Personality and Self-Reported Use of Mobile Phones for Games

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ABSTRACT

Mobile phones are popular devices that may generate problems for a section of the community. A previous study using the Eysenck Personality Questionnaire found that extraverts with low self-esteem reported more problems with their mobile phone use. The present study used the NEO FI and Coopersmith Self-Esteem Inventory to predict the self reported mobile phone use of 112 participants. Multiple regression found that people low on agreeableness were more likely to use their mobile phones to play games. The findings imply an interplay between personality traits and excessive or problematic use on mobile phones that is relevant to proposed innovations such as gambling on mobile phones.

INTRODUCTION

MOBILE PHONES are ubiquitous. In Australia, mobile phone connections exceeded the number of landline connections in 2001, with a nationwide estimate in 2004–2005 revealing that at least 81% of the Australian population use a mobile phone.[1] This technology has struck a strong chord within the community, and attracted interest from governments and the gambling industry.[2] It has been estimated that casinos will have a US$4.6 billion market in mobile phone gambling by 2009, with the biggest growth in this market in Asia and Australia.[3] Hence, the psychological factors influencing the use of mobile phones to play games are of interest, as they may identify a group with an interest in forthcoming innovations in mobile phone technology (e.g., gambling).

A variety of games are commercially available for mobile phones. Some of these games resemble arcade computer games, while a smaller proportion resemble games available in casinos and internet gambling sites (e.g., blackjack, poker).[4] Casino style games on mobile phones could educate players as to the rules and mechanics of these forms of gambling, and then stimulate an interest in other extant or forthcoming forms of gambling.

As technologies such as the mobile phone and the internet are recent innovations, it is reasonable to consider pre-existing mechanisms that may govern their uptake and abuse.[5,6] One approach is to consider dispositional factors. Research on addictive and problem behaviors suggests that certain personality factors may indicate a predisposition towards addiction and hence are of interest when considering mobile phone use. For instance, traits such as extraversion predict sensation-seeking behaviors.

Bianchi and Phillips[7] considered factors predisposing people to report problems with their mobile phones. Their study administered the Eysenck Personality Questionnaire and the Coopersmith Self-Esteem Inventory, to 195 participants. Bianchi and Phillips[7] found that heavier users of mobile phones tended to be young and extraverted. In addition, 2%–7% of their sample agreed (1) that they had problems controlling the time they spent on their mobile phones; (2) that they had problems paying their phone bills; (3) that mobile phones distracted them from other responsibilities; and (4) that mobile phones generated interpersonal conflict. In addition, Bianchi and Phillips[7] observed that those people who reported problems with their mobile phones were more likely to be young, extraverted,

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and have low self esteem. This implies that there is already a section of the community that may have problems controlling their mobile phone use, and this may be associated with traits such as extraversion.

Extraversion also features in the five-factor model of personality.[8,9] The five factors of (1) Neuroticism, (2) Extraversion, (3) Openness to Experience, (4) Agreeableness, and (5) Conscientiousness[10] have the potential to account for mobile phone use. For instance, extraversion and sensation seeking have consistently been linked with problem behavior, particularly forms of risk taking.[11] Individuals high in the trait of neuroticism may be prone to addiction and problem behaviours such as problem Internet use.[12] Individuals who are less conscientious may have difficulties in applying themselves and working towards goals.[9] This lack of determination may increase one's likeliness to waste time playing games. Individuals high in openness to experience are often less conforming and have more unusual and widespread interests[10]; hence, this trait might predict the uptake of new technologies. One might also expect that individuals high on agreeableness would be more likely to comply with appropriate usage guidelines and this implies that people low on agreeableness might be more likely to use mobile phones for less appropriate applications such as games. Interestingly, studies have observed greater amounts of internet use in those who are low in agreeableness.[13,14] This may reflect differences in interpersonal skill,[15] or may mean that less agreeable people just have more time on their hands,[13] In addition, low self-esteem has been linked with heavier amounts of internet use.[16,17] Hence lower self esteem could predict the use of mobile phones for solitary activities such as playing games.[15] Thus, it is expected that people who are have low self-esteem, or are higher on the traits of extraversion, neuroticism, openness to experience or low in agreeableness will be more prone to use their mobile phones to play games, or would be more interested in new developments in mobile phone technology.

METHODS

Participants

A total of 200 questionnaires were distributed to a convenience sample of participants recruited from workplaces, university campuses and the general public. Of these, 115 were returned giving an adequate response rate of 57.5%. Three returned questionnaires were blank leaving a final sample of 112 participants (78 females, 34 males). Age ranged from 18 to 59 years, with an average age of 28.36 (standard deviation = 9.87) years. The highest level of education demographic revealed that the sample were typically university graduates. Involvement was restricted to those who owned mobile phones and who were 18 years of age and over.

Materials

Coopersmith Self-Esteem Inventory. The Coopersmith Self-Esteem Inventory (SEI) is a 25-item questionnaire, developed to measure the evaluative attitudes toward the self in social, academic, family and personal areas of experiences.[18] Reliability analysis in this study produced a respectable alpha coefficient of 0.77.

NEO-FFI. The NEO-FFI is a self-administered 60-item version of the NEO PI-R Form S.[9] It is designed to measure the five major dimensions of personality, as described by the Five Factor Model of Personality. It uses five 12-item scales to measure Neuroticism, Extraversion, Openness, Agreeableness, and Conscientiousness. Participant level of statement agreement is rated on a five-point Likert scale: (1) strongly disagree, (2) disagree, (3) neutral, (4) agree, or (5) strongly agree. For the present data, the five scales had alpha reliability coefficients of 0.83, 0.81, 0.76, 0.74, and 0.81 for N, E, O, A, and C, respectively.

Mobile Phone Use Survey. The Mobile Phone Use Survey contained two sections: the first addressing demographic details; and the second specific individual mobile phone usage. The demographic section consisted of three questions enquiring about the participant's age, gender and level of education. The mobile phone usage section was made up of eight questions. The present analysis focussed upon the questions estimating the average weekly amount of time spent playing games, and degree of interest in new features of mobile phones. Other questions elicited estimates of the time spent on the mobile, and the types of mobile phone use (e.g., business, incoming/outgoing calls, social, wanted/unwanted calls, short message service [SMS]).

Statistical analysis

Scores on the Coopersmith SEI, NEO FFI and self-reported mobile phone use and interest were entered into SPSS v12.0.1 and analysed using separate multiple regressions.

TABLE 1. TOTALS, MEANS, STANDARD DEVIATIONS, MINIMUM AND MAXIMUM VALUES,
AND SKEW FOR THE NEUROTICISM, EXTRAVERSION, OPENNESS TO EXPERIENCE,
AGREEABLENESS, CONSCIENTIOUSNESS SCALES, AND SELF ESTEEM INDEX (SEI)

Predictors	n	M	SD	Minimum	Maximum	Skew
Neuroticism	112	20.73	8.04	2	38	0.12
Extraversion	112	30.26	6.57	14	43	−0.14
Openness	112	29.80	6.85	15	47	0.05
Agreeableness	112	31.82	6.14	8	46	−1.0
Conscientiousness	112	34.5	6.54	15	48	−0.45
SEI	112	75.32	16.5	32	100	−0.58

$N = 112$.

RESULTS

A small amount of random missing values were found throughout the data. Missing values in the mobile phone usage survey were assigned a score of 0. Those who failed to provide an answer to all the SEI items had mean values substituted with the corresponding item mean. Missing values found in participant responses to the NEO-FFI were dealt with according to the questionnaire manual,[9] and were assigned a neutral value.

Analysis of the independent variables

Totals, means and standard deviations were calculated for Neuroticism, Extraversion, Agreeableness, Conscientiousness and SEI, in conjunction with the minimum, maximum, and skew for each of the independent variables. The descriptive sta-

tistics for the personality scales are comparable to normative values supplied in the manuals.[9,18] Table 1 illustrates the totals, means, standard deviations, minimum and maximum values, and skew for the independent variables.

An inspection of independent variables revealed that agreeableness was negatively skewed; hence, this scale was inverted by subtracting it from its maximum value plus one before transformation. A square root transformation was used on the agreeableness variable. Due to the inversion of agreeableness this variable has now been renamed "lo-agreeableness" to help interpretation. After the application of transformations however, no univariate or multivariate outliers were identified, and so no cases had to be excluded. To test for multicollinearity, Pearson's correlations were run on all predictors after transformation, and are presented in Table 2. Although several significant correlations

TABLE 2. CORRELATIONS BETWEEN PREDICTORS AND MOBILE PHONE USE

	N	E	O	Lo-A	C	SEI	Calls	Games	Interest
Neuroticism (N)		−0.32**	0.05	0.21*	−0.30**	−0.64**	0.07	0.13	0.18
Extraversion (E)			−0.12	−0.17	0.27**	0.39**	0.22*	0.03	0.03
Openness (O)				−0.10	−0.10	−0.07	−0.01	−0.09	0.05
Lo-Agreeableness (Lo-A)[a]					−0.29**	−0.30**	0.25*	0.35**	0.21*
Conscientiousness (C)						0.33**	−0.07	−0.19*	0.03
Self Esteem Index (SEI)							−0.13	−0.19	0.08
Calls (time per week)[b]								0.16	0.22*
Games[b]									0.30**
Interest in new mobile features									

[a]Scores inverted and square root transformed
[b]Scores +1 are log 10 transformed
*$p < 0.05$
**$p < 0.01$
Lo-Agreeable = Inverted NEO-FFI agreeableness scale

TABLE 3.   TOTALS, MEANS, STANDARD DEVIATIONS, MINIMUM, MAXIMUM, AND SKEW FOR WEEKLY AVERAGE TIME (MINUTES) MAKING AND RECEIVING CALLS, AND PLAYING GAMES, AND DEGREE OF INTEREST IN NEW MOBILE PHONE FEATURES

Dependent variable	n	M	SD	Minimum	Maximum	Skew
Calls (min)	112	149.29	222.38	0.00	1080	2.498
Games (min)	112	27.72	174.53	0.00	1800	9.66
Interest in new features[a]	112	3.22	1.10	1	5	−0.54

[a]Measured on five-point scale (1 = very disinterested; 5 = very interested).

were evident all correlations were well below the selection criteria of 0.99.[19] Hence, this assumption was met.

Analysis of the dependent variables

Totals, means, and standard deviations were calculated for (a) weekly average time (minutes) making and receiving calls, (b) amounts of time spent playing games on the mobile phone; (c) and interest in the newer features of mobile phones; along with minimum and maximum values, and skew. The results are presented in Table 3. As mobile phone use variables were positively skewed, a log transform was applied after +1 was added to the scores, reducing the skew to achieve the assumption of normality.

Games

The independent variables predicted 15.9% of the variance in the amount of time spent playing games [$F(6,105) = 3.307$, $p < 0.005$]. Lo-agreeable [$t(105) = 3.08$, $p = 0.003$] people were more likely to report playing games on their mobile phones (Table 4).

Interest in new features of mobile phones

Lo-agreeableness was a possible predictor of interest in the newer features of mobile phones ($t(105) = -2.12$, $p = 0.036$; Table 2). Nevertheless,

the combination of independent variables did not predict a significant proportion of the variance. The combination of variables only predicted 8.0% of variance ($F(6,105) = 1.568$, $p = 0.164$; Table 5).

DISCUSSION

The present study sought to identify personality traits associated with an interest in potential innovations in mobile phones such as gambling.[2] People who were low on agreeableness currently report spending more time playing games on their mobile phones, but it was harder to predict an interest in the newer features of mobile phones.

The use of mobile phones for business purposes[7] led to expectations that a lack of conscientiousness might predict mobile phone use for games. In addition, relationships have been found between depression and problem gambling.[20,21] Although low conscientiousness and possibly low self esteem could potentially explain game playing, the multiple regression suggests that this is because of their correlations with agreeableness. Lower agreeableness scores explained game playing in the present study.

Agreeableness is a trait that is most concerned with interpersonal relationships, that are based on the equal and honest exchange of information.[22] People with lower agreeableness score low on trust,

TABLE 4.   STANDARDIZED REGRESSION COEFFICIENT (β), T-VALUE OF β, AND SIGNIFICANCE FOR PREDICTORS OF AMOUNT OF TIME PER WEEK PLAYING GAMES

Predictors	β	t	p
Extraversion	0.15	1.53	0.130
Neuroticism	0.02	0.17	0.868
Conscientiousness	−0.11	−1.13	0.259
Openness	−0.061	−0.67	0.503
Lo-agreeableness	0.30	3.08	0.003
SEI	−0.11	−0.88	0.380

TABLE 5.   STANDARDIZED REGRESSION COEFFICIENT (β), T-VALUE OF β, AND SIGNIFICANCE FOR PREDICTORS OF INTEREST IN NEW FEATURES OF MOBILE PHONES

Predictors	β	t	p
Extraversion	−0.099	−0.951	0.344
Neuroticism	−0.227	−1.841	0.068
Conscientiousness	−0.043	−0.412	0.681
Openness	0.017	0.181	0.857
Lo-Agreeableness	−0.215	−2.12	0.036
SEI	−0.077	−0.60	0.551

straightforwardness, altruism, compliance, modesty and tender-mindedness. An individual low on agreeableness, as described by Costa and McCrae,[9] is principally selfish, uncooperative, and not afraid to be self-centered. Indeed, Costa and McCrae[23] indicated that there is an association between lower agreeableness and Narcissistic and Antisocial Personality Disorders, raising the suggestion that a proportion of the community may be predisposed to misuse mobile phone technology.[24]

As extraverts are recognized as being gregarious and having an extensive social network,[9] it was expected that extraverts would use their mobile phones more.[7] Nevertheless, Bianchi and Phillips[7] did not find that mobiles were necessarily being used for purposes of socialization. Bianchi and Phillips[7] had suggested that extraverts used their mobiles for self-stimulatory purposes rather than socialization; hence, it was surprising that the present study did not find that extraversion predicted game playing. This may be because the dimension of extraversion has within it several disparate tendencies that make it difficult to predict game-playing behavior.[25] For extraverts, the mobile phone could serve as a form of social stimulation or as a means of self-stimulation, but for introverts, the mobile phone could serve as a form of solitary pursuit. Unfortunately, the present study did not specify the type of mobile phone game used.

Although the commercially available games for mobile phones can resemble games currently played in casinos (e.g., Blackjack), other commercially available games can resemble PC and Console games.[4] These games can exist in solitary or multi-player mode. Indeed, games played using mobile phones need not necessarily be of commercial origin. Games played using mobiles can involve informal variations on the game "tag" using communications technology (e.g., SMS, multimedia messaging service [MMS], global positioning service [GPS]) such as "look what I am doing," "guess where I am," or "find the network outage" or even on-line dating or match-making. The availability and prevalence of these games may change as the capabilities of mobiles alter.[2,4] But if the internet research of Kraut et al.[25] can guide us, it is likely that technology such as the internet or mobile phones will support and potentiate existing tendencies.

A number of features contribute to the popularity of the mobile phone, with some ongoing and forthcoming features (interpersonal communication) being more popular than others (advertising).[26] The present data indicate a general interest in new developments in this technology.[26] As a device, the mobile phone has more features that attract and capture attention than a desktop computer,[2] because it is portable and personal.[26] The mobile phone is extrinsically rewarding, as it delivers immediate access to people or services. The mobile phone is intrinsically rewarding as it offers opportunities to customise, control and manipulate the interface.[2] In particular, the immediacy and frequency of signalling has attention capturing properties[2,27] that promote regular monitoring. Games do not appear to rank as one of the most popular applications,[26] but personality traits can predict interest in this specific application. It remains to be seen whether factors like extraversion, lower agreeableness or unconscientiousness can predict the success of proposed innovations such as gambling on mobile phones.[2] But the present data implies that there is a section of the community that might abuse such services.

The opportunity to gamble exists in a variety of forms and jurisdictions and some organizations use gambling as a source of revenue.[28,29] Along with an increasing dependence on this revenue,[30] there has been a shift from the provision of gambling within established physical environments such as casinos to less regulated virtual environments.[2,31] The use of this revenue should entail an obligation to minimise harm.[32,33] Hence there is a need, not just for estimates as to the size of potential gambling markets,[3] but also for some consideration of possible harm.

There is already a section of the community predisposed to report problems with their mobile phone use,[7] and the present data suggest that some of the people who are predisposed to play games on their mobile phones may already be "difficult people." Hence, there are already some people who could be predisposed to developing gambling problems on their mobile phones if gambling on mobile phones was introduced.[2] Nevertheless, this section of the community is small, and the questionnaires involved in the present study only succeeded in predicting only a proportion of the tendency to play games. In addition, scores on a personality scale do not necessarily predict actual behavior in a specific situation well.[34] It is not appropriate to suggest laws be influenced on the basis of such data but rather that legislators consider the possible impact of mobile phone gambling on a susceptible subset of the community.

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