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Smartphone Dependence of University Students and Parental Rearing Attitudes

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ABSTRACT

We investigated associations between smartphone dependence and perceived parental rearing attitudes. We administered a set of self-reporting questionnaires to 195 medical-university students designed to evaluate these factors. For females, the maternal high care/high protection group had statistically significantly higher scores for smartphone dependence than the low care/low protection group. No such relationship was apparent for male respondents. These findings suggest, at least for females, that smartphone dependence may be associated with perceived rearing attitudes.

KEYWORDS

Parental Bonding Instrument (PBI), Parental Rearing Attitudes, Smartphone, University Students, Wakayama Smartphone-Dependence Scale (WSDS)

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INTRODUCTION

As mobile phones have become an established part of daily life, various social issues have arisen, including excessive use or even dependence, and objections to the use of mobile phones in public places. Smartphones, in particular, are more like tablet computers than mobile phones, and therefore, while bringing greater convenience, may also carry the potential for addictive use. In Japan, smartphones have rapidly come into widespread use and, now, are particularly widely used by people (87.0%) in their twenties (Ministry of Internal Affairs and Communications, 2016).

Technostress is considered a psychosomatic illness that involves either: anxiety over using technological equipment; or over identification with the computer (Brod, 1984). Viewing problematic smartphone use as a type of technostress, we recently developed a new scale for gauging smartphone dependence (we define it in terms of two factors: excessive use and use of smartphones in public places even when such use is considered to be a nuisance), the Wakayama Smartphone-Dependence Scale (WSDS), and confirmed its reliability and validity (Toda, Nishio, & Takeshita, 2015a). The scale consists of three dimensions, and we think it is a useful tool for rating smartphone dependence.

In past studies, using the WSDS, we have found associations between smartphone dependence of university students and factors such as demographic characteristics, personality traits, general health status, depressive state, or chronotype (Toda, Ezoe, Mure, & Takeshita, 2016; Toda, Nishio, & Takeshita, 2015a, 2015b). Other factors, however, may also contribute to smartphone dependence. One possibly important factor is the parent-child relationship during childhood. It has been suggested that parental mediation may play an important role in their children's digital media use (Clark, 2011). Although some previous studies investigated parental mediation regarding children's smartphone use, these studies targeted at parents with elementary age children (Hwang & Jeong, 2015; Hwang, Choi, Yum, & Jeong, 2017). In addition, in one study, we did find an association between childhood maternal relationship and mobile phone dependence (Toda et al., 2008). The respondents, however, rather than smartphones, used now largely obsolete feature phones and were all female.

In the present study, by analyzing the responses of university students, we investigated the associations between smartphone dependence and perceived parental rearing attitudes, which were evaluated by the Parental Bonding Instrument (PBI) (Parker, Tupling, & Brown, 1979), which evaluates fundamental parenting dimensions in terms of care and overprotection. It has also been suggested that parental rearing attitudes in childhood may be associated with depression or comprehensive health-related lifestyle in adulthood (Parker, 1979; Parker, 1983a; Toda, Kawai, Takeo, Rokutan, & Morimoto, 2008). The PBI is widely used in psychosocial studies of current interpersonal relationships (Kitamura, Kijima, Watanabe, Takezaki, & Tanaka, 1999; Parker, Barrett, & Hickie, 1992). We hypothesized that the childhood relationship with the parents may be associated with smartphone dependence in adolescents and that there may be a gender difference in these associations.

MATERIALS AND METHODS

For the study, approved by the Ethics Committee of the Wakayama Medical University, we recruited 195 medical-university students. After informed consent was obtained, the students filled out a set of self-rating questionnaires designed to evaluate smartphone dependence and perceived parenting. Of 177 respondents who both possessed smartphones and had properly completed all the questionnaire items, statistical analysis was performed for 150 respondents (96 males, 54 females) who reported using smartphones mainly to access the Internet. In a previous study, we found that respondents using smartphones mainly to access the Internet had statistically significantly higher scores, both in total and for each WSDS subscale, than respondents who mainly used other devices to access the Internet (Toda, Nishio, & Takeshita, 2015a). Mean ($\pm SD$) age for males was 20.5±2.2 years and for females 19.5±1.0 years.

Smartphone dependence was evaluated using the WSDS (Toda, Nishio, & Takeshita, 2015a, 2015b), a 21-item self-rating scale with 3 subscales (each comprising 7 items): Subscale 1, immersion in Internet communication; Subscale 2, using a smartphone for extended periods of time and neglecting social obligations and other tasks; Subscale 3, using a smartphone while doing something else and neglect of etiquette. Each response is scored on a 4-point Likert scale (always, often, sometimes, hardly ever) ranging from 0 to 3 for each item. Likert scores for each item were then summed to provide subscales scores for smartphone dependence (ranging from 0 to 21). Higher scores indicate greater dependence.

Perceived parenting was quantitatively evaluated using the PBI (Parker, Tupling, & Brown, 1979), a self-rating questionnaire which consists of 25 items, including 12 items rating parental care and 13 items relevant to overprotection. The scale is retrospective: based on respondent memory of parents to age 16, subjects rate each item using a Likert scale (very like, moderately like, moderately unlike, very unlike) ranging from 0 to 3 for each item. Higher care scores indicate perceived acceptance and affection, while lower care scores indicate perceived indifference and rejection. Higher overprotection scores indicate perceived overprotection and interference, while lower overprotection scores indicate perceived encouragement of independence. Cut-off care and overprotection scores were 27.0 and 13.5 for mothers, and 24.0 and 12.5 for fathers (Parker, 1983b). For each parent, respondents were allocated to one of four groups: high care and high protection (affectionate constraint); low care and high protection (affectionless control); high care and low protection (optimal parenting); and low care and low protection (neglectful parenting).

All results are expressed as mean values ± standard deviation. Before statistical analysis, normal distribution was checked with Kolmogorov-Smirnov testing. Valid distributions were found for each WSDS subscale score. Student's *t*-test was performed to detect gender differences, and analysis of variance (ANOVA) to compare the data of different PBI groups. Bonferroni's test was used for multiple comparisons. Values were considered significantly different when $p < 0.05$.

RESULTS

Table 1 shows scores for smartphone dependence and perceived parental rearing attitudes. No statistically significant differences were found between males and females in WSDS subscale scores. Meanwhile, females had statistically significantly higher maternal care scores than males ($t = 3.77$, $p < 0.01$). No such difference was apparent in other PBI subscale scores. For six males initially included in analysis, five had no memory of their fathers and one had no memory of his mother; for two females, one had no memory of her father and one had no memory of her mother: These eight respondents were consequently excluded from the analyses. As we found a significant difference in Table 1, the consequent analyses were conducted separated by gender.

Table 2 shows relationships between smartphone dependence and maternal rearing attitudes. For females, the high care/high protection group and the low care/low protection group showed a statistically significant difference in WSDS subscale 1 scores ($F = 3.11$, $p < 0.05$). No such relationship was apparent for male respondents. For neither males nor females, relationships between maternal rearing attitudes and subscales 2 and 3 were not apparent.

Table 3 shows relationships between smartphone dependence and paternal rearing attitudes. For both males and females, no statistically significant relationships were found between each WSDS subscale and paternal rearing attitudes.

DISCUSSION

For females, we found associations between smartphone dependence and perceived maternal rearing attitudes. The high care / high protection group had statistically significantly higher scores for WSDS subscale 1 than the low care / low protection

Table 1. Scores for smartphone dependence and perceived parental rearing attitudes

	Males (n = 96)	Females (n = 54)	p*
Wakayama Smartphone-Dependence Scale (WSDS)			
Subscale 1	5.2±4.2	5.4±2.9	0.86
Subscale 2	9.0±4.2	9.2±3.7	0.74
Subscale 3	11.5±4.3	12.1±4.4	0.39
Parental Bonding Instrument (PBI)			
Maternal care	26.4±6.2	30.1±4.8	< 0.01
Maternal overprotection	13.5±7.1	12.3±7.1	0.32
Paternal care	23.3±6.6	24.3±7.3	0.41
Paternal overprotection	12.4±6.5	11.3±6.0	0.30

Values are expressed as mean±SD.

*Student's *t* test.

Subscale 1, Immersion in Internet communication; Subscale 2, Using a smartphone for extended periods of time and neglecting social obligations and other tasks; Subscale 3, Using a smartphone while doing something else and neglect of etiquette.

Note. One male and one female subject had no memory of his or her mother. One female and five male subjects had no memory of their fathers.

Table 2. Relationship between smartphone dependence and maternal rearing attitudes

	male				female			
	High care / high protection (n = 11)	Low care / high protection (n = 36)	High care / low protection (n = 34)	Low care / low protection (n = 14)	High care / high protection (n = 14)	Low care / high protection (n = 9)	High care / low protection (n = 26)	Low care / low protection (n = 4)
WSDS*								
Subscale 1	5.9±4.4	5.1±4.3	4.6±3.7	5.4±2.5	6.9±2.8	5.7±2.4	4.9±2.9	2.5±2.1†
Subscale 2	10.4±3.4	7.6±4.1	9.1±3.9	10.1±4.1	9.6±3.7	9.0±3.0	9.6±3.9	5.3±3.5
Subscale 3	11.1±4.4	10.2±4.8	12.1±3.4	12.9±3.4	12.2±3.0	12.8±4.4	12.1±4.5	10.3±8.6

Values are expressed as mean±SD.

†Statistically significantly different from high care / high protection group (ANOVA and Bonferroni's test).

*Wakayama Smartphone-Dependence Scale: Subscale 1, Immersion in Internet communication; Subscale 2, Using a smartphone for extended periods of time and neglecting social obligations and other tasks; Subscale 3, Using a smartphone while doing something else and neglect of etiquette.

Note. One male and one female subject had no memory of his or her mother.

Table 3. Relationship between smartphone dependence and paternal rearing attitudes

	male				female			
	High care / high protection (n = 15)	Low care / high protection (n =31)	High care / low protection (n = 30)	Low care / low protection (n = 15)	High care / high protection (n = 7)	Low care / high protection (n = 12)	High care / low protection (n = 24)	Low care / low protection (n = 10)
WSDS*								
Subscale 1	7.4±5.5	5.5±4.4	4.1±3.5	5.0±3.3	5.1±2.3	6.8±2.5	4.7±3.1	5.8±2.6
Subscale 2	10.2±4.8	7.8±4.2	8.7±4.1	10.7±3.7	10.7±2.4	10.6±3.1	8.8±4.3	8.3±2.2
Subscale 3	11.4±5.0	10.8±4.8	11.2±3.9	12.8±3.2	11.1±2.9	13.3±2.6	12.4±5.2	12.0±3.3

Values are expressed as mean±SD.

*Wakayama Smartphone-Dependence Scale: Subscale 1, Immersion in Internet communication; Subscale 2, Using a smartphone for extended periods of time and neglecting social obligations and other tasks; Subscale 3, Using a smartphone while doing something else and neglect of etiquette.

Note. One female and five male subjects had no memory of their fathers.

group. We found no such difference associated with paternal rearing attitudes. These findings are in line with results from our previous study with feature phones (Toda et al., 2008) and suggest that, for females, technostress tends to be associated with same-sex parental rearing attitudes.

Furthermore, the present study revealed, of three dimensions of smartphone dependence, that "Immersion in Internet communication" is associated with maternal rearing attitudes. It has been suggested, for females, that a close maternal relationship in childhood may contribute to susceptibility to loneliness (Toda et al., 2008). Consequently, loneliness, in turn, may lead to immersion in Internet communication. Actually, more respondents in the high care / high protection group than the low care / low protection group answered: "I use my smartphone to escape from reality" (item

of Subscale 1) ($\chi^2 = 5.14$, $df = 1$, $p = 0.08$). Even so, our protocol, unfortunately, made no provision for assessing loneliness. Further studies are needed to confirm our speculation.

By contrast, for males, we detected no statistically significant relationships between WSDS subscales and paternal and maternal rearing attitudes. In a previous study, we found that females, but not males, with high scores for perceived paternal and maternal overprotection were more likely to have comprehensive health-related lifestyle scores that indicated unhealthy habits (Toda, Kawai, Takeo, Rokutan, & Morimoto, 2008). These findings suggest, particularly for females, that parent-child relationships during childhood may be related to current lifestyle. Even so, it has been reported, for male elementary school students rather than for females, that mobile phone use is influenced by maternal rearing attitudes (Kim, Lee, & Choi, 2015). Students who perceived their mothers' rearing attitudes as warm and permissive tended to be able to self-control their mobile phone use. This discrepancy in results may suggest a gender difference in growth stage affected by parental rearing attitudes. Incidentally, in a recent study, we found that males seem to immerse themselves in online games and females in online communications (Toda, Ezoe, Mure, & Takeshita, 2016). Such a gender difference in the nature of smartphone use, therefore, may also have contributed to our findings. To conclusively establish these assumptions, further studies are required.

This research has several limitations, mainly stemming from the demographic focus. Since our university does not have other faculties, we could only include medical students, which is too restricted to represent a general population cohort. Thus, our results may have been biased. Further examination of larger and more varied populations is required. Neither, as mentioned previously in this discussion, did our questionnaire include items on loneliness. We hope to address these methodological problems in future studies.

In this study, for females, we found associations between smartphone dependence and perceived parental rearing attitudes. As data on smartphone dependence accumulate, it may become possible to customize smartphone guidance according to the individual characteristics of young people.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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