* = 3.98) messages being sent per day compared to an average of 1.96 (*SD* = 1.90) calls being made per day. SMSs were also more likely to be received on a daily basis (*M* = 4.24, *SD* = 4.75) than calls (*M* = 2.6, *SD* = 2.06).

Mobile Phone Use in Social Situations

Results reveal that mobile phone use is impacting of young adults' social behaviour, (see Table 1). For example, the majority of respondents reported that they would regularly interrupt a conversation with other people to read an SMS or answer their phone. However, they were less likely reply to a message when in the company of others. Interestingly, answering a mobile call when in the company of others occurred more frequently then reading an SMS, suggesting that calls generally take priority over SMSs. Although the majority of respondents reported that they never use their mobile phone in situations when they are expected not to (e.g. movies, driving), a small number reported that societal expectations do not prevent them from using their phone. Finally, results indicate that the majority of young adults do not display their phone in public.

Insert Table 1 about here

Differences in Beliefs of High and Low Level Mobile Phone Users

To create a distinction between low and high level mobile phone users, scores were divided at the midpoint of level of mobile phone use in the past week, to create a dichotomous independent variable. Low level users (*n* = 66) were participants who reported who reported using their mobile phone at least 5 times a day *no days to half the days* in the past week, whereas high level users (*n* = 107) were participants who reported that they used their mobile

phone at least 5 times a day *most days to everyday* in the past week. Overall, high level

mobile phone users used their mobile phone at least 5 times per day on a daily basis ($M =$

6.20, $SD = .86$) compared to low level users who used their phone 5 times per day less half the

days of the week ($M = 2.90$, $SD = .94$). This result indicates that mobile phone use plays an

integral regular role in the lives of high level users.

Exploratory analyses were conducted to examine differences between high and low

mobile phone users on behavioural beliefs, normative beliefs and control beliefs. Three one-

way multivariate analyses of variance (MANOVAs) were conducted using high level mobile

phone use as the independent variable. Behavioural beliefs, normative beliefs and control

beliefs were the dependent variables. Overall, Wilk's Lambdas were significant for the three

analyses indicating that there were significant differences in behavioural, normative and

control beliefs between low high level mobile phone users.[1]

Insert Table 2 about here

Regression Analyses Investigating the Role of Beliefs on Mobile Phone Use

Whilst the MANOVA analyses identified differences in beliefs for high and low level

mobile phone users, the beliefs which are most impactful on young adults' decisions to use

their mobile phone were not revealed. A multiple regression analysis was conducted to assess

the relative importance of mobile phone users' behavioural (separated into costs or benefits or

using a mobile phone), normative, and control beliefs in predicting high level mobile phone

use. In total, the belief-based measures significantly explained 33% of the variance in level of

mobile phone use. Inspection of the beta weights revealed that the strongest significant

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[1] Main author will provide statistical details upon request

predictor of high level mobile phone use was perceived benefits arising from use. Additionally, mobile phone use is significantly related to perceived normative pressures from salient referents (e.g., friends). Neither costs nor control beliefs significantly predicted use. Thus, overall, young adults' high level mobile phone use is significantly impacted by expected benefits arising from use and perceived normative pressures to engage in use.

Discussion

Results of this study revealed that mobile phone use has been incorporated into most young adults' daily lives. It was interesting to note that the majority of young people would answer their phone or read an SMS when in the company of others. These results suggest that mobile phone use in social situations may have developed into an acceptable norm amongst this cohort. Thus, telephone communication is no longer restricted to private or personal contexts with personal calls being conducted in public situations. Answering a mobile call appears to be given more priority than responding to SMSs in social situations suggesting that receiving a call is viewed as more urgent. There is often a cost involved in retrieving a voice message, whereas a recognised benefit of using SMS is that messages are stored on the phone and can be read anytime without cost to the receiver, possibly reducing the need to respond to an SMS immediately.

Although the majority of young adults reported that they would not use their phone in contexts where they are requested not to, a small number reported that they would regularly use their phone when driving or in the movies. This finding is a concern due to the use of mobile phones in cinemas causing frustration to large number of movie-goers (ACNeilsen, 2004) and the increased risk of car accidents resulting from mobile phone use whilst driving (McEvoy et al., 2005). Thus, exploration of differences in beliefs of high and low level mobile phone users provides useful information to improve understanding of factors impacting

on young adults' mobile phone use so that strategies to overcome problematic use may be designed.

It was found that young adults' perceptions of the advantages, rather than disadvantages, of high level mobile phone use differentiated high and low level mobile phone users. High level mobile phone users were significantly more likely than low users to report that communicating easily, being readily available, and feeling safe were likely to result from high level mobile phone use. These results provide support for previous research indicating young adults use the mobile phone as a tool to increase and maintain social networks and that the phone represents a safety and security device for many users, particularly young women (e.g., Carroll et al., 2002; Ozcan & Kocak, 2003; Srivastava, 2005). The lack of significant difference in relation to perceived disadvantages of high level mobile phone use reveals that perceived negative outcomes do not influence young adult's level of mobile phone use.

Examination of normative beliefs revealed that young adults who engage in high mobile phone use differed significantly to low level users in relation to perceived approval from others to engage in high level mobile phone use. High level mobile phone users were more likely to report that friends, family members, and work colleagues would approve of their high level mobile phone use. Thus, social influence plays an important role in young adult's lives with high level mobile phone users more likely to believe that mobile phone use is an accepted and normative behaviour within their social networks. Overall, normative beliefs were revealed as the second most impactful set of beliefs on high level mobile use.

There was no significant difference between the groups in relation to beliefs relating to whether partners, mobile phone companies, and people within hearing distance would approve of high level use. Overall, both groups indicated a relatively high level of perceived approval from partners and mobile phone companies to engage in use. The finding that both groups

perceived that people within hearing distance would not approve of high level use indicates that young mobile phone users are aware of social disapproval of inappropriate mobile phone use but that this does not influence level of use. Thus, the results in respect of normative influences suggest that it is closer (i.e. family, friends) rather than more external influences which impact on young adults' mobile phone use. As such, it may be useful for campaigns designed to promote appropriate use in educational setting and wider society to emphasise that close contacts would disapprove of inappropriate or problematic mobile phone use.

Finally, the only control belief to differ between young adults who use their mobile phone at high and low levels was cost. Low level mobile phone users were more likely than high level users to report that the cost of using a mobile phone would prevent them from engaging in high level use revealing that cost is still a major factor in determining young adults' level of use in spite of the introduction of pre-paid and fixed price plans. The lack of difference on the majority of high and low level mobile phone users' control beliefs indicates that young mobile phone users do not perceive that many barriers would prevent them from engaging in high level mobile phone use, should they wish do so. Thus, young adults perceive mobile phone use to be a highly volitional behaviour with few constraints to performance.

Strengths and Limitations of the Present Research

One of the strengths of this study is the use of a theoretical framework, the TPB, to gain an in-depth understanding of individual and composite factors which impact on young adults' decisions to engage in high or low level mobile phone use. In addition, there is little research, overall, investigating young adults' mobile phone use, particularly in Australia. Use of the TPB framework and investigation of young adults' general patterns of mobile phone use further contributes to the understanding of factors influencing mobile phone use amongst

young adults by providing both descriptive and predictive information. However, the results must be interpreted in light of the limitations of the study.

One limitation to the study is that the proportion of young female participants (75%) was disproportionately high and, therefore, the study may not have provided an accurate sample of young adult mobile phone users. Whilst previous research has noted that level of use is similar for both young men and women, their reasons for use may differ (Lemish & Cohen, 2005; Srivastava, 2005). As there is no significant difference in the numbers of males and females who own a mobile phone, future research should aim to have a larger sample with a more proportionate number of young male participants

Second, the use of a student population in this study requires consideration. Cost was the only control factor which significantly differentiated between high and low level users. The income of many students is restricted and the relative costs of mobile phone use, in particular the costs of calling to and from mobile phones in Australia, is relatively high (Australian Communications Authority, 2004). It may be that cost would not be as prohibitive in a similar aged working population. Thus, future research using a population of young adults who are not students would reveal whether the results found in this study are student specific.

A further possible limitation is the use of 5 times per day to represent high level mobile phone users in this study. Although 5 times a day was above the average level of daily mobile phone use amongst this cohort, some participants reported that they used their phone up to 25 times some days. Therefore, future research should attempt to clearly distinguish high level use from above average use. Previous research has also indicated that mobile phone use on weekends is more likely to be higher than weekday use (Wilska, 2003). In this study, the point of differentiation between high and low level users was number of days per week the

person engaged in high level use with high level users using their phone at least 5 times per day most days of the week. Thus, it is possible that participants who only use their phone at high levels on weekends may have been categorised as low level users in general. Future research should investigate this important distinction between mobile phone users who engage in regular high level use and those who use their phone at high levels on weekends only.

In conclusion, this study provided an initial investigation into mobile phone use amongst young Australian adults. Results reveal that mobile phone use is a regular part of many young people's lives and is performed in a variety of social situations. It was found that young adults who engage in high level mobile phone use were more likely to believe that benefits would result from high level use and that others would approve of their engaging in high level use. In contrast, low level users reported that the major factor preventing high level use was cost. Thus, results indicate that campaigns designed to encourage appropriate mobile phone use amongst young people should adopt a multi-faceted approach incorporating both attitudinal components (such as the benefits of using a mobile phone appropriately) and normative influences (for example, highlighting that significant people would approve of appropriate use). The information obtained in this preliminary examination of mobile phone use amongst Australian university students provides a basis for future research seeking to better understand young adults' mobile phone behaviour.

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Table 1

Percentages of responses and item means for mobile phone use in a variety of social situations

	Never 1	2	3	4	5	6	Always 7	Mean (SD)
When you are in a group of people and your phone rings, generally speaking, how often would you answer your mobile phone?	1.7%	6.9%	5.2%	9.2%	14.4%	26.4%	36.2%	5.51 (1.63)
When you are having a conversation with another person and your phone rings, generally speaking, how often would you answer your mobile phone?	2.9%	9.8%	10.3%	9.8%	19.5%	23.0%	24.7%	5.01 (1.76)
When you are in a group of people and you receive an SMS, generally speaking, how often would you immediately read the message?	4.0%	10.4%	8.1%	14.5%	18.5%	20.2%	24.3%	4.90 (1.80)
When you in conversation with another person and you receive an SMS, generally speaking, how often would you immediately read the message?	11.6%	15.6%	7.5%	15.0%	20.2%	15.0%	15.0%	4.22 (1.97)
When you are in a group of people and you receive an SMS, generally speaking, how often would you immediately reply?	18.4%	10.3%	18.4%	19.0%	19.5%	6.9%	7.5%	3.61 (1.81)
When you are in conversation with another person and you receive a SMS, generally speaking, how often would you immediately reply?	28.9%	17.9%	19.7%	11.6%	9.8%	5.8%	6.4%	2.98 (1.84)
There are some times when people are expected not to use their mobile phones (e.g. movies, lectures, driving). Generally speaking, how often would you use your mobile phone in these situations?	52.3%	26.4%	11.5%	4.0%	4.6%	1.1%	0.0%	1.86 (1.18)
Generally speaking, how often is your phone visible when you are in public (e.g. on table in coffee shop, attached to belt or pocket)?	26.4%	24.7%	16.1%	14.4%	9.8%	4.0%	4.6%	2.86 (1.71)

Table 2

Mean Behavioural, Normative and Control Beliefs for Low and High Level Mobile Phone Users

Behavioural Belief	Low Users *n* = 66	High Users *n* = 107
Communicating easily	5.57	6.18*
Being readily available	5.25	6.02**
Spending too much money on mobile phone bill	4.53	5.02
Being contacted at inappropriate times	4.18	4.51
Feeling safe	4.66	5.65**
Risking exposure to radiation	3.94	4.28
Normative Belief	*n* =66	*n* =104
Friends	5.00	5.87**
Family members	3.89	4.75*
Partner/boyfriend/girlfriend	4.61	5.14
Work colleagues	3.84	4.52*
Mobile phone companies	5.09	5.54
People within hearing distance	2.73	2.88
Control Belief	*n* =65	*n* =106
Cost	5.90	4.93**
Location e.g. lectures/driving	5.19	4.87
Forgetting to take mobile phone with you	4.20	3.73
Privacy concerns	2.91	2.87
Lack of knowledge about how to use phone	1.66	1.55
Poor reception	3.29	3.50

*$p<.05$, **$p<.001$