Research Report

Media multitasking and psychological wellbeing in Chinese adolescents: Time management as a moderator

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Abstract

The present study examined the relationships among media multitasking, time management, and psychological wellbeing in Chinese adolescents. A total of 320 adolescents aged 11 to 18 years old were recruited and asked to complete the Media Use Questionnaire, Chinese Adolescent Mental Health Inventory, and Adolescent Time Management Disposition scale. A structural equation model was used to assess possible relationships among media multitasking, time management, and psychological wellbeing. The results showed that the media multitasking index of the sample was 2.5, indicating that adolescents also had access to other 2.5 media tasks when performing the primary media task. Media multitasking was significantly negatively correlated with psychological wellbeing. Time management disposition was negatively correlated with Media multitasking and positively correlated with psychological wellbeing. Our findings indicate that time management disposition can moderate the relationship between Media multitasking and psychological wellbeing. The theoretical and practical implications of adolescent media use are discussed.

1. Introduction

The simultaneous use of one or more digital devices is referred to as media multitasking (Foehr, 2006; Roberts & Foehr, 2008) and is becoming ubiquitous among young people (Carrier, Cheever, Rosen, Benitez, & Chang, 2009; Jeong & Fishbein, 2007). Moreno et al. (2012) found that more than half of the time university students were using the internet they were multitasking. Given this rapidly changing media environment, it is vital to conduct empirical studies to understand how this new digital climate is influencing youth. However, there is no research into Chinese young users’ media multitasking behavior. As an important period between childhood and adulthood, adolescence is characterized by alterations in physical, psychological, and social development (Ernst, Pine, & Hardin, 2006). The presence of relatively immature cognitive control (Casey, Tottenham, Liston, & Durston, 2005) makes this period a time of vulnerability and adjustment (Steinberg, 2005), making adolescents worthy of special consideration. The aim of the present study was to examine media multitasking and its relationship with psychological wellbeing among Chinese adolescents and to explore what factors influence this relationship.

1.1. Media multitasking and adolescent development

There is mounting evidence that digital media multitasking can have a range of negative impacts on task performance and learning. Participants in a number of studies took more time to complete tasks performed concurrently than when they were performed sequentially (Pashler, 2000; Rubinstein, Meyer, & Evans, 2001). Accuracy and overall performance can also suffer during multitasking (Adler & Benbunan-Fich, 2012; Ophir, Nass, & Wagner, 2009). Using phones or laptops in the classroom (Fried, 2008; Junco, 2012a) and during lectures (Aguilar-Roca, Williams, & O’Dowd, 2012; Hembrooke & Gay, 2003) have negative impacts on the learning outcomes of both media users and students seated nearby (Sana, Weston, & Cepeda, 2013; Wood et al., 2012). A series of recent studies have highlighted the negative impacts of high levels of social media use on academic engagement and performance (Junco, 2012b; Junco & Cotten, 2012; Kirschner & Karpinski, 2010). Multitasking appears to inhibit the transfer of information into both short- and long-term memory (Edwards & Gronlund, 1998), and functional magnetic resonance imaging (fMRI) studies indicate that multitasking shifts activity from the hippocampus to the striatum. These structures associated with explicit/declarative and procedural memory, respectively, and a shift to the latter is clearly not conducive to deeper learning (Foerde, Knowlton, & Poldrack, 2006).
To examine the influence of chronic heavy multitasking on cognitive control, Ophir et al. (2009) developed the media multitasking index (MMI) to evaluate self-reported media multitasking across a variety of different media. They reported that college students who were heavy media multitaskers (HMMs) performed much more poorly than light media multitaskers (LMMs) in three key aspects of cognitive functioning: filtering, working memory management, and task switching. Positive correlations between levels of media multitasking and self-reports ofattentional failures, as well as spontaneous and deliberate mind wandering, were observed (Ralph, Thomson, Cheyne, & Smilek, 2013). The results showed that frequent task switching occurred in HMM groups, and their performances were far below that of LMM groups (Song, Nam, Kim, & Lim, 2013).

Many of the studies mentioned above concerned the impacts of media multitasking on learning and cognition, and most of them were conducted in college students. However, we have a limited understanding of chronic heavy multitasking on children’s well-being. Adolescents must deal with developmental challenges to establish interpersonal connections, construct self-identity, develop abstract thinking, learn to regulate emotion, and adapt to their environments. Only a few studies have examined the relationship between media multitasking and social wellbeing. Just one group investigated the effect of media multitasking on children’s wellbeing, and their sample was limited to female subjects. Pea et al. (2012) found that media multitasking was associated with a series of negative socioemotional outcomes in 8- to 12-year-old girls (e.g., feeling less social success, not feeling normal, having more friends whom parents perceive as bad influences, and sleeping less). For college students, media multitasking was a unique predictor of both depression and social anxiety after controlling for personality traits and overall media use (Alzahabi & Becker, 2013; Yang & Zhu, 2014). However, a Survey of the Previous Day (SPD) instrument in which participants were asked to recall what they did during each hour of the previous day revealed no significant relationship between media multitasking measures and wellbeing (Shih, 2013). Collectively, these studies demonstrate that the relationship between media multitasking and wellbeing is not well understood.

1.2. Time management, media multitasking, and wellbeing

Previous studies have investigated some factors that could increase the likelihood that an individual will multitask. Psychological variables such as sensation seeking (Foehr, 2006; Jeong & Fishbein, 2007) and impulsivity (Minear, Brasher, McCurdy, Lewis, & Younggren, 2013) are positively correlated with multitasking. Executive attention is central to multitasking because the information and goals relevant to one task must be actively maintained while other tasks are performed. However, Ophir et al. (2009) found that HMMs performed much more poorly than LMMs in executive function tasks. In other words, individuals who most frequently multitask may be those who are the least cognitively equipped to effectively carry out multiple tasks simultaneously. Therefore, variables related with self-regulation may negatively correlate with media multitasking.

Time management is conceptualized as an important aspect of behavior for self-regulation, which involves setting goals, prioritizing, time estimation, problem solving, evaluating, and observing patterns and trends in behavior (Pintrich, 2000, 2004). Huang and Zhang (2001) proposed the concept of time management disposition, which is a multilevel and multidimensional construct comprised of three dimensions: time value, time monitor, and time efficacy. These factors reflect self-control and self-efficacy with regard to time use. Numerous studies have shown that time management is positively correlated with wellbeing (Kaufman-Scarborough & Lindquist, 1999) and job satisfaction (Adams & Jex, 1999), but negatively associated with depression, anxiety (Misra & McKean, 2000) and tension (Macan, Shahani, Dipboye, & Phillips, 1990). Moderate effects of time management for organizing behaviors has been demonstrated with regard to the relationship of work demands and autonomy on job burnout (Peeters & Rutte, 2005) and for stressors and strains (Jex & Elacqua, 1999).

Based on theoretical and practical studies into time management, we expected a positive association of time management with wellbeing and a negative correlation with media multitasking. If an individual has a good plan of what to do, they may be not be distracted by other media activities. In addition, time management could buffer the negative effect of media multitasking on wellbeing.

2. Method

2.1. Participants

We recruited 320 high school students (grades 7–11) from 10 classes of 2 schools in Beijing. One experimenter and the class advisers released the questionnaires to the participants. Each subject received stationery as compensation for participating in the study. Ten participants were excluded because their questionnaire responses were deemed not serious. Among the 310 remaining participants, there were 157 boys and 153 girls, whose age ranged from 11 to 18, with a mean age of 15.3 (standard deviation [SD] = 1.4).

2.2. Measures

2.2.1. Media Use Questionnaire

The Chinese version (Yang & Zhu, 2014) of the Media Use Questionnaire developed by Ophir et al. (2009) was used. The questionnaire assesses the time spent using eight different types of media tasks while participating in face-to-face communication and doing homework. The eight different forms of media tasks include print media, texting, instant messaging, or emailing, using social network sites (SNS), using non-social text-oriented sites, talking on the telephone or video chatting, listening to music, watching TV and movies, and playing video or online games. Respondents were asked to report the total number of hours they spent using each medium on an average day. In addition, they indicated the extent to which they used each of the other types of media while engaging with each primary medium by responding most of the time, some of the time, a little of the time, or never. An index of media multitasking (MMI) was derived from the responses to the Media Use Questionnaire using the following formula developed by Ophir et al. (2009):

\[
MMI = \sum_{i=1}^{10} \frac{m_i \times h_i}{h_{total}}
\]

In the formula, \(h_i\) is the number of hours per day reportedly spent using the primary medium \(i\), and \(h_{total}\) is the total number of hours per day spent with all primary media. \(m_i\) was based on participants’ estimations of time spent on other media activities while engaged with a primary medium. Numeric values were assigned to participants’ estimations as follows: 1, most of the time; 0.67, some of the time; 0.33, a little of the time; and 0, never. The sum of the estimated activities was \(m_i\). To account for the amount of time spent engaging in the primary medium or activity, the MMI is adjusted by dividing the sum of the activity by \(h_{total}\).
2.2.2. Chinese Adolescent Mental Health Inventory
The 110 items of the Chinese Adolescent Mental Health Inventory (CMHI) developed by Institute of Psychology, Chinese Academy of Sciences consists of 5 subscales: emotion perception and regulation (27 items, with 17 reverse-coded items), cognition (17 items, with 7 reverse-coded items), communication with others (22 items, with 8 reverse-coded items), self-evaluation (23 items, with 5 reverse-coded items), and adaption to environment (18 items, with 8 reverse-coded items). The questionnaire also contains three items to assess the participants’ attitude, if two or more items were answered wrong, the participant was excluded from analysis. Responses were made on a 5-point scale from strongly disagree to strongly agree. The scores of the scale and the subscales are the total score for all of the items divided by the number of items. In the current study, the Cronbach’s alpha for the whole scale was 0.92, and the values for the five subscales ranged from 0.78 to 0.86.

2.2.3. Adolescent Time Management Disposition scale
The Adolescent Time Management Disposition scale (Huang & Zhang, 2001) is a 44-item scale comprised of 3 subscales that measuring time value (10 items), time monitoring (24 items), and time efficacy (10 items). A sample item was “I set my study goal everyday.” Responses were made on a 5-point scale from strongly disagree to strongly agree. In the current study, the Cronbach’s alpha for the entire scale was 0.91, and the three subscales ranged from 0.73 to 0.87.

2.3. Analytic plans
Structural equation modeling (SEM) was used to examine the relationships among media multitasking, time management, and wellbeing. The unconstrained mean-centered approach proposed by Marsh, Wen, and Hau (2004) was used to detect the interaction of latent variables. The model used centered indicator variables and the products of centered indicators as indicators of the latent product variable. In contrast to the constrained approach, this model does not impose any constraints derived from the multivariate normality assumption of the latent variables, making it easy for applied researchers to use. Moreover, the estimates in the unconstrained approach were slightly less biased than those in the constrained approach, and the solutions were somewhat more likely to converge when the indicators were normally distributed and the sample size was small (Marsh et al., 2007).

Models were evaluated for convergence using absolute, incremental, residual-based, and population-based fit indices (Kline, 2011). The goodness of fit index (GFI) ranges from 0 to 1, with values ≥0.9 indicating good fit (Jöreskog & Sörbom, 2006). The comparative fit index (CFI) ranges from 0 to 1, with values ≥0.9 indicating good fit. For the root mean square error of approximation (RMSEA) (Steiger, 1990), a value <0.08 is considered acceptable, with values ≤0.05 indicating very good fit.

All data analyses was performed with SPSS 19.0 (IBM Corp., Armonk, NY) and LISREL 8.0 (Scientific Software International, Skokie, IL) software.

3. Results
3.1. Media multitasking among adolescents
The media multitasking index (MMI) was 2.5 (SD = 1.67), indicating that adolescents simultaneously accessed 2.5 different kinds of media tasks in a single session. The MMIs of the 10 activities are shown in Table 1. The top three MMI types were listening to music, face-to-face conversation and texting/instant messaging/emailing. The lowest three MMI categories were watching TV and movies, playing video or online games, and talking on the telephone or video chatting, which require more focus. The score for these three MMI types was just over 1, suggesting that most participants were performing no more than 1 other task when participating in these forms of media.

We explored which media activities always occur simultaneously by counting the average extent to perform each of the 10 secondary activities (including the primary activity) when engaging with/in primary activities. Based on the numeric values assigned to participants’ estimations (1, most of the time; 0.67, some of the time; 0.33, a little of the time; and 0, never), Table 1 shows the activities pairs for which the secondary activities’ number were >0.33. When the primary activities were video chatting, watching TV/movies, and playing games, the values for all 10 secondary activities’ were <0.33, so the highest number of activities is shown.

When students communicated face to face with others, 44% of the time they were also studying; 36% of the time they were texting, instant messaging, or emailing; and 35% of the time they were listening to music. When they were doing homework, 44% of the time they were also listening to music; they spent 27% of the time sending texts, instant messages, or emails to others; and 21% of the time they were on SNS. The total number of the activities pairs proportion was >100%, indicating that students simultaneously carry on more than two tasks. The pattern of media activities pairs of the 10 activities were similar, with some activities more or less prone to occur simultaneously with others. Students always listened to music or sent texts, instant messages, or emails when they were doing most of the other activities. SNS use was also strongly implicated in multitasking behaviors. On the other hand, video chatting and video or online gaming required more focused attention.

3.2. Time management, media multitasking, and psychological wellbeing
The correlation matrix of time management, media multitasking, and psychological wellbeing (Table 2) showed that MMI was significantly negatively correlated with the five aspects of media multitasking, and wellbeing with the five aspects of media multitasking, and wellbeing (Table 2) showed that MMI was significantly negatively correlated with the five aspects of

<table>
<thead>
<tr>
<th>Activity pairs</th>
<th>Activity 1</th>
<th>Activity 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Studying (0.44), texting/instant messaging/emailing (0.36), music (0.35)</td>
<td>3.01</td>
<td>2.24</td>
</tr>
<tr>
<td>Music (0.47), texting/instant messaging/emailing (0.33)</td>
<td>2.37</td>
<td>2.05</td>
</tr>
<tr>
<td>Music (0.45), texting/instant messaging/emailing (0.39), studying (0.34), SNS (0.33)</td>
<td>2.85</td>
<td>2.06</td>
</tr>
<tr>
<td>Music (0.47), texting/instant messaging/emailing (0.34)</td>
<td>2.53</td>
<td>2.21</td>
</tr>
<tr>
<td>Music (0.39)</td>
<td>2.14</td>
<td>2.12</td>
</tr>
<tr>
<td>Studying (0.23)</td>
<td>1.51</td>
<td>1.08</td>
</tr>
<tr>
<td>Studying (0.46), texting/instant messaging/emailing (0.42), SNS (0.40), using print media (0.36)</td>
<td>2.88</td>
<td>2.24</td>
</tr>
<tr>
<td>Music (0.45), texting/instant messaging/emailing (0.27), SNS (0.21)</td>
<td>1.83</td>
<td>1.70</td>
</tr>
<tr>
<td>Texting/instant messaging/emailing (0.24)</td>
<td>1.43</td>
<td>1.24</td>
</tr>
<tr>
<td>Music (0.31)</td>
<td>1.35</td>
<td>1.07</td>
</tr>
</tbody>
</table>

Notes: The numbers in parentheses indicate the extent of the secondary activity when performing the primary activity.
Confirmatory factor analysis (CFA) was performed to evaluate the validity of the three latent constructs and determine the extent to which CMV may exist in the data. We compared our hypothesized 3-factor measurement model (wellbeing, time management, and media multitasking) with two nested alternative models, and the model fit results are shown in Table 3. In the 3-factor model, each item was restricted to an a priori factor, and each factor was allowed to correlate with all the other factors. The measurement model demonstrated an acceptable fit ($\chi^2 = 93.391, p < 0.01; \text{CFI} = 0.960, \text{GFI} = 0.942, \text{RMSEA} = 0.076$). All a priori factors loadings of the latent constructs were large, positive, and significant ($p < 0.01$), demonstrating convergent validity. To test the discriminant validity, we combined time management and wellbeing in a 2-factor model given that the bivariate correlations were $>0.30$ (see Table 2), the model fit indices were much worse than the 3-factor model, which supported the distinctiveness of the constructs in the study. In addition, drawing upon the widely used Harman’s single-factor test (Podsakoff, Mackenzie, Lee, & Podsakoff, 2003), we interpreted the lack of fit for the 1-factor model as indicating that common method variance was not a serious problem in the present study.

The moderate effect model (see Fig. 1) fit well: $\chi^2(49) = 87.51$, RMSEA = 0.05, GFI = 0.95, CFI = 0.98. All three paths were significant; the standardization coefficient of time management on wellbeing was 0.68 ($p < 0.001$), and media multitasking negatively predicted the level of wellbeing ($\beta = -0.10, p < 0.05$). Time management was negatively correlated with media multitasking ($r = -0.19, p < 0.01$). The coefficient of the interaction term was significant ($\beta = -0.10, p < 0.05$), which implied that time management moderated the relationship between media multitasking and wellbeing.

To plot the interaction effect, we used the standardization coefficients, with mean time management ± 1 SD (here, 1). Simple

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**Table 2**

Zero-order correlation matrix for measured constructs.

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Emotion</td>
<td>.86</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Self-evaluation</td>
<td>.67**</td>
<td>.84</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Communication</td>
<td>.68**</td>
<td>.71**</td>
<td>.80</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Cognition</td>
<td>.58**</td>
<td>.75**</td>
<td>.57**</td>
<td>.79</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Adaptation</td>
<td>.73**</td>
<td>.79**</td>
<td>.68**</td>
<td>.70**</td>
<td>.73</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Time value</td>
<td>.23**</td>
<td>.37**</td>
<td>.29**</td>
<td>.32**</td>
<td>.29</td>
<td>.73</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Time monitor</td>
<td>.36**</td>
<td>.60**</td>
<td>.45**</td>
<td>.59**</td>
<td>.52**</td>
<td>.60**</td>
<td>.87</td>
<td></td>
</tr>
<tr>
<td>8. Time efficacy</td>
<td>.44**</td>
<td>.62**</td>
<td>.51**</td>
<td>.63**</td>
<td>.55**</td>
<td>.64**</td>
<td>.79**</td>
<td>.75</td>
</tr>
<tr>
<td>9. MMI</td>
<td>-0.17</td>
<td>-0.18</td>
<td>-0.20</td>
<td>-0.20</td>
<td>-0.18</td>
<td>-0.16</td>
<td>-0.15</td>
<td>-0.17</td>
</tr>
</tbody>
</table>

Note: The numbers on the diagonal are the Cronbach’s alpha coefficients of these subconstructs.

**Table 3**

CFA results.

<table>
<thead>
<tr>
<th>Models</th>
<th>$\chi^2$</th>
<th>df</th>
<th>CFI</th>
<th>GFI</th>
<th>RMSEA</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 factor</td>
<td>93.391</td>
<td>25</td>
<td>0.960</td>
<td>0.933</td>
<td>0.076</td>
</tr>
<tr>
<td>2 factor</td>
<td>833.324</td>
<td>28</td>
<td>0.519</td>
<td>0.520</td>
<td>0.315</td>
</tr>
<tr>
<td>1 factor</td>
<td>1058.506</td>
<td>29</td>
<td>0.385</td>
<td>0.513</td>
<td>0.350</td>
</tr>
</tbody>
</table>

wellbeing ($r = -0.17$ to $-0.20, p < 0.01$) and the three subscales of time management ($r = -0.15$ to $-0.17, p < 0.01$). As we predicted, subconstructs of time management showed strong positive correlations with subconstructs of wellbeing ($r = 0.23$ to $0.63, p < 0.01$). The numbers on the diagonal are the Cronbach’s alpha coefficients of these subconstructs. We observed high correlations within the subscales of time management and wellbeing, indicating the internal consistency of the two scales.

The latent factors of the structural models were based on congeneric measurement models. For the latent wellbeing factor, the scores of the five subscales were used as observed indicators of wellbeing. For the time management factor, the summed scores for each of the three subcomponents (time value, time monitor and time efficacy) were used as indicators of the latent time management factor. Media multitasking had only one indicator (MMI). For the latent media multitasking × time management interaction factor, the product of the average of the three time management indicators and the average of MMI were used as the observed indicator. All of the indicators were mean centered to avoid the multicollinearity problem of moderation effect analysis.

To avoid potential common method variance (CMV), we evaluated the validity the measurement model and the problem of common method variance (CMV) before we tested the moderation effect model.
slopes test results showed that for the high-level time management group, wellbeing decreased as the MMI increased (simple slope = −0.196, t = −1.967, p < 0.05). However, in the mean and low levels of time management groups, there was no significant difference between the LMM and HMM groups in the scores of wellbeing (simple slope = −0.106, t = −1.390, p = 0.165; simple slope = −0.001, t = −1.624, p = 0.105) (see Fig. 2).

4. Discussion

This study extends the literature on the relationship between media multitasking and adolescent psychological wellbeing. The findings indicate that media multitasking was negatively associated with wellbeing; however, time management was positively correlated with psychological wellbeing. Moreover, time management was found to moderate the relationship between media multitasking and psychological wellbeing.

In the present sample, the average MMI was 2.5 which was significantly lower than that of college students in both U.S. and China (Alzahabi & Becker, 2013; Ophir et al., 2009; Yang & Zhu, 2014). Older students reported more media multitasking, which is similar to the results of Rideout, Foehr, and Roberts (2010). As children grow up, they have more chances to access to different types of electronic media. On the other hand, research has suggested that the brain centers responsible for executive functions, and hence multitasking, are not fully developed until after puberty (Conklin, Luciana, Hooper, & Yarger, 2007; Dux, Ivanoff, Asplund, & Marois, 2006); therefore, older students are better able to simultaneously handle several media tasks. The top three activities most likely to share time with other activities were listening to music, face-to-face communication, and online communication. The media activity pairs also showed that listening to music, online communications, and using SNS, usually occur in tandem with other tasks, but students were more focused when watching movies or playing games. We can use the “Cognitive Load” theory (Jeong & Fishbein, 2007) to interpret these results. Different tasks impose different loads on users due to their variable characteristics. Certain task combinations are more frequently observed because the combined cognitive loads of these tasks are within the limitations of human performance. Music and face-to-face communication require different sensory modalities compared with other media activities, so they would have minimal interference with other activities (Rosen, Lim, Carrier, & Cheever, 2011). Texting, instant messaging, or emailing usually are done with other tasks because they do not require sustained attention, they are sequential, and it is easy to fill down time in social networking and instant messaging with other media activities (Shih, 2013). Playing a video game is already a form of multitasking in that people need to watch the changing images, control the keyboard and mouse, and communicate with other game players, so with the exception of listening music which involves different sensory resources, it is difficult to simultaneously perform other activities while playing video games. With regard to watching movies and video chatting, it may be due to the computer’s characteristics, the chat and movie windows are dominant, reducing the opportunity to perform other computer tasks.

As expected and consistent with findings in adolescent girls and college students, there was a significant main effect of media multitasking on wellbeing. We used five concepts to measure wellbeing, and media multitasking was negatively correlated with all of them. Media multitasking was negatively correlated with communication and emotion. Based on the descriptive results of the MMI of the 10 activities assessed, media multitasking always involved online communication. One interpretation of this finding is that engaging in social interactions while dividing one’s attention to other media or activities can lead to weaker ties or lowered wellbeing (Wallis, 2010). Another interpretation is that online communication itself is associated with a range of negative socioemotional outcomes (Pea et al., 2012); alternatively, there may be complex interactions between online communication and media multitasking. Task switching among different media tasks leads to divided attention, and media multitasking increases media use time by several fold (Foehr, 2006). Extensive research has suggested that excessive media use is associated with a series of psychosocial and physical problems (Kraut et al., 1998; Primack, Swaner, Georgiopoulos, Land, & Fine, 2009; Yen et al., 2008). Taken together, these findings suggest that the growth in media multitasking should be viewed with some concern.

As hypothesized, time management was positively associated with wellbeing and negatively correlated with media multitasking, and there was a significant interaction between time management and media multitasking. For those with a high level of time management, media multitasking was negatively associated with wellbeing, but for the adolescents with low level of time management, there was no significant difference between HMM and LMM wellbeing. The result was unexpected as we predicted that good time management skills would buffer the harmful effect of media multitasking on wellbeing. Conversely, the results indicated that time management made individuals more sensitive to the negative effect of media multitasking on wellbeing. Time management is conceptualized as an important aspect of behavior for self-regulation; it involves a series of time management behaviors such as goal setting, schedule prioritizing, and time estimation. If one has a good grasp of the goals they need to accomplish, he/she may not be easily distracted by other activities (Panek, 2014). The results also indicated that media multitasking was negatively correlated with time management. However, media multitasking behavior or media choice are influenced by the characteristics of the media user, accessibility to electronic media, and even family media use environment and peer pressure (Jeong & Fishbein, 2007; Zhang et al., 2013). So, although one student has arranged his homework but his classmates and friends are having a lively chat room discussion about weekend traveling, he is likely to have the chat windows open when he is doing his homework to avoid feeling left out. When he estimated the work outcomes, he may not be satisfied with himself or feel regretful about his SNS use (Panek, 2014). It may be that the conflict between efficiency and distraction makes students with good time management feel uncomfortable about media multitasking.

The results of the present and previous studies urge educators and students to be aware of what constitutes media multitasking and understand its potential impact on development and learning. Rosen et al. (2011) and Wijekumar and Meidinger (2005) both showed that metacognitive skills are key factors that influence students’ media use behavior during studying. Our results regarding the moderate effect of time management can help guide media use strategies. Once the goals and schedules were set, it’s better to stick to the plan and not to be distracted to other media.
activities. As the distracting characteristic of SNS and texting, email or short message, students need to keep these distractions away when doing homework. The aim of the present study was to explore the phenomena of media multitasking among Chinese adolescents and its effect on wellbeing. The observation of a negative relationship between media multitasking and wellbeing is consistent with previous findings in U.S. adolescent girls and college students. The interaction between media multitasking and time management is novel. Although this study advances the literature on media multitasking and adolescents' wellbeing, there were some limitations. The self-report method used to measure multitasking performance could be biased, as people would overestimate their media use time (Moreno et al., 2012). Further studies are needed to develop and test more relevant methods such as experience sampling approach and media use diaries.

The statement of the individual author's contributions

Xiaohui Yang's contribution was to design the study, collect and analyze data, and draft the paper. Xiaohui Xu's contribution was to analyze data and revise the article. Liqi Zhu co-designed and revised the paper critically.

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