

# Mobile Phone Use and Stress-Coping Strategies of Medical Students

Masahiro Toda, Department of Public Health, Wakayama Medical University, Wakayama, Japan

Satoko Ezoe, Health Service Center Izumo, Shimane University, Shimane, Japan

Tatsuya Takeshita, Department of Public Health, Wakayama Medical University, Wakayama, Japan

---

## ABSTRACT

*This paper investigates associations between mobile phone use and stress coping. To 139 medical university students, a set of self-reporting questionnaires designed to evaluate mobile-phone use and stress coping was administered. In relation to the intensity of mobile phone use, the low-dependence group had statistically significantly higher scores for coping strategy, planful problem solving, than the high-dependence group. When the respondents were allocated to one of three groups according to which mobile-phone service they use most frequently, scores for planful problem solving were statistically significantly higher in the voice phone group than in the Web-browsing group. These findings suggest that the intensity and type of mobile phone use may be associated with stress coping, particularly planful problem solving strategy.*

*Keywords:* Dependence, Gender Difference, Medical Students, Mobile Phone, Stress Coping

---

## 1. INTRODUCTION

While mobile phones have rapidly become an established part of daily life, they have also brought various social issues, such as use in public places, and health concerns, such as the effects of excessive use. Previous studies have suggested that excessive mobile phone use may be associated with depression (Sánchez-Martínez & Otero, 2009; Thomée, Härenstam, & Hagberg, 2011; Yen et al., 2009) or health-

compromising behaviors, such as smoking or alcohol drinking (Koivusilta, Lintonen, & Rimpelä, 2005; Sánchez-Martínez & Otero, 2009). Furthermore, using the Mobile Phone Dependence Questionnaire (MPDQ), which we designed to identify high-risk groups, we found a comprehensive association between mobile phone dependence and unhealthy lifestyle (Ezoe et al., 2009; Toda, Monden, Kubo, & Morimoto, 2006).

DOI: 10.4018/ijcbpl.2014100104

On the other hand, mobile phones may also provide a means of coping with stress, and it cannot be denied that mobile phones may enhance communication with others (Igarashi, Takai, & Yoshida, 2005). Even so, temptations such as Web browsing, online games, and other addictive activities are constantly available. In the present study, we examined associations between mobile phone use and stress coping. Lazarus and Folkman defined coping as “constantly changing cognitive and behavioral efforts to manage specific external and/or internal demands that are appraised as taxing or exceeding the resources of the person” (Lazarus & Folkman, 1984). Coping is a process rather than a trait, and changes over time and in accordance with the situational contexts in which it occurs (Lazarus, 1993).

## 2. METHOD

For 139 medical university students, we distributed a set of self-reporting questionnaires designed to evaluate mobile-phone use and stress coping. The students immediately filled out the forms, which were collected upon completion. Statistical analysis was possible for 127 respondents (44 males, 83 females), who properly completed all the questionnaire items. Mean ( $\pm SD$ ) age for males was  $19.3 \pm 1.9$  years and for females  $18.7 \pm 0.9$  years. Before the study, the protocol received approval from the institutional review board and informed consent was obtained for each participant.

Mobile phone dependence was evaluated using the MPDQ (Toda, Monden, Kubo, & Morimoto, 2004, 2006), a self-rating questionnaire comprising 20 items. Each response was scored on a Likert scale (hardly ever, 0; sometimes, 1; often, 2; and always, 3), and scores for each item were then summed to provide an overall mobile phone dependence score ranging from 0 to 60, higher scores indicating greater dependence. Subjects in the highest quartile were classified as highly dependent. In addition, we also investigated the frequency of the

use of voice phone, e-mail, and Web browsing services on mobile phones.

Stress coping was evaluated using the Ways of Coping Questionnaire (WCQ) (Folkman & Lazarus, 1988a), which consists of 64 items and includes eight subscales – planful problem solving, confrontive coping, seeking social support, accepting responsibility, self-controlling, escape–avoidance, distancing, and positive reappraisal. Using a Likert scale (not used, 0; used somewhat, 1; and used a great deal, 2), scores for each coping strategy ranged from 0 to 16, higher scores indicating more use of that particular coping strategy.

All results are displayed as mean values  $\pm$  standard deviation. Student's *t* test was used to compare WCQ scores between, and one-way ANOVA among, groups classified according to mobile phone use. Furthermore, gender differences in scores for the WCQ were analyzed using Student's *t* test. Bonferroni's test was used for multiple comparisons. Values were considered to be significantly different when  $p < 0.05$ .

## 3. RESULTS

Mean score for mobile phone dependence was  $26.6 \pm 9.3$ . Respondents in the highest quartile were classified as highly dependent (cutoff point 33/34). The low-dependence group had statistically significantly higher scores for planful problem solving than the high-dependence group ( $p < 0.05$ ) (Table 1).

We also classified the respondents according to most-used mobile-phone service: voice phone, e-mail, or Web browsing. The voice-phone group had statistically significantly higher scores for planful problem solving than the Web-browsing group ( $p < 0.05$ ) (Table 2).

Table 3 shows the WCQ scores for males and females. There were statistically significant gender differences for the following coping strategies. Males scored higher than females in planful problem solving ( $p < 0.05$ ), confrontive coping ( $p < 0.001$ ), and seeking social support ( $p < 0.05$ ).

Table 1. Scores for coping strategies related to mobile-phone dependence

Coping strategy	Low-dependence (n = 94)	High-dependence (n = 33)	p value*
Planful problem solving	8.8 ± 3.9	7.2 ± 2.8	0.012
Confrontive coping	6.4 ± 3.1	5.7 ± 2.5	0.270
Seeking social support	6.1 ± 3.6	6.6 ± 2.4	0.356
Accepting responsibility	9.5 ± 3.6	9.2 ± 2.8	0.599
Self-controlling	8.8 ± 3.5	8.3 ± 3.7	0.506
Escape-avoidance	6.6 ± 2.8	6.0 ± 2.5	0.262
Distancing	7.7 ± 3.5	6.6 ± 2.2	0.057
Positive reappraisal	9.1 ± 4.1	7.9 ± 3.8	0.140

Values are expressed as mean ± SD.

\*Student's *t* test.

#### 4. DISCUSSION

The major finding of this study is that the intensity and type of mobile phone use may be associated with stress coping, particularly planful problem solving strategy.

We assumed that mobile phones might be a stress-coping tool. For particular coping strategies, escape-avoidance includes wishful thinking and behavioral efforts to escape or avoid problems (Folkman & Lazarus, 1988a), and may involve behaviors such as alcohol abuse (Folkman & Moskowitz, 2004). Furthermore,

previous studies have suggested that mobile phones may increase social support (Igarashi et al., 2005; Rettie, 2008). Mobile-phone dependence, however, was not associated with these coping strategies. On the contrary, the low-dependence group, more frequently than the high-dependence group, used planful problem solving strategy. Incidentally, in a previous study, we found that mobile phone dependency is associated with depressive state (Toda & Ezoe, 2013). These findings suggest that excessive mobile phone use may result in poor stress management. Unfortunately, because this study

Table 2. Scores for coping strategies related to preferred mobile-phone service

Coping strategy	Voice phone (n = 9)	E-mail (n = 79)	Web browsing (n = 39)	p value†
Planful problem solving	11.1 ± 3.5*	8.4 ± 4.1	7.8 ± 2.5	0.053
Confrontive coping	7.4 ± 4.3	6.3 ± 3.2	5.8 ± 2.0	0.342
Seeking social support	7.7 ± 4.1	6.1 ± 3.6	6.1 ± 2.5	0.383
Accepting responsibility	10.9 ± 2.6	9.4 ± 3.7	9.3 ± 2.9	0.409
Self-controlling	9.7 ± 3.8	8.8 ± 3.6	8.1 ± 3.4	0.361
Escape – avoidance	8.1 ± 2.7	6.3 ± 2.8	6.3 ± 2.6	0.165
Distancing	9.1 ± 3.2	7.5 ± 3.4	6.8 ± 2.7	0.147
Positive reappraisal	10.6 ± 3.0	8.8 ± 4.4	8.4 ± 3.5	0.341

Values are expressed as mean ± SD.

†One-way ANOVA

\*Statistically significantly different from Web-browsing group;  $p < 0.05$  (Bonferroni's multiple comparison test).

Table 3. Male and female scores for coping strategies

Coping strategy	Males (n = 44)	Females (n = 83)	p value*
Planful problem solving	9.4 ± 3.9	7.9 ± 3.5	0.033
Confrontive coping	7.5 ± 3.0	5.5 ± 2.7	0.0002
Seeking social support	7.1 ± 3.4	5.7 ± 3.2	0.029
Accepting responsibility	9.6 ± 3.5	9.3 ± 3.3	0.650
Self-controlling	8.9 ± 3.8	8.5 ± 3.5	0.573
Escape-avoidance	6.8 ± 2.9	6.2 ± 2.7	0.225
Distancing	8.0 ± 3.4	7.1 ± 3.1	0.154
Positive reappraisal	9.7 ± 3.8	8.3 ± 4.1	0.067

Values are expressed as mean ± SD.

\*Student's *t* test.

was cross-sectional, we cannot conclusively establish causality. Mobile phone dependence, however, is probably different in character to other addictions such as alcohol or smoking.

When the respondents were classified according to most-used mobile-phone service, the voice-phone group used planful problem solving strategy more frequently than the Web-browsing group. Planful problem solving involves attempting to alter the situation while analytically assessing possible outcomes (Folkman & Lazarus, 1988a). Previous studies have suggested that planful problem solving and positive reappraisal, an effort to create positive meaning by focusing on personal growth (Folkman & Lazarus, 1988a), are associated with satisfactory outcomes and positive changes in emotion (Folkman & Lazarus, 1988b; Folkman, Lazarus, Dunkel-Schetter, DeLongis, & Gruen, 1986). Our findings, therefore, suggest that voice phoning may be used in desirable coping strategies, which can be effective owing to the bi-directionality of this service. Also in the OECD's PIAAC study, an ability to use communication tools is considered as one of the problem-solving skills in technology-rich environments (OECD, 2013). Even so, no similar findings were found in the e-mail group. When people ask others' advice about their distress, oral communication may be preferred than literal communication. To establish

this assumption conclusively, however, further studies are required.

We found clear gender differences for several coping strategies: males, more frequently than females, used planful problem solving, confrontive coping, and social-support seeking. Coping theory emphasizes that there are at least two major categories of coping: problem-focused and emotion-focused (Lazarus, 1993). Problem-focused coping involves direct attempts to change a stressful situation and may include planful problem solving, confrontive coping, seeking social support, and accepting responsibility. Meanwhile, emotion-focused coping involves cognitive and emotional effort to manage a stressful situation, even though the situation itself does not change, and may include self-controlling, escape-avoidance, distancing, and positive reappraisal. Previous studies have also found that males, more than females, tend to use problem-focused coping strategies (Folkman & Lazarus, 1980; Ptacek, Smith, & Dodge, 1994; Rath & Nanda, 2012). This may result from social gender roles. In many cultures, males are ideally expected to be more self-reliant and active than females. Enculturated values may lead males to use more problem-focused coping strategies (Rath & Nanda, 2012). In addition, there may be gender differences in the sources of stress. A previous study has suggested that for males,

relationships, finance, and work give rise to more stressful events than family and health, which are the main sources of stress reported by females (Matud, 2004). Unfortunately, in this study, we did not inquire about subjects' life events. This point should be considered in future studies.

This research has several limitations. For a start, all the subjects were medical and nursing students. The sample size was also too small to be representative of the general population cohort. Furthermore, now that social networking service (SNS) websites can function as communication tools, Web browsing is not as passive as it used to be, especially for smartphone users, and there is no clear boundary between e-mail and Web browsing. When this survey was carried out (in 2010), the penetration of smartphones in the Japanese mobile phone market was less than 7% (Comscore, 2011). In August 2012, they account for nearly 25% of mobile handsets (Comscore, 2012). This point, therefore, requires consideration in future studies.

## 5. CONFLICT OF INTEREST

The authors declare no conflict of interest.

## REFERENCES

- Comscore. (2011). *Smartphone adoption continues to grow in Japan*. Retrieved May 29, 2014, from [http://www.comscore.com/Insights/Press\\_Releases/2011/2/Smartphone\\_Adoption\\_Continues\\_to\\_Grow\\_in\\_Japan](http://www.comscore.com/Insights/Press_Releases/2011/2/Smartphone_Adoption_Continues_to_Grow_in_Japan)
- Comscore. (2012). *Japan's smartphone surge: 1 in 4 mobile consumers now owns a smartphone*. Retrieved May 29, 2014, from [http://www.comscore.com/Insights/Press\\_Releases/2012/8/Japan\\_Smartphone\\_Surge](http://www.comscore.com/Insights/Press_Releases/2012/8/Japan_Smartphone_Surge)
- Ezoe, S., Toda, M., Yoshimura, K., Naritomi, A., Den, R., & Morimoto, K. (2009). Relationships of personality and lifestyle with mobile phone dependence among female nursing students. *Social Behavior and Personality, 37*(2), 231–238. doi:10.2224/sbp.2009.37.2.231
- Folkman, S., & Lazarus, R. S. (1980). An analysis of coping in a middle-aged community sample. *Journal of Health and Social Behavior, 21*(3), 219–239. doi:10.2307/2136617 PMID:7410799
- Folkman, S., & Lazarus, R. S. (1988). *Manual for the Ways of Coping Questionnaire*. Palo Alto, CA: Consulting Psychologists Press.
- Folkman, S., & Lazarus, R. S. (1988). Coping as a mediator of emotion. *Journal of Personality and Social Psychology, 54*(3), 466–475. doi:10.1037/0022-3514.54.3.466 PMID:3361419
- Folkman, S., Lazarus, R. S., Dunkel-Schetter, C., DeLongis, A., & Gruen, R. J. (1986). Dynamics of a stressful encounter: Cognitive appraisal, coping, and encounter outcomes. *Journal of Personality and Social Psychology, 50*(5), 992–1003. doi:10.1037/0022-3514.50.5.992 PMID:3712234
- Folkman, S., & Moskowitz, J. T. (2004). Coping: Pitfalls and promise. *Annual Review of Psychology, 55*(1), 745–774. doi:10.1146/annurev.psych.55.090902.141456 PMID:14744233
- Igarashi, T., Takai, J., & Yoshida, T. (2005). Gender differences in social network development via mobile phone text messages: A longitudinal study. *Journal of Social and Personal Relationships, 22*(5), 691–713. doi:10.1177/0265407505056492
- Koivusilta, L., Lintonen, T., & Rimpelä, A. (2005). Intensity of mobile phone use and health compromising behaviours: How is information and communication technology connected to health-related lifestyle in adolescence? *Journal of Adolescence, 28*(1), 35–47. doi:10.1016/j.adolescence.2004.05.004 PMID:15683633
- Lazarus, R. S. (1993). Coping theory and research: Past, present, and future. *Psychosomatic Medicine, 55*(3), 234–247. doi:10.1097/00006842-199305000-00002 PMID:8346332
- Lazarus, R. S., & Folkman, S. (1984). *Stress, appraisal, and coping*. New York: Springer.
- Matud, M. P. (2004). Gender differences in stress and coping styles. *Personality and Individual Differences, 37*(7), 1401–1415. doi:10.1016/j.paid.2004.01.010
- OECD. (2013). *OECD Skills Outlook 2013: First Results from the Survey of Adult Skills*. Paris: OECD Publishing.
- Ptacek, J. T., Smith, R. E., & Dodge, K. L. (1994). Gender differences in coping with stress: When stressor and appraisals do not differ. *Personality and Social Psychology Bulletin, 20*(4), 421–430. doi:10.1177/0146167294204009

- Rath, S., & Nanda, S. (2012). Adolescents' coping: Understanding the role of gender and academic competence. *Journal of Education and Practice*, 3(3), 9–16.
- Rettie, R. (2008). Mobile phones as network capital: Facilitating connections. *Mobilities*, 3(2), 291–311. doi:10.1080/17450100802095346
- Sánchez-Martínez, M., & Otero, A. (2009). Factors associated with cell phone use in adolescents in the community of Madrid (Spain). *Cyberpsychology & Behavior*, 12(2), 131–137. doi:10.1089/cpb.2008.0164 PMID:19072078
- Thomé, S., Härenstam, A., & Hagberg, M. (2011). Mobile phone use and stress, sleep disturbances, and symptoms of depression among young adults: A prospective cohort study. *BMC Public Health*, 11(1), 66. doi:10.1186/1471-2458-11-66 PMID:21281471
- Toda, M., & Ezo, S. (2013). Multifactorial study of mobile phone dependence in medical students: Relationship to health-related lifestyle, Type A behavior, and depressive state. *Open Journal of Preventive Medicine*, 3(1), 99–103. doi:10.4236/ojpm.2013.31012
- Toda, M., Monden, K., Kubo, K., & Morimoto, K. (2004). Cellular phone dependence tendency of female university students. *Japanese Journal of Hygiene*, 59(4), 383–386. doi:10.1265/jjh.59.383 PMID:15626025
- Toda, M., Monden, K., Kubo, K., & Morimoto, K. (2006). Mobile phone dependence and health-related lifestyle of university students. *Social Behavior and Personality*, 34(10), 1277–1284. doi:10.2224/sbp.2006.34.10.1277
- Yen, C. F., Tang, T. C., Yen, J. Y., Lin, H. C., Huang, C. F., Liu, S. C., & Ko, C. H. (2009). Symptoms of problematic cellular phone use, functional impairment and its association with depression among adolescents in Southern Taiwan. *Journal of Adolescence*, 32(4), 863–873. doi:10.1016/j.adolescence.2008.10.006 PMID:19027941