

How Reading Habits and Smartphone Usage Relate to Mindfulness and Psychological Status in a Student Sample: A Pilot Study

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大学生の読書習慣およびスマートフォン利用状況とマインドフルネスおよび心理特性との関連： 予備研究

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Abstract

Reading forms an essential part of our daily higher cognitive activities, and may well involve psychological functions parallel to mindfulness and meditation. The present study examined associations between habits of reading and/or smartphone usage and psychological status in university undergraduate students. Participants provided daily reading time on different genres of books, time spent reading on different media/platforms, as well as time spent using smartphones for different activities. Participants also completed a battery of questionnaires each on mindfulness, subjective well-being, and depression. Book genres overall failed to show apparent correlations with the psychological status, although reading comic books was negatively associated with some dimensions of subjective well-being. Also, amount of reading and time spent playing games and watching movies on the smartphone tended to be negatively correlated with dimensions of mindfulness and well-being. These results overall fail to strongly indicate that reading is positively associated with desirable psychological status in undergraduates. In addition, several different activities made on the smartphone, which accounts for a considerable amount of the participants' daily cognitive activities, appear to relate to decrease in desirable psychological functions.

Key Words: reading, social media, mindfulness, psychological status, university students

Introduction

Reading undoubtedly forms a crucial part of our daily cognitive activities. How much time do university students today engage in reading? According to Tama (2017), more than 40 % of Japanese students report that they spend 0 minutes per day reading, although approximately 24 % report that they engage in reading for more than one hour per day (as of 2015). These

data also showed that university students as well as high school students in recent years spend relatively little time reading (Tama, 2017). By contrast, these students use smartphones more than 2.5 hours per day on average. Whereas a number of people in these days use smartphones more frequently than paper books, these people tend to spend relatively little time reading electronic books when using smartphones (data from

high school students). Despite these trends, reading is still suggested to be an important activity in that it can be a basis for critical thinking, communication skills, etc. (Tama, 2017). It thus seems worthwhile asking whether and how details of reading activities as well as smartphone usage may relate to daily psychological status of the students.

The present study addressed whether and how time and amount of reading as well as use of smartphones for different activities (including reading) may be related to mindfulness and relevant psychological status in university undergraduate students. Mindfulness is based on the traditional contemplative practices originated in the ancient Buddhism and yoga, and refers to a mental state in which one is “paying attention in a particular way: on purpose, in the present moment, and nonjudgmentally (Kabat-Zinn, 1994, p. 4).” Interventions such as mindfulness-based stress reduction (MBSR; Kabat-Zinn, 1982; 1990) and mindfulness-based cognitive therapy (MBCT; Segal et al., 2002) programs have been proved to be effective in terms of reducing perceived stress, increasing psychological well-being, as well as in reducing proportions of recurrence in depression (e.g., Carmody & Baer, 2008; Teasdale et al., 2000). Mindfulness is also deemed as a personality trait/characteristic in healthy people that is positively associated with subjective well-being. For example, Sugiura and Sugiura (2018) showed that mindfulness facets moderate relationships between income and life satisfaction/psychological well-being. Specifically, whereas income was positively related to psychological well-being in those low in mindfulness facets (i.e., nonjudging and describing of experiences), those high in these facets showed higher well-being regardless of income levels (Sugiura & Sugiura, 2018).

With regard to relationships between reading and mindfulness, Miyata (2016) preliminarily examined how daily reading time and speed may relate to trait mindfulness, subjective well-being, and relevant psychological functions in a large sample of Japanese participants. Results showed that self-

reported reading time per day, and less apparently self-reported reading speed, significantly predict increase in desirable psychological functions including mindfulness, subjective well-being, positive affect, and empathy, and decrease in non-desirable ones including depression and negative affect. The present study focused on university students, in whom not only reading paper books but also reading on the smartphone as well as use of social media may potentially influence mindfulness and psychological status. Relationships between use of social media and psychological status to date remain equivocal, with some studies suggesting that use of Facebook may be related to symptoms of depression (e.g., Kross et al., 2013; Pantic, 2014). Also, there has so far been little evidence regarding how use of smartphones is associated with mindfulness tendencies.

Accordingly, the present study conducted a pilot questionnaire survey to examine relationships between time and amount of reading on different book genres and/or on different media/platforms and psychological traits including mindfulness, subjective well-being, and depression by involving university undergraduate students. The study also asked how use of smartphones on different activities may be associated with these psychological functions. Based on the previous studies (Miyata, 2016; Pantic, 2014), the present study expected that reading (either by paper books or on the smartphone) may be positively associated with mindfulness and desirable psychological status. By contrast, frequent use of smartphones for activities other than reading may negatively impact mindfulness and relevant psychological functions.

Methods

Participants and Procedures

Fifty-one university undergraduate students (29 females and 22 males; 18-24 years; mean age = 20.2 years; $SD = 1.3$) participated. Another seven students were handed the survey sheets but gave no written answers to the question items (including one student who reported only age and sex), and thus were not

included in the participants. Of the participants, six reported that they practice either speed-reading or meditation, who were included in the analysis because their data were consistent with those from the other participants. All these participants were recruited at the lecture-style classes and seminars held at a Japanese private university located in Tokyo. Prior to starting the survey, all participants provided written informed consent upon agreement to cooperate. Participants also agreed that the data would be open to the public only for academic purposes without specifying any individuals. They were not compensated for participation in the study. Collection of the data was conducted in November 2017.

Psychological Scales

The following battery of questionnaire sheets were handed to the participants, which they were instructed to complete during a class. Participants were notified that the purpose of the study is to know the daily habits and psychological status of the participants with no intention to evaluate the individuals. They were also instructed to always provide honest answers, because there are no good or bad answers to any items. The questionnaires administered involved another psychological scale concerning anxiety in addition to the scales below, the results for which are not reported in this paper due to technical errors in the questionnaire sheets.

Five Facet Mindfulness Questionnaire

The Five Facet Mindfulness Questionnaire (FFMQ; Baer et al., 2006) is regarded as one of the most comprehensive and useful psychological measures of mindfulness. The questionnaire involves five facets: observing (noticing and/or paying attention to the external and internal stimuli, such as sounds, smells, thoughts, emotions, body sensations, etc.), describing (verbalizing one's own thoughts, emotions, sensations, etc.), acting with awareness (paying attention to how one is behaving at each moment, as opposed to acting in automatic and/or absent-minded ways), non-judging

of inner experience (refraining from evaluating one's own thoughts, emotions, sensations, etc.), and nonreactivity to inner experience (letting thoughts, emotions, images, etc. come and go without attention getting caught up in them). The FFMQ has 39 items in total, each of which is rated on a five-point scale from 1 (never or very rarely true in one's own daily life) to 5 (very often or always true in one's life). Answers to these items are summed up to yield a total/subscale score. The present study used the Japanese version of the FFMQ, which was developed and validated by Sugiura et al. (2012).

Subjective Well-Being Scale

The Subjective Well-Being Scale (SWBS; Ito et al., 2003) was developed in Japanese based on the Subjective Well-Being Inventory (SUBI; Sell & Nagpal, 1992; Tonan et al., 1995). Ito et al. (2003) reported that the SWBS demonstrates adequate reliability for both samples of university/college students and older working people. The SWBS involves 15 items concerning one's own feelings and/or impressions in everyday life, with each item being rated on a 4-point scale from 1 (not at all, never, etc.) to 4 (very much, always, etc.). Each item belongs to one of the five dimensions of well-being, i.e., general well-being: positive affect (generally positive attitudes towards one's life), confidence in coping (confidence to cope with difficult and/or unexpected situations that can happen in life), expectation-achievement congruence (feeling of success and achievement as one has expected), general well-being: negative affect (generally negative and/or depressed perspectives on one's life), and transcendence (experiences that go beyond the usual existence, such as moments of bliss or sense of belonging to the world/universe).

Beck Depression Inventory

The Beck Depression Inventory (BDI; Beck et al., 1961; 1979) is deemed as one of the most common psychometric tests for evaluating symptoms and characteristic attitudes of depression. The BDI includes

21 items, with each item concerning symptoms of depression such as pessimism, sadness, guilty feelings, and suicidal thoughts/wishes, as well as physical symptoms such as decrease in appetite, feelings of tiredness or fatigue, and lack of interest in sex. Each item has four self-evaluative sentences. The participant is required to endorse most relevant statements to these items, which are scored from 0 to 3. For consistency with the other scales, participants were instructed to report their recent feelings. The answers to each item are summed up to yield a total score. The present study used the established Japanese version of the BDI (Hayashi, 1988; Hayashi & Takimoto, 1991).

Reading Habits and Smartphone Usage

In addition to the psychological scales above, participants were required to answer questions in three categories regarding daily habits of reading as well as regarding how they use smartphones in daily life. Specifically, participants first self-reported amount of daily reading (both in minutes per day and in number of books per month) on different genres of writings including novels, critical essays, comic books, and others. Second, participants reported amount of daily reading (in the same units as above) on different media and/or platforms including paper books, smartphones, PCs/tablets, and others. Participants were instructed that the total amount of reading should be identical between the first and the second questions. Third, assuming that participants are supposed to spend considerable time using smartphones and/or social media (Tama, 2017), they were asked to report how long they use smartphones (in minutes per day) on different activities including reading (this should match the value as above), engaging in social media, playing games, watching movies, shopping, browsing websites, and other activities.

Results

Regarding measures on reading habits and smartphone usage, participants failed to complete 1.9 % of the question items. These missing data were excluded

from analysis. Participants' mean self-reported reading time in minutes per day on different genres was: 15.6 min ($SD = 20.0$) for novels, 10.2 min ($SD = 17.6$) for critical essays, 10.6 min ($SD = 13.9$) for comic books, and 9.5 min ($SD = 43.7$) for the other book genres, while the total reading time was 43.5 min per day ($SD = 51.4$). Similarly, their self-reported amount of reading in number of books read per month was: 1.5 ($SD = 2.4$) for novels, 1.3 ($SD = 4.2$) for critical essays, 3.0 ($SD = 5.1$) for comic books, and 0.4 ($SD = 1.6$) for the other book genres, while the total number of books was 6.1 per month ($SD = 8.3$). Thus, students spent relatively long time reading either novels or critical essays, whereas comic books also accounted for approximately half of the amount of reading in terms of number of books they read every month.

Regarding the three psychological scales, participants failed to complete 14.8 % of the question items. These missing data were again excluded from analysis. Mean total and subscale scores from these scales are summarized in **Table 1**. Internal consistency coefficients (Cronbach's α) for these scores overall evidenced good to acceptable reliability, although α values were relatively low for some subscales, e.g., describing subscale from the FFMQ and general well-being: negative affect subscale from the SWBS. Total scores for the FFMQ were positively correlated with those for the SWBS, although not reaching statistical significance ($r = 0.175, p = 0.262$). Total scores for the FFMQ showed a significant negative correlation with those for the BDI ($r = -0.375, p = 0.013$). Consistently, a statistically significant negative correlation was found between the total scores for the SWBS and those for the BDI ($r = -0.732, p < 0.001$). Thus, desirable and non-desirable psychological traits were associated with each other.

Table 1 further shows partial correlation coefficients, controlling for age, between measures on reading different genres and total/subscale scores from the psychological scales. These correlations were not statistically significant for many of the comparisons; however, the amount of reading critical essays was

How Reading Habits and Smartphone Usage Relate to Mindfulness and Psychological Status
in a Student Sample: A Pilot Study

Table 1. Descriptive statistics and correlations between measures regarding reading on different genres and scores from the psychological scales.

Scale	α	Mean (<i>SD</i>)	Reading time (min per day)				Reading amount (N books per month)			
			Novel	Criticism	Comic	Others	Novel	Criticism	Comic	Others
FFMQ total	0.83	114.2 (13.3)	.116	.190	-.034	.296	.069	.366*	-.016	.290
Observing	0.67	23.4 (4.5)	-.065	.081	-.214	.110	-.095	.195	-.208	.187
Describing	0.51	22.2 (5.1)	.173	.234	-.042	.210	.073	.317	-.127	.220
Acting with awareness	0.82	25.6 (5.1)	.053	.075	-.032	.316	-.099	.081	-.096	.222
Nonjudging	0.86	23.3 (5.0)	.122	-.023	.252	.124	.319	.244	.218	.110
Nonreactivity	0.88	19.8 (3.3)	.046	.223	-.078	.070	.024	.290	.265	.094
SWBS total	0.85	39.8 (6.0)	.015	.074	-.427*	.086	-.176	.077	-.074	.034
General well-being: Positive affect	0.84	8.8 (1.7)	-.037	.030	-.406*	.054	-.278	.105	-.132	-.020
Confidence in coping	0.74	8.1 (1.5)	.119	.037	-.314	.149	-.050	-.027	.057	.165
Expectation-achievement congruence	0.57	8.6 (1.6)	.200	.204	-.345*	.189	.037	.016	.124	.047
General well-being: Negative affect†	0.53	7.0 (1.7)	-.120	.028	-.372*	-.056	-.193	.027	-.104	-.083
Transcendence	0.57	7.3 (1.7)	-.068	.004	-.190	.011	-.145	.145	-.176	.031
BDI total	0.86	14.7 (8.5)	.072	-.064	.220	.066	.073	-.149	-.017	.008

Mean scores and their standard deviations are shown for each scale/subscale. Asterisks indicate statistically significant partial correlation coefficients (*: $p < 0.05$). †: The higher the scores, the smaller amount of negative affect was reported.

Table 2. Correlations between measures regarding reading on different media/platforms and scores from the psychological scales.

Scale	Reading time (min per day)			Reading amount (N books per month)		
	Paper book	Smartphone	PC/Tablet	Paper book	Smartphone	PC/Tablet
FFMQ total	.280	-.071	-.003	.221	.026	-.037
Observing	.047	-.177	-.152	-.021	-.039	-.165
Describing	.258	.029	-.075	.133	.058	-.130
Acting with awareness	.225	-.098	-.048	-.009	.009	-.085
Nonjudging	.123	.176	.137	.265	.210	.149
Nonreactivity	.162	-.185	.196	.383*	-.229	.206
SWBS total	-.010	-.301	.079	.070	-.408*	.010
General well-being: Positive affect	-.060	-.257	-.028	-.032	-.419*	-.014
Confidence in coping	.070	-.285	.267	.072	-.308	.144
Expectation-achievement congruence	.223	-.408*	.388*	.063	-.477**	.325
General well-being: Negative affect †	-.125	-.250	-.095	.143	-.271	-.171
Transcendence	-.101	.012	-.156	.034	-.100	-.185
BDI total	.064	.176	.0004	-.205	.127	.060

Asterisks indicate statistically significant partial correlation coefficients (*: $p < 0.05$; **: $p < 0.01$). †: The higher the scores, the smaller amount of negative affect was reported.

significantly correlated positively with the total score of the FFMQ. By contrast, time spent reading comic books was significantly correlated negatively with the total score of the SWBS and its three subscale scores, i.e., general well-being: positive affect, expectation-achievement congruence, and general well-being: negative affect subscales. Thus, at least the amount of reading critical essays was associated with enhanced mindfulness, whereas time spent reading comic books tended to predict decreased subjective well-being. Statistically significant correlations failed to be observed for total reading time (partial correlation = $-0.259 - 0.262$, all $ps > 0.140$) or for total number of books (partial correlation = $-0.155 - 0.326$, all $ps > 0.063$).

Participants' mean self-reported reading time in minutes per day on different media/platforms was: 35.5 min ($SD = 48.8$) for paper books, 8.6 min ($SD = 16.0$) for smartphones, 1.0 min ($SD = 4.6$) for PCs/tablets, and 0 min for the other media/platforms. Also, their self-reported amount of reading in number of books per month was: 3.2 ($SD = 3.3$) for paper books, 2.2 ($SD = 6.1$) for smartphones, 0.6 ($SD = 3.6$) for PCs/tablets, and 0 for the other media/platforms. Thus, these participants primarily used paper books when reading, while they also read by using smartphones and (less frequently) PCs and/or tablets.

Table 2 summarizes partial correlations (controlling for age) between measures on reading by using different media/platforms and total/subscale scores from the psychological scales. Correlations were not calculated for the other media/platforms, because no participants reported that they use the other media/platforms. Many of these correlations again failed to yield statistical significance; however, the amount of reading paper books was significantly correlated positively with the nonreactivity subscale score of the FFMQ. By contrast, the amount of reading on the smartphones was significantly correlated negatively with the total and subscale (i.e., general well-being: positive affect and expectation-achievement congruence) scores of the SWBS. Consistently, time

spent reading on the smartphone was significantly correlated negatively with the expectation-achievement congruence subscale scores of the SWBS. Also, there was a significant positive correlation between reading time on the PCs/tablets and the expectation-achievement congruence subscale scores of the SWBS. Thus, at least some dimension of mindfulness was significantly associated with the amount of reading paper books, whereas use of smartphones for reading tended to predict reduced subjective well-being. In addition, reading by using PCs or tablets predicted increase in some dimension of well-being.

A further analysis was conducted concerning how use of smartphones for different activities including reading may relate to the psychological status. Participants' self-reported time (minutes per day) they spent using smartphones for each activity was: 13.2 min ($SD = 20.2$) for reading, 64.1 min ($SD = 48.9$) for engaging in social media, 19.4 min ($SD = 39.6$) for playing games, 39.6 min ($SD = 52.5$) for watching movies, 3.3 min ($SD = 7.6$) for shopping, 32.6 min ($SD = 25.8$) for browsing websites, and 3.5 min ($SD = 1.3$) for the other activities, while the total time they used smartphones was 172.7 min per day ($SD = 108.9$). These data show that these students on average spend more than one hour on social media and more than one hour on watching movies or checking websites, which result in approximately 3 hours of daily smartphone usage in total.

Results of the partial correlation analyses conducted in the same ways as above is shown in **Table 3**. Because time spent using smartphones for reading reported here was not identical to that previously reported, these correlations were calculated again. Whereas these correlations were non-significant for many of the comparisons, time spent watching movies on the smartphone was significantly correlated negatively with the nonreactivity subscale scores of the FFMQ. In addition, time spent playing games showed significant negative correlations with scores for the two subscales from the SWBS (i.e., general well-being: positive affect and expectation-

Table 3. Correlations between time spent using smartphones for different activities and scores from the psychological scales.

Scale	Time spent using smartphones (min per day)						
	Reading	Social media	Games	Movies	Shopping	Websites	Others
FFMQ total	-.029	-.125	-.109	-.325	-.028	-.115	.078
Observing	-.063	-.271	-.264	-.189	.075	-.290	.007
Describing	.068	.043	.082	-.148	.035	-.042	.130
Acting with awareness	-.054	.039	-.185	-.028	.120	.053	-.028
Nonjudging	.113	.004	.008	-.314	-.227	.122	.174
Nonreactivity	-.211	-.286	.061	-.379*	-.151	-.271	-.084
SWBS total	-.085	-.013	-.264	-.128	.071	-.128	-.170
General well-being: Positive affect	-.088	.057	-.408*	-.033	.142	-.065	-.113
Confidence in coping	.020	-.118	-.152	-.018	-.070	-.183	-.076
Expectation-achievement congruence	-.141	-.103	-.408*	-.254	.198	-.289	-.152
General well-being: Negative affect†	-.098	-.027	-.157	-.046	.087	-.025	-.164
Transcendence	-.019	.104	.097	-.143	-.076	.035	-.138
BDI total	.033	-.045	.040	.185	.082	.044	.055

Asterisks indicate statistically significant partial correlation coefficients (*: $p < 0.05$). †: The higher the scores, the smaller amount of negative affect was reported.

achievement congruence subscales). Reading time on the smartphone did not significantly correlate with scores from the psychological scales, consistently with the previous analyses (Table 2). With regard to the total duration of smartphone usage, observing (partial correlation = -0.377 , $p = 0.031$) and nonreactivity (partial correlation = -0.430 , $p = 0.013$) subscale scores of the FFMQ and expectation-achievement congruence subscale of the SWBS (partial correlation = -0.398 , $p = 0.022$) each revealed a significant negative correlation, whereas statistically significant correlations failed to be observed for the other comparisons (partial correlation = -0.304 – 0.128 , all $ps > 0.085$). These data show that some dimensions of mindfulness and subjective well-being are negatively associated with the total length of smartphone usage as well as with some specific activities on the smartphones (i.e., playing games or watching movies). By contrast, there was no significant indication that reading on the smartphone may relate to the desirable or non-desirable psychological status.

Discussion

The present study conducted a pilot examination regarding details of daily reading activities and/or smartphone usage in university students and how these activities may relate to mindfulness tendencies and relevant psychological status. Correlations between measures regarding reading and scores from the psychological scales failed to reach statistical significance in many of the comparisons, including total time and amount of reading and total/subscale scores from the psychological scales (Tables 1 and 2). Thus, there was no strong evidence in support of the hypothesis that daily reading activities are positively associated with desirable psychological status. Nevertheless, several statistically significant correlations were found in these analyses. For example, time spent reading comic books was significantly correlated negatively with the total scores of subjective well-being and its three subscales. In a similar way, amount (and less apparently time) of reading on the smartphone revealed significant negative correlations with the total/subscale scores

of subjective well-being. These results are consistent with the notion that activities such as reading comic books and reading on the smartphone, which may well involve reading comics on the smartphone, can lead to reduced psychological well-being in students.

Regarding smartphone usage, duration of activities such as engaging in social media or browsing websites failed to be significantly correlated with the scores from the psychological scales (**Table 3**). However, multiple significant negative correlations were again found. Specifically, total duration of smartphone usage revealed negative correlations with subscale scores of mindfulness and subjective well-being. Also, activities such as playing games or watching movies on the smartphone were significantly correlated negatively with subscale scores of mindfulness and well-being. These data seem to be partially in support of the hypothesis that frequent use of smartphones negatively impact daily psychological status including mindfulness, even though such negative influence seems also true for reading activities on the smartphone. The results obtained are also consistent with the recent reports regarding smartphone usage and/or addition. For example, Twenge et al. (2018) showed that psychological well-being of teenagers in the United States has remarkably decreased in association with the rise of smartphone technology. Demirci et al. (2015) reported that overuse of smartphones is related to decrease in sleep qualities and increase in levels of depression and anxiety in Turkish university students. The present data are thus consistent with the view that the same trends are true for students across countries, regardless of whether they engage in reading or in other activities on the smartphone.

In contrast, positive correlations were found for a few comparisons. For example, amount of reading critical essays was significantly correlated with larger total scores of the FFMQ (**Table 1**). Amount of reading paper books also showed a significant positive correlation with the scores of nonreactivity subscale of the FFMQ (**Table 2**). Trends of these data

are consistent with findings from a previous study involving people from wider age ranges (Miyata, 2016), and are partly supportive of the hypothesis that reading paper books/sentences is associated with desirable psychological functions in students. In addition, duration of using PCs/tablets revealed a significant positive correlation with the scores of a subscale from the SWBS (**Table 2**). This may be relevant to the fact that participants frequently use these devices when reading critical essays or other sentences for their studies. Obtaining data from a larger sample in future would promisingly help to strengthen these arguments.

The present survey remains a pilot study in that data from a limited number of participants have been obtained thus far. In fact, correlations failed to reach statistical significance between total scores of the FFMQ and those of the SWBS, which were strongly correlated with each other in both samples of yoga practitioners and non-practitioners in preceding studies (e.g., Miyata et al., 2015). Acquisition of the further data may reveal not only more apparent correlations than those reported here, but also moderating effects of mindfulness in the relationships between reading and desirable psychological status, or between smartphone overuse and non-desirable psychological functions. For example, for those high in mindfulness, reading habits might be more positively related to subjective well-being than for those low in mindfulness. It is also important that these surveys are conducted continuously, because reading habits and smartphone usage among students would go through rapid changes within several years. These investigations should allow further clarifications of the relationships between daily cognitive activities and psychological status in university students, especially by involving mindfulness as a key variable.

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Conflict of Interest

The author declares that no potential conflicts of interest exist with respect to the research, authorship, and/or publication of this article.