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Explicating multitasking with computers: Gratifications and situations

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Abstract

This study tries to test the theory of uses and gratifications and the theory of situated action as explanations of multitasking in computer-mediated communication. Based on the data collected from an online survey (N = 234), we find that as hypothesized, different gratifications and situations are connected to different types of multitasking in different ways. In particular, multimedia and work-related multitasking are primarily driven by instrumental gratifications whereas affective gratifications contribute to multimedia and interaction type of multitasking. Situational factors have less powerful influence compared to gratifications. However, there are clear differences that discern types of computer multitasking along the situational dimension.

Key words: computer-mediated communication, gratification, multitasking, need, situation, situated action, uses and gratifications.

1. Introduction

Multitasking is the behavior by which people handle multiple tasks simultaneously in order to either cope with the complicated environment or optimize the time or process of finishing tasks [21, 40, 41]. Multitasking with media refers to engaging in one medium along with other media or non-media activities [55]. Data from various sources show that media multitasking has become the dominant media behavior, especially among the younger generation [12, 13, 14, 24]. Foehr [52] found that 26% of youth's media time was spent on multitasking with multiple media. For adults, Papper, Holmes and Popovich [42] estimated that almost a quarter of media use (23.7%) was spent with more than one medium.

The increasing prevalence of the behavior has important implications. Theoretically, it challenges the conventional notion of media effects when media are no longer consumed alone. Traditional media effect studies often assume an isolated individual who uses one medium at a time. The effects are also assumed to be homogenous and monotonic for audiences who have similar personal traits. For instance, the arousing effect of sexual content in the media should be the same across different audiences if they share similar sensation seeking tendencies and other traits. This was found to be inaccurate when the arousing effect has to condition on whether the user is multitasking when consuming the sexual content [47].

Practically, the widespread behavioral pattern raises the concern of many advertisers, educators, and employers. Advertisers start to ponder on how they can reach the people they intend to convince if the audiences are busy doing different tasks when using media. Educators become worried about the young learners' ability to concentrate on their learning when multitasking becomes their day-to-day routine [19]. Still employers have to accept the fact that because of the flattening of hierarchies and expansion of work roles, managing multiple tasks is

becoming a basic characteristic of work life that influences work productivity [53]. Both the prevalence and the importance of the behavior urge researchers to thoroughly examine media multitasking, including both the description of such behavior and the explanation of it.

Survey evidence suggests that computer activities are by far the most multitasked, while the majority of computer usage could be considered media multitasking [16, 36, 52]. Foehr [52] found that young people are seldom to exclusively concentrate their attention on one activity when using a computer. Most activities during computer multitasking are media-based, including surfing websites, instant messaging (IMing), emailing, and so on. For example, researchers [3] note that: "(t)eens have long harnessed these small moments during IM conversations to enable them to accomplish other tasks while conversing. When teens go online, they will use IM as a 'conversational' centerpiece while conducting other business in the time gaps." (pp. 23)

Although the potential to combine tasks is infinite, people do not randomly pick two activities and carry them out simultaneously [16]. There are existing theories that seem to suggest different reasons why and how people engage in multitasking and this paper attempts to verify these theoretical predictions. Firstly, the uses and gratifications approach to media use assumes that audiences are aware of their social and psychological needs, and actively seek media outlets to fulfill them. Gratifications are considered as one important personal psychological factor that shapes media behaviors. The approach has been applied to studying digital media, such as MP3 players, satellite radio, mobile phones, the Internet, and computers [1, 15, 32, 46, 54, 57]. Scholars found that computer-mediated communication gratifies users in information seeking, entertainment, convenience, passing time, and interpersonal utility [2, 44, 56]. It is thus expected that computer multitasking can be explained by users' needs as well.

A second theoretical approach to understanding media behaviors is to center around situations. As media devices grow in number and become more portable, situations in which media are used become more diverse [35]. For example, the migration of media into people's bedrooms has been identified as at least partially responsible for media multitasking [12, 45]. The private location, free from disturbance and distraction, increases the opportunity to use more than one medium at a time [45]. In addition to physical locations, Goffman [19] defined situations by interpersonal relationships and communication. Recently, technosocial situations, advocated by mobile phone scholars [35], consider technology as another factor that defines situations. Therefore, situations in this study, defined through the physical, social and technological dimensions, are expected to be another set of predictors of computer multitasking behaviors.

This paper attempts to provide an empirical test of a theoretical model that considers both gratifications and situations to explicate one particular media multitasking behavior—multitasking with computers. Computer multitasking includes activities that are either Internet or non-Internet based such as completing an assignment using a Mircosoft package while IMing. A modeling effort is made to include users as well as the often neglected factor, situations. The user is examined through a traditional uses and gratifications approach by measuring the needs that motivate him/her to multitask with computers. In addition to gratifications, this paper proposes situational factors including spatial differentiation, interpersonal setting, and technological mediation as another set of predictors of computer multitasking. An online survey of 234 respondents was conducted to investigate the roles of gratifications and situations in affecting both the types and the amount of computer multitasking. The theoretical distinctions between

gratifications and situations are discussed to inform research on other new media behaviors, such as mobile phone usage.

2. Multitasking with computers

Although computer multitasking can take many forms, people don't randomly pick two activities and do them simultaneously. Carrier and his colleagues [36] found that people generally agreed on which task combinations are hard or easy. Mental capacities define and limit the types of tasks that can be multitasked. The concept of cognitive load suggests that multiple tasks compete for cognitive sources at different levels, from attention to long-term memory [55]. Different tasks lay different loads on users, due to different characteristics of the tasks. Certain task combinations are more frequently seen because the combined cognitive loads of these tasks are within the limitations of human performance. Because multitasking with computers is recognized as one of the most often observed multitasking behaviors, we first want to explore which types of activity pairings are conducted in the computer-mediated context.

RQ1: Which types of tasks are paired together in computer multitasking?

2.1. Explicating computer multitasking: Gratifications

Needs are considered as one important personal psychology that shapes new media behaviors. The uses and gratifications approach to media use assumes that audiences are aware of their social and psychological needs and actively seek the media to fulfill them [39]. Needs lead to both ritualized (passive) and instrumental (active) use of media [6, 7, 37]. Media usages characterized as ritualized are habitual and frequent; those which are instrumental tend to be

purposeful, selective and goal-oriented. Previous uses and gratifications studies identified various media gratifications, including surveillance, sociability, diversion, escape, arousal, instrumentality, reassurance, and companionship from studying various media (newspapers and magazines, see [4]; television, see [5,10, 38]; VCR, see [8, 11]; cable TV, see [43]; and the telephone, see [22, 25]).

More recently, scholars have recognized the importance of applying uses and gratifications to new media and digital technologies [8, 30] . Ruggiero [51] argues that "as new technologies present people with more and more media choices, motivation and satisfaction become even more crucial components of audiences analysis." (pp.14) Studies on the motivations of computer usage have emerged as an important part of this tradition [23, 28, 49]. Papacharissi and Rubin [56] identify the primary motives for computer usage as instrumental information seeking, entertainment, convenience, passing time, and interpersonal utility. Another study by Flanagin and Metzger [2] reveals that compared to traditional means of mediated interpersonal and mass communication, computer-mediated communication better gratify users in information retrieval, learning, play, leisure, persuasion, social bonding, relationship maintenance, problem solving, status, and personal insight. Wei and Leung [44] summarize four factors that represent essential motives that drive Internet use: fun seeking, socializing, diversion/escape, and surveillance/information gathering.

In computer-mediated context, the boundary between user activities is becoming blurred. Havick [27] states that the computer-mediated context creates a distinctive communication environment that "gives individuals more control of the dissemination, storage and production of information and can operate as another dimension of communication within the new and traditional media mix." (p. 121). In such a context, users' multitasking with computers may

result from two or more different gratifications at the same time. Moreover, intentional and active multitasking indicates that there may be unique gratifications related to computer multitasking itself. Our second research question is thus to explore the type of gratifications users seek to fulfill when multitasking with computers. Our first hypothesis predicts that the different gratifications are connected to the specific types of multitasking pairings.

RQ2: What are the gratifications for computer multitasking?

Hypothesis 1: Different gratifications will be connected to different types of computer multitasking in different ways.

2.2. Explicating computer multitasking: Situations

In the field of human-computer interaction (HCI), theorizing situation has been highlighted as a crucial critique to the cognitive paradigm that dominates the field. The writings of Greeno[26], Lave [29], Suchman[31], Winograd and Flores[50], whom now are labeled as the "situated action" school, share the notion that people's behavior is contextualized to the extent that situation plays a co-determining role (along with cognitions) in shaping actions. Cole [33] traced the philosophical ground of this thought to John Dewey, Anthony Giddens, and Pierre Bourdieu as these theorists hold to the conviction that an action is not a simple response to its situation but part of the ecological system called context. However, what constitutes situation has remained to be unclear due to first, the ontological understanding of situation as fundamentally diverse and second, the ethnomethodological stance that denies any *a priori* classifications of situational factors. The reluctance to define situation could be seen in the lack of a commonly acceptable description of this concept across the writings. But when it comes to guiding practical design matters such as building location-based technologies, it seems to be necessary to give

situation an operational meaning at least within the specific scope of the action we are examining. If we are not able to build a universal model of situations, we at least need to consider modeling the situations [34] associated with one particular action such as multitasking with computers. The modeling of situation in our paper thus builds upon the ethnographic observations of the contexts in which new media are used.

Ethnographers who examine everyday new media usage such as mobile phones [35] have given us much of such evidence to theorize the contexts around using one medium. The concept of technosocial situations [35] was proposed to accommodate both our conventional understanding of situations as interpersonal settings and technology as another dimension of situations. Goffman [18] was first to refer to situations as settings mainly defined by interpersonal relationships and communication, as he said that "(s)ituations begin when mutual monitoring occurs, and lapse when the second last person has left" (p.18). Studies following this understanding show that "(m)obile phones create new kinds of bounded places that merge the infrastructures of geography and technology, as well as technosocial practices that merge technical standards and social norms" [35]. For example, camera phone use is found to be constructed through the merging of the mobile phone and the digital camera into a single device [17]. The technical standards enabled by camera phones challenge social norms surrounding camera use. Camera phone introduces a dimension of visually archiving personal life and sharing of the selective and intimate viewpoint. Therefore, situations in this study are not just about physical locations but also include the social and the technological/media dimensions. Katz [20] argues that the social and physical loci of media reception are wed together with personal psychologies. The example Katz uses is that "a darkened theater and projection from behind-the-head regress cinema-goers to an infantile stage in which a movie becomes their dream or their

voyeuristic experience…This contrasts with the television experience which invites a more dialogic stance based on the vis-a-visness of the set and the intimacy of the setting." This example shows that situations are not only influenced by psychological needs but also influencing these needs. The question of "who I am (now)" has to be answered by considering both situations and gratifications.

Based on the literatures reviewed above, we define situation as a non-user component that shapes media usage behaviors. Our model indicates that new media behaviors are influenced by both personal psychologies and situation-related conditions (see Figure 1). This theoretical framework transcends the media-centric vs. user-centric division in media theories. We are not just interested in either "what media do to people" or "what people do to media". We are concerned by "how media and users influence each other in situations". Media usage situations vary a lot so we expect to see the mutual influence manifests itself in different scopes in different situations. In some situations, users' gratifications may determine which media they want to use, and how they want to use the media (e.g., there is an emergency call to make despite where the user is). In other situations, social norms may have a stronger influence that it only allows certain media usage behaviors to emerge, regardless of the needs of users (e.g., talking on mobile phones in a theater is forbidden). In short, both personal psychologies and situations should exert influences on new media behaviors.

Figure 1 about here.

Situation in our model has three dimensions: Firstly, the physical places that media usage happens in, such as living rooms, shopping malls, and movie theaters. Secondly, the media technologies that are available in these places. How audiences watch a TV wall on the street should be different from watching a TV set in the living room, although the content that is shown

might be the same. Thirdly, the social relationships and norms that are embedded in the physical places. Living rooms etiquettes may forbid certain media usage behaviors and users have to move to private bedrooms in order to fulfill the needs. When we say situation is a non-user component, we do not mean that situation does not involve users. Rather, we consider this component as relatively pre-determined thus it imposes limitations on users and their behaviors. On the other hand, personal needs are a user component because users can easily adjust their needs according to their evaluations of the situations. We do not assume that users always comply with the limitations imposed by situations. We recognize the possibility that users may choose to challenge the situational limitations and purposely re-shape the situations by using media in certain ways. However, there should be a general pattern that can be observed in terms of the relationship between situations and media usage behaviors, when taking account in the influence of needs and gratifications. Our second hypothesis thus predicts that the situational factors influence computer multitasking as well.

Hypothesis 2: Different situations will be connected to different types of computer multitasking in different ways.

3. Method

An online survey was completed in April 2009[1]. With the help of our contacts who worked as class coordinators in high schools and colleges, a URL link to an online questionnaire was sent to the email addresses of 475 students from one high school class, three junior college classes and two university classes. We received 271 responses (57.1% response rate) and after

[1] A pilot online survey of 82 undergraduate students was conducted in March 2009. The students were recruited from a large introductory class for communication majors in a university. Students did the survey in exchange of research participation points. The response rate was about 80%.The findings of the pilot informed the construction of the questionnaire used in the main study.

excluding incomplete questionnaires, 234 of them were valid. The respondents were mainly female (*N* = 161 , 68.9%) and had an average age of 22.79 years (*SD* = 7.46). They were predominantly college students, with 50.4 % of them (*N* = 118) pursuing their undergraduate degree and another 30.4 % *(N* = 71) pursing their master's degree; the rest were high school students (*N* = 31, 13.7%) and PhD students or graduates (*N* = 4, 1.7%). Approximately 70% of them have used computers for more than two years. When they used computers, they mainly relied on desktop computers (*N* = 154, 65.5 %), with only a small portion of 14% saying that they often or always use laptops (*N* = 33).

3.1. Type of Task Pairings

Respondents to the pilot study were asked to list their five most common multitasking activities[2]. Multitasking behaviors, compared to using single medium, are very diverse. The free listing in our survey is used to balance the diversity of multitasking behaviors and the space limitation of questionnaires. By giving respondents the freedom of naming their most frequent multitasking activities, we are able to focus on the most prominent types of multitasking behaviors. One coder categorized the answers and a list of 31 computer multitasking behaviors was generated. All the 31 multitasking behaviors were centered on three computer usages: instant messaging (i.e., IMing), web surfing, and emailing. Respondents to the main study were asked to rate how often they were doing two particular activities simultaneously on a 7-point Likert scale (1 = never, 7 = always). Details about the items can be found in column 1, Table 1.

[2] In a review of instruments, Jeong, Fishbein and Zhang [46] compared survey, diary, and experiment. Whereas experiments are most limited in terms of the types of multitasking behaviors they can examine, diaries provide most flexibility to document emerging multitasking behaviors. Survey items are in between the two as they can be more extensive than experiments but due to the space limitation of questionnaires, the items cannot be as inclusive as diaries. A rarely used method is direct observation [42], which involves researchers following research subjects for a full day and recording extensively which media the subjects have used. This method is very telling but most resource-demanding and sometimes, obtrusive.

3.2. Gratifications

Respondents to the pilot study were asked two open-ended questions: (1) Using single, easy-to-understand terms, why do you multitask with computers? (2) Using single, easy-to-understand terms, what do you enjoy the most by multitasking with computers? One coder did an analysis of the answers to the open-ended questions by classifying similar answers to the same categories. Thirty-eight items were generated from this analysis (see column 1 in Table 2). Respondents to the main study were asked to estimate to what extent they agree with the 38 items about motives of computer multitasking using a 7-point Likert scale (1 = totally disagree, 7 = totally agree).

3.3. Situations

Respondents were asked about three types of situational factors, namely, the social, physical, and media environments, in the format of structured questions. The social environment was measured by the frequency of using computers on different occasions, such as being alone or being with friends (1 = never, 7 = always). Similarly, the physical environment was measured by the frequency of using computers in different locations, such as in one's own bedroom or in a public space. The media environment was estimated by internet connectivity (1 = Local Area Network (LAN), 0 = others including broadband, dialing, and wireless), the speed of the operation system (1 = very slow, 7 = very fast), and the reliability of the computer (1 = very unreliable, 7 = very reliable).

4. Data analysis and results

In order to answer the first two research questions, factor analyses are operated on the 31 items of task pairings and the 38 items of gratifications to discover the basic patterns. Factor analyses also serve as the first step leading to the building of regression models that test the two alternative theories indicated in the two hypotheses. Three multitasking types and three gratification types obtained from factor analyses, along with situational factors as well as basic demographics, are entered into multiple regressions to test their relationships.

4.1. Task Pairings

A factor analysis was conducted to cluster the main types of task pairings. Using varimax with Kaiser normalization as the rotation method, we indentified three types of computer multitasking. The factor loading of activities multitasked with emailing, instant messaging, and web surfing was of the same pattern (see Table 1). The three-factor solution using an eigenvalue greater than 2.00 explained 56.22% of the variance[3].

Table 1 about here.

4.1.1. *Multiple media.*

The first factor (see column 2 in Table 1) included activities such as searching for useful information, browsing news or leisure content, listening to music on the computer or the Internet, watching online TV or movies, and downloading from the Internet. IMing and emailing were also loaded on this factor. We named this factor the multiple media type of computer multitasking (*Cronbach's Alpha* = .938) because all the activities clearly involve more than one media format. This particular type of computer multitasking was the most popular among our subjects (M = 4.54, SD = 1.57).

[3] Items that measure actual behaviors and gratifications obtained from open-ended questions are different from psychometrics that are constructed by the researchers, The items examined in this paper do happen or exist in the real world and therefore, may contain more noises. A review of previous studies that include factor analyses of media usage gratifications shows that the variances explained ranges from 50% to 60%.

4.1.2. *Interaction.*

The second factor (see column 3 in Table 1) consists of online transaction, participation in online discussions, using chat rooms, and playing online games. Activities loaded on this factor all involve a certain degree of interactivity and were thus named the interaction type of computer multitasking (*Cronbach's Alpha* = .894). This multitasking pattern seems to include at least two dimensions of interactivity: online transactions illustrate the human-medium interactivity; and online discussions and chatting represent the human-human interactivity. However, the interaction type of computer multitasking was the least popular among our subjects (*M* = 2.90, *SD* = 1.40).

4.1.3. *Work-related.*

The third factor (see column 4 in Table 1) can be tagged as work-related activities, including writing or editing documents, and reading for work and study (*Cronbach's Alpha* = .817). These two activities can be both online and offline. The combination of work-related activities and emailing, IMing, and web surfing raises the concern that multitasking may have the problematic influence on work performance. This type of computer multitasking is also common among our subjects (*M* = 3.70, *SD* = 1.51).

4.2.Gratifications

Another factor analysis was conducted to cluster the 38 items of gratifications for computer multitasking. Using varimax with Kaiser normalization as the rotation method, we indentified three types of computer multitasking gratifications (see Table 2). The three-factor solution using an eigenvalue greater than 2.00 explains 53.95% of the variance.

Table 2 about here.

4.2.1. *Convenient/easy/instant gratifications.*

Twenty items constituted this factor (*Cronbach's Alpha* = .949, see column 2 in Table 2). Some of the gratifications are facilitated by the technological capacity of computers, e.g., "suddenly I get online messages or mails from others." Other gratifications reflect the fact that such capacities are still limited, such as doing something else while waiting for the computer to respond. In addition, computer multitasking also provides an instant fulfillment of traditional needs, such as keeping connected with friends or family. This type of gratification is found to be the most popular among our subjects (M = 4.59, SD = 1.40).

4.2.2. *Control/habitual gratification.*

Computer multitasking, on the one hand, is a habitual behavior when items, such as, "I feel the urge to do many things at one go", are loaded on this factor (see column 3 in Table 2). On the other hand, this factor also indicates that in an environment that often involves information overload, the need to exert control is a significant one (e.g., "I can do things at my own pace."). This factor is made up by 10 items (*Cronbach's Alpha* = .896), and it is the second most popular dimension of gratifications among our subjects (M = 4.19, SD = 1.35).

4.2.3. *Social/affective/relaxation gratification.*

This factor emphasizes the personal feeling or non-instrumental needs linked to computer multitasking and included eight items (*Cronbach's Alpha* = .891, see column 4 in Table 2). Affective needs, such as a sense of achievement or feeling less lonely, were loaded on this factor. Relaxation and pressure relief were also linked to this factor. These needs are consistent with

what we have seen in previous studies on uses and gratifications of other media technologies. This gratification is similarly popular among our subjects (M = 4.12, SD = 1.50).

4.3. Explicating multitasking with computers

Bivariate relationships were assessed using Pearson's r correlation coefficients (see Table 3). The results show that computer multitasking behavior, regardless of its type, is strongly associated with gratifications of the instrumental, affective, and control needs. Almost all types of social environment are positively associated with computer multitasking except that work-related multitasking does not correlate with being alone or with strangers. The correlations between different types of physical environment and computer multitasking are more discernable. The multimedia type of multitasking is only positively associated with using computers in a bedroom. The interaction type of multitasking is positively associated with using computers in a living or study room or public space. The work-related multitasking is positively associated with using computers in a working place or school or living or study room. In terms of the media environment, the results show that using LAN has negative association with the multimedia and the work-related type of multitasking. Both system speed and computer reliability are positively associated with the work-related type of multitasking.

Table 3 about here.

We utilized multiple regressions to generate prediction models for the three types of computer multitasking. Each type of computer multitasking was regressed on demographic variables, gratifications, and situations (including measures of the physical, social, and media environment; see Table 4).

Table 4 about here.

4.3.1. *Demographics.*

Unlike in previous studies, gender was not a significant predictor of any of the three types of computer multitasking in our study. Age turned out to be the most significant demographic predictor: It negatively related to the multiple media type of computer multitasking, whereas it positively linked to the work-related computer multitasking. Education was marginally significant when it negatively related to the interaction type of multitasking.

4.3.2. *Gratifications.*

Bivariate correlations showed that all dimensions of gratifications were significantly related to each kind of multitasking, yet, in the regression model, only one or two of the gratification categories significantly predicted one particular type of multitasking. Specifically, the gratifications of convenience, easiness, and instantness were strong predictors of both the multimedia and the work-related type of computer multitasking. The multimedia type of multitasking can also be predicted by the social/affective/relaxation gratification. In contrast, the gratifications of convenience, easiness, and instantness had no influence on the interaction type of computer multitasking, while the control/habitual gratification and the social/affective/relaxation gratification were the two significant predictors. In summary, hypothesis 1 is supported here.

4.3.3. *Situations*

Interesting findings were identified when examining situational factors, including the physical, social, and media environment and their influence on computer multitasking. Locations such as the living or study room, and public space increased the tendency for

multitasking for interaction purposes. Being alone significantly increased the amount of multitasking with multiple media. Being with family and strangers increased the amount of multitasking to gain interaction. Being with family also increased multitasking with work-related activities. Computer capacity and internet connection had no influence on either the interaction or the work-related type of computer multitasking. One media variable marginally related to the multimedia type of multitasking: being connected to the Internet via LAN decreased the amount of multimedia use. This finding makes sense considering that multimedia usages demand a high Internet speed and the free flow of data. In short, hypothesis 2 is supported, too.

5. Discussion

The contribution of this study is two-fold: First, it offers a description of computer multitasking behaviors, and a classification of relevant gratifications. Second, it provides empirical evidence to verify the influence of situations, in comparison to gratifications, on computer multitasking. The study identified three major multitasking types, which could be generally described as multimedia, interaction, and work-related. Both gratifications and situations were found to be significant predictors of these behaviors. Users bring their motivations and intentions to new media use, which is shown in the finding that different gratifications of computer multitasking predict different multitasking types. On the other hand, situational factors are found to be predictors of computer multitasking. The finding that being in a public space or with strangers increases the tendency to multitask with interactive activities (see the positive coefficients of the two variables when regressing on interaction-type of multitasking in Table 2) suggest that after taking users' needs into account, both physical and

social settings still show influence on computer multitasking behaviors. As another indication, technological constraints, such as internet connections, limit users' involvement in computer multitasking. These findings provide supports to the integrated model we proposed through confirming that gratifications alone are not enough to explain and predict behaviors and we have to include situational factors as a regular component in our theoretical framework. No matter how strong the need is, the behaviors would not be possible without permissive social norms, relevant technological affordance, and so on. Our findings are consistent with many theoretical initiatives considering the connection between situations and gratifications. For example, rather than assuming that human needs are stable, Rubin and Windahl [9] pointed out that "people's needs and motives vary as they evolve in interactions with societal and communications systems." Similarly, Katz suggested that we should focus on the social and physical loci of media reception when we examine media effects. Future research should examine the dynamics embedded in such situations in order to better understand why certain types of multitasking seem to proliferate.

There is a tremendous space for developing future research on media multitasking and this study only serves as a first step towards that development. Theoretically, our findings suggest that the uses and gratifications approach alone is inadequate in explaining how users engage in new media in a media-saturated environment. A perspective that takes the concept "situation" seriously is urgently needed in order to accommodate the highly fluid and flexible nature of new media use supported by technological affordances (e.g., the portability of mobile phones greatly enhanced the diversity of physical space in which phones are used). The situational view helps us to reconcile the seemingly conflictual approaches to understanding media behaviors. Media effects studies try to ask "what media do to users" and audience-

centered research focuses on "what users do to media". But if we consider media usage as behaviors that emerge out of situations, which have to be defined by users, media, and contexts, the emphasis of our inquiry would no longer be "what is more powerful, the media or the users". Instead, we would spend our effort on discovering how different components (including users, physical, social, and technological environments) mutually construct a situation and how the interaction between these components renders certain consequences but not others.

The practical significance of computer multitasking is also obvious. If an advertiser is interested in taking advantage of computer-mediated communication to reach users, computer multitasking suggests that it is no longer effective to purely focus on what to present on the computers. Whether users could be successfully reached would have to take situational factors into account as well. If an advertiser wants to target audience segments based on their usage behaviors, computer multitasking implies that the segmentation strategy may include multitasking patterns. Educators can also learn from our study that work-related multitasking is indeed one of the three prominent multitasking patterns among our student sample and therefore, does imply a problematic influence on learning. In addition, when work-related multitasking occurs, it seems to be driven by users' instrumental needs for convenience, easiness, and instantness. This finding suggests that students multitask with work in order to respond to emerging situations rather than doing it as a habit or fulfilling their social/affective needs. Since our sample is not a group of working professionals, our findings regarding computer multitasking may not be applied to a work environment. However, the general finding that situations matter implies that we need to study the detailed aspects of work environments before we can fully understand the effects of multitasking on work performance. In order to provide clear guidance to different practitioners (advertisers, educators, and employers), both detailed

descriptive work and theoretical development are in great need. Media multitasking in general, computer multitasking in particular, promises a profound research area that deserves a thorough investigation.

This study is not without limitations. First, our survey sample was not a representative adult sample, so the generalization of our findings should be made with caution. The patterns found here may only apply to the younger group of computer users in a Chinese higher education context. The descriptions and predictions need to be further verified using other populations from other contexts. In addition, the interactions between gratifications and situations were not empirically supported in this study, but they may be evident in other new media behaviors that are more situation-sensitive, such as mobile phone usage. The examination needs to be extended to other formats of new media multitasking behaviors. However, these limitations do not contradict the exploration effort this paper is making, which is to test the two alternative, if not competing, theoretical approaches (i.e., uses and gratifications versus situated action) in order to understand new and complex media behaviors such as computer multitasking.

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Appendix

Figure 1. An integrated model of computer multitasking

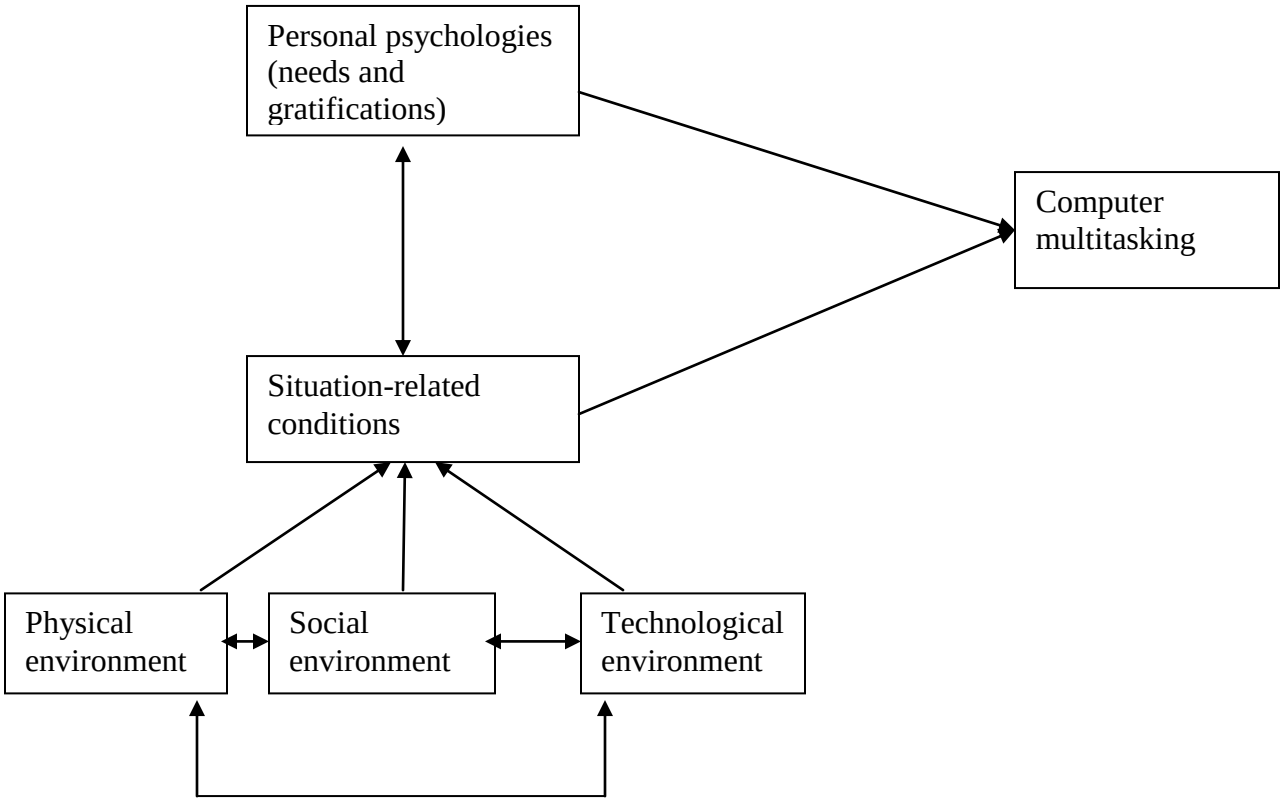

Table 1. Factor Analysis of Types of Computer Multitasking

	Multiple media			Interaction			Work-related		
	Loading	M	SD	Loading	M	SD	Loading	M	SD
IM and Searching useful information	.673	4.71	1.913						
IM and Browsing news or leisure content	.649	4.37	2.045						
IM and Listen to music from computer or the Internet	.803	4.80	2.048						
IM and Watching online video or movie	.721	4.42	2.077						
IM and Downloading from the Internet	.756	4.69	2.078						
Web and Listen to music from computer or the Internet	.717	4.58	2.012						
Web and Watching online video or movie	.688	4.09	2.236						
Web and Downloading from the Internet	.722	4.51	2.159						
Email and Searching useful information	.587	4.94	2.005						
Email and Browsing news or leisure content	.565	4.29	2.166						
Email and Listen to music from computer or the Internet	.792	4.80	2.054						
Email and Watching online video or movie	.742	4.26	2.187						
Email and Downloading from the Internet	.741	4.60	2.129						
IM and Online transaction				.742	2.43	1.912			
IM and Participate in online discussion				.659	3.02	2.067			
IM and Using chat room				.612	3.03	2.138			
IM and Playing online games				.742	3.20	2.251			
Web and Online transaction				.724	2.47	1.843			
Web and Participate in online discussion				.661	3.06	2.049			
Web and Using chat room				.746	3.01	2.099			
Web and Playing online games				.651	3.20	2.192			
Email and Online transaction				.698	2.28	1.749			
Email and Participate in online discussion				.547	3.01	2.033			
Email and Using chat room				.579	2.80	2.074			
Email and Playing online games				.566	3.23	2.255			
IM and Writing or editing documents							.677	3.34	2.028
IM and Reading for work and study							.658	4.12	2.107
Web and Writing or editing documents							.648	3.14	2.054
Web and Reading for work and study							.629	3.79	2.235
Email and Writing or editing documents							.704	3.38	2.075
Email and Reading for work and study							.592	4.41	2.010
Eigenvalues		10.71			4.33			2.95	
Variance explained (%)		33.48			13.52			9.22	

Table 2. Factor Analysis of Gratifications of Computer Multitasking

	Convenient/Easy/Instant			Control/ Habitual			Social/Affective/Relaxation		
	Loading	M	SD	Loading	M	SD	Loading	M	SD
It's enjoyable	.663	4.34	2.005						
I want to be entertained while working	.637	4.81	1.846						
It's easy	.610	4.22	2.022						
Computers have the capacity to multitask with	.695	4.80	1.932						
Computers make a lot of things easier	.568	4.62	1.982						
Doing something else while waiting for the computer to respond	.624	4.57	2.010						
Keep connected with friends or family	.650	4.57	2.073						
Check out anything new happened	.696	4.88	1.950						
To discuss things on hand	.720	4.37	1.962						
Something occur to me when doing other things	.545	4.13	1.920						
Get what I need at once	.777	5.00	1.900						
Suddenly I get online messages or mails from others	.596	4.36	1.987						
It's very convenient to do so	.520	4.34	2.064						
Need to complete many things with computer	.725	4.47	2.101						
Certain tasks are easy to multitask with	.708	4.43	2.023						
To save time	.573	4.52	1.882						
Finish the most tasks with the least time	.571	4.77	1.862						
Computer is the single device where my needs are met	.562	4.80	1.839						
Get more information	.579	4.83	1.953						
Need various functions or resources simultaneously	.546	4.84	1.872						
It's just a habit				.546	4.01	1.890			
I find it natural				.572	4.09	1.773			

I feel the urge to do many things at one go			.596	3.91	1.931		
I find it boring to do a single task at a time			.662	4.11	1.929		
I can't help myself doing other things			.698	3.85	1.957		
It's more flexible			.633	4.37	1.864		
I can do things at my own pace			.550	4.43	1.842		
Does not have to reply immediately when communicating with others			.693	4.21	1.891		
It's easy to resume activities from interruption			.650	4.40	1.831		
Things do not need to be done soon			.670	4.47	1.877		
To feel kind of achievement						.477	3.67	1.966
I cannot do one thing for long						.631	4.08	1.956
It’s easier to kill time						.686	4.41	1.982
To feel less lonely						.765	4.23	2.099
To take a break from things I am doing						.733	4.03	1.965
To thoroughly relax						.744	3.95	2.005
To release pressure						.557	4.43	1.935
To make me more involved and absorbed						.631	4.19	1.970
Eigenvalues	16.33		2.69			2.02		
Variance explained (%)	41.86		6.90			5.19		

Table 3. Correlation matrix between multitasking and gratification/situation factors (Pearson's r, N=235)

	Multiple media	Interaction	Work-related
Gratifications			
Convenient/easy/instant	.646***	.287***	.442***
Control/habitual	.452***	.384***	.285***
Social/affective/relaxation	.516***	.435***	.300***
Physical environment			
Bedroom	.126	.073	.102
Living room or study	.013	.221***	.126
Working place or school	.001	-.027	.202**
Public space	.060	.261***	.015
Social environment			
Alone	.250***	.126	.070
With family	.295***	.307***	.248***
With friends	.401***	.190**	.232***
With colleagues/classmates	.357***	.168	.218***
With strangers	.242***	.272***	.064
Computer environment			
System speed	.046	.020	.130**
Computer reliability	.016	-.041	.125
LAN	-.359***	-.099	-.130**

*** $p < .01$, ** $p < .05$

Table 4. Regression Models Predicting Different Types of Computer Multitasking

	Multiple media	Interaction	Work-related
	Beta	*Beta*	*Beta*
Demographics and computer usage			
Gender	-.082	.069	-.050
Age	-.225***	-.119	.150**
Education	-.048	-.114	.089
Average time spent on computers	.008	.079	.058
Gratifications			
Convenient/easy/instant	.487***	-.036	.336***
Control/habitual	-.105	.142	-.040
Social/affective/relaxation	.157**	.294***	.065
Physical environment			
Bedroom	.000	-.086	-.009
Living room or study	-.045	.170**	-.023
Working place or school	-.001	-.066	.073
Public space	-.047	.121	-.014
Social environment			
Alone	.104**	-.030	-.069
With family	.038	.114	.119
With friends	.073	-.029	.098
With colleagues/classmates	.054	.022	.038
With strangers	.013	.140**	-.012
Computer environment			
System speed	.018	-.017	.024
Computer reliability	.070	.046	.064
LAN	-.099	.039	-.087
Adjusted R square	.55	.27	.22
N	234	234	234

*** $p < .01$, ** $p < .05$