Exploring the Relationships among University Students' Media Multitasking, Personality and Academic Performance: A Quantitative Study

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1. Introduction

Media multitasking refers to one's behavior of getting involved in multiple media tasks simultaneously or shifting from one task to another frequently. It has drawn substantial attention from both the general mass and the scientific community (e.g., Foehr, 2006; Ophir, Nass, & Wagner, 2009). In the United States, the prevalence of media multitasking was found among the youth. A report demonstrated that about 30% of American students' time was spent on performing media multitasking (Rideout, Foehr, & Roberts, 2010). The recent study among Hong Kong young generations also found the increasing use of social media (Lu, Hao, & Jing, 2016; Lu, Jing, & Hao, 2017). Despite previous studies conducted in western societies have suggested that multitasking could affect students' learning, cognition, and neuro (e.g., Ophir et al., 2009; Uncapher, Thieu, & Wagner, 2016), yet little is known about the effect of media multitasking on young students in Hong Kong. Thus this quantitative study aims to fill the research gap by investigating media multitasking among Hong Kong university students and its relationship with students' personality and academic performance.

2. Literature Review

Young generations nowadays are always connecting to and are constantly checking their social media accounts and messages (Carrier, Rosen, Cheever, & Lim, 2015; Wallis, 2010). They "smartly" engage in media activities and keep themselves "always elsewhere", "never alone" and "always together" (Wallis, 2010), which naturally result in a wide range of media multitasking behaviors. Researchers have found that media multitasking is related to such personality traits as sensation seeking and impulsivity (e.g., Jeong & Fishbein, 2007; Kononova, 2013). However another personality trait, fear of missing out, which refers to the trait that pervasively apprehended others (e.g., friends) as having more rewarding experiences (Przybylski, Murayama, Dehaan, &

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Gladwell, 2013), has not yet been adequately studied in terms of its relationship with media multitasking.

Previous studies proposed a negative relationship between media multitasking and students' academic performance. For example, Junco (2012) reported that in-class multitasking on Facebook and message-texting led to poorer academic performance among university students. A review study by van der Schuur, Baumgartner, Sumter, and Valkenburg (2015) also found a similar result. However, most of these negative relationships found between media multitasking and academic performance were identified when participants were asked to report their study-related multitasking behaviors. Thus, the relationship between students' academic performance and their media multitasking in a general manner remains unclarified in the existing literature.

The primary aim of this study is to explore the relationship among media multitasking, personality traits (e.g., sensation seeking, impulsivity, and fear of missing out), and academic performance. In addition, it also aims to explore the relationship between media multitasking and academic performance in more detail in the sense that to explore the specific relationships between academic performance and the sub-dimensions of media multitasking behavior.

Research questions

This study aims to answer the following research questions: 1) what are the relationship among university students' media multitasking, personality traits (e.g., sensation seeking, impulsivity, and fear of missing out), and academic performance? 2) what is the relationship among media multitasking, its sub-dimensions, and academic performance? 3) what personality factors predict media multitasking most significantly?

3. Methods

3.1 Participants

Eighty-three undergraduate students from a local university in Hong Kong filled out the questionnaire. After excluding those who over reported their media use time (more than 7 * 24 = 168 hours), 68 responses were retained for further analysis. The participants were 21.1-year-old (SD = 3.05) and 50 of them were female (about 73.5%).

3.2 Measurements

Media multitasking The media use questionnaire was used to measure participants' media multitasking (Ophir et al., 2009). There were two types of questions in the media use questionnaire. First, participants were asked they spend how much time weekly on the 12 primary media listed above. Second, they were asked to indicate how often they engaged with each of the media as secondary tasks: never (=0), a little of the time (=0.33), some of the time (=0.67), and most of the time (=1).

This study slightly modified the formula by leaving out the social media (text messing) as the primary media for two reasons. First, the time spent on social media (texting messaging) is similar to instant messaging (Ophir et al., 2009), and therefore difficult to estimate. Moreover, the boundary separating instant messaging and social media (text messaging) have been blurred in recent years. Therefore, we calculated MMI based on 10 types of media as primary media and reported these 10 media multitasking sub-dimension scores in order to examine the relationship between MMI and its sub-dimension scores.

Personality traits 12 items were used to measure sensation seeking. It consisted 8 items adopted from the Brief Sensation-Seeking Scale (Hoyle, Stephenson, Palmgreen, Lorch, & Donohew, 2002) and 4 items from the original sensation seeking scale developed by Zuckerman, Eysenck, and Eysenck's study (1978). An adapted Brief Impulsiveness Scale (BIS) consisting of 15 items was used to measure impulsivity (Spinella, 2007). In addition, 6 items were used to measure fear of missing out (Przybylski et al., 2013). The boredom susceptibility – one sub-dimension under sensation seeking scale was removed from the further analysis due to the poor internal reliability (less than 0.50). Finally, the Cronbach's alpha were 0.84, 0.79 and 0.88 for sensation seeking, impulsivity and fear of missing out respectively (see Table 1).

Academic performance Students were asked to report their grade-point average (GPA) of the past semester based on the university criteria, which is a 4.3-point GPA scale (Max = 4.30, means A+ for all courses). Students' answers range from 1 = "2.00 or below" to 6 = "4.00 or above".

3.3 Data analysis

Descriptive analysis was conducted to describe students' performance on media multitasking, sensation seeking, impulsivity, fear of missing out, and academic performance (i.e., GPA). Correlational analysis was performed to examine the relationship among the variables included in this study. A multiple linear regression analysis was also performed to explore the effect of personality traits on MMI while controlling for the effect of gender and age.

4. Results

4.1 Descriptive and correlational analysis of key variables

Table 1 shows the results of the descriptive and correlational analysis. The average score of MMI was 3.63 (SD = 1.87). Among the personality traits, the participants scored 2.74 (SD = 1.13; 5-point scale) on sensation seeking, 2.18 (SD = 0.40; 4-point scale), 2.55 (SD = 0.85; 5-point scale). The average academic performance was 3.69 (SD = 0.94; 4.3-point scale).

The result shows that media multitasking index significantly related to personality traits examined in the present study. Specifically, the media multitasking positively related to sensation seeking ($r = 0.33$, $p < 0.01$), impulsivity ($r = 0.25$, $p < 0.05$), and fear of missing out ($r = 0.27$, $p < 0.05$). Sensation seeking negatively related to academic performance ($r = -0.24$, $p < 0.05$), while no relationship was found between academic performance with impulsivity ($r = -0.14$, $p > 0.05$) and fear of missing out ($r = -0.13$, $p > 0.05$). Moreover, no significant relationship was found between media multitasking index and academic performance ($r = -0.20$, $p > 0.05$).

Table 1. Descriptive and correlation analysis of key variables

	1	2	3	4	5	Cronbach's Alpha (if applicable)
MMI	—					
SS	0.33^{**}	—				0.84
IMP	0.25^{*}	0.30^{*}	—			0.79

FoMO	0.27*	0.24*	0.49**	—		0.88
AP	-0.20	-0.24*	-0.14	-0.13	—	
Mean	3.63	2.74	2.18	2.55	3.69	
SD	1.87	1.13	0.40	0.85	0.94	

*Note. MMI = Media multitasking index, SS = Sensation Seeking, IMP = Impulsivity, FoMO = Fear of missing out, AP = Academic performance; * $p < 0.05$, ** $p < 0.01$*

4.2 MMI's sub-dimension scores with MMI and academic performance

Among all 12 MMI's sub-dimensions (see Table 2), the MMI was found significantly related to television ($r = 0.26$, $p < 0.05$), computer-based video ($r = 0.29$, $p < 0.05$), non-music audio ($r = 0.41$, $p < 0.01$), video/ or computer games ($r = 0.30$, $p < 0.05$), Email ($r = 0.40$, $p < 0.01$), Web surfing ($r = 0.54$, $p < 0.01$), and other computers-based applications ($r = 0.31$, $p < 0.01$). Table 2 also shows the relationship between academic performance and MMI's sub-dimension scores, among which, academic performance was found to be negatively related to the TV sub-dimension score ($r = -0.26$, $p < 0.05$).

Table 2. MMI's sub-dimension with MMI and academic performance

	PM	TV	CBV	Music	Non-Music	VCG	Call	Email	Web	CBA
MMI	0.21	0.26*	0.29*	0.23	0.41**	0.30*	0.27	0.40**	0.54**	0.31**
AP	0.08	-0.26*	-0.07	-0.06	-0.17	-0.03	0.03	-0.03	0.06	0.19

*Note. MMI = Media multitasking index, PM =Print media, TV = Television, CBV = Computer based video, VCG = video/ computer games, Web = Web surfing, CBA = Other computer based applications; * $p < 0.05$, ** $p < 0.01$*

4.3 Multiple linear regression analysis of personality traits on MMI

As shown in Table 3, the results of multiple linear regression analysis demonstrated that the sensation seeking was the most significant factor that predicted MMI ($\beta = 0.28$, t-score = 2.27, $p < 0.05$). The total variance explained in this regression model was 18% ($F = 2.79$, $p < 0.05$, $\triangle R^2 = 16\%$) after controlling for the effect of gender and age.

Table 3. Multiple linear regression analysis of personality traits on MMI

Predictor	MMI

		Step 1		Step 2	
		β	t-score	β	t-score
Control	Gender	-0.11	-0.86	-0.17	-1.39
	Age	-0.10	-0.79	-0.04	-0.32
Personality traits	SS			0.28*	2.27
	IMP			0.11	0.84
	FoMO			0.15	1.09
	F	0.80		2.79*	
	R^2	0.02		0.18	
	R^2_{adj}	-0.01		0.12	
	$\triangle R^2$	—		0.16	

Note. MMI = Media multitasking index, SS = Sensation Seeking, IMP = Impulsivity, FoMO = Fear of missing out; * $p < 0.05$

5. Discussion

This study aimed at investigating the relationship among university students' media multitasking, personality and academic performance in Hong Kong. The results showed that media multitasking significantly related to personality traits such as sensation seeking, impulsivity, and fear of missing out. Sensation seeking was found negatively related to academic performance. However, media multitasking did not show a significant relationship with academic performance. In terms of MMI's sub-dimensions, it was found that most of the sub-dimension scores significantly related to MMI. Such a result indicates that some of the items on MMI could be removed from the original instrument, thus simplifying the current measurement. In addition, academic performance was not significantly related to MMI's sub-dimension scores, except for multitasking during watching TV. Finally, after controlling for the effect of gender and age, the study found that sensation seeking was the most significant factor that predicted MMI among university students.

This study reported that media multitasking positively related to sensation seeking and impulsivity. It means students who are inclined to seek risky behavior or lack of self-regulation are more likely to engage in media multitasking activities (Foehr, 2006;

Jeong & Fishbein, 2007; Sanbonmatsu, Strayer, Medeiros-Ward, & Watson, 2013). The positive relationship found between media multitasking and fear of missing out suggests that young students nowadays demonstrate strong eagerness to keep up with the online world and are especially interested in finding out what their friends are doing (Przybylski et al., 2013), and they usually do this by checking the messages sent by friends to their own mobile phones and computers. Specifically, sensation seeking was the most significant factor to MMI in the current study.

This study did not find the significant relationship between media multitasking and academic performance, except for multitasking during watching TV. However, a number of previous studies reported that multitasking negatively related to academic performance (Karpinski, Kirschner, Ozer, Mellott, & Ochwo, 2012; Lau, 2017; van der Schuur et al., 2015). Thus, we propose the following potential explanations to this non-significant result. First, as we only recruited a limited number of participants among one university, sample bias might be introduced. Second, media multitasking does not necessarily occur in study-related circumstances, thus exerting a limited effect on students' academic achievement. Third, according to previous studies, many researchers have suggested that media multitasking might affect one's cognition and neuro (Moisala et al., 2016; Ophir et al., 2009). Therefore, we should consider this non-significant finding in a broader context. Referring to the perspective put forward in *Diagnostic and Statistical Manual of Mental Disorder* (American Psychiatric Association, 2013), the effects of multitasking does not necessarily impact on every developmental aspect of individual students, the academic performance, for example, in this study. In other words, media multitasking may only exert a mild effect on users, and it is likely that this effect does not manifest itself through one's academic performance.

However, some limitations of the current study should be noted. First, the relatively small sample size of this study may be inadequate to represent the whole population of Hong Kong university students and therefore a larger sample size is needed in the future studies. Second, the instrument used to examine students' multitasking behavior in the present study did not measure academically-related multitasking behaviors. Future studies are adviced to focus on exploring the relationship between students' media multitasking behavior in the school context and their academic performance. It also

should be noted that the current media multitasking questionnaire and its calculation result – media multitasking index (Ophir et al., 2009) were too complicated to be applied to a large sample size. Therefore, a more simplified media multitasking scale is needed in the future studies.

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Abstract

The prevalence of media multitasking behavior among adolescents and young adults has drawn extensive attention from the research community. This study examines university students' media multitasking behavior by surveying 68 undergraduates in Hong Kong. It was found that media multitasking positively related to personality traits, including sensation seeking, impulsivity, and fear of missing out. In addition, the present study revealed that sensation seeking was negatively related to students' academic performance, whereas media multitasking was not related to academic performance. We suggest that future studies should employ a larger sample size to explore the relationships of students' media multitasking, personality traits, and academic performance, and also can develop more advanced measurements to explore the impact of media multitasking on different levels of students' development including their learning, cognition and neuro.

Keywords: media multitasking; university students; personality; academic performance