International Journal of Communication 8 (2014), 699–714 1932–8036/20140005

The Role of News Media Use and Demographic Characteristics in the Prediction of Information Overload

QIHAO JI
Florida State University, USA

LOUISA HA
Bowling Green State University, USA

ULLA SYPHER
Florida State University, USA

Drawing on the information overload theory, this study investigates how news media use relates to the probability of information overload. Our broad goal is to explore how typical media use outside the working environment impacts information overload. Through a large mail survey conducted in northwest Ohio (*N* = 661), the study combined resident samples and college student samples and examined several variables regarding demographic characteristics, news media use, and information searching efficiency. Multinomial logistic regression was used to analyze the data. Results confirmed that age, gender, income, traditional news media use, and information searching efficiency can partially predict one's probability of experiencing information overload. Theoretical explanations for these outcomes are presented, and implications for information overload research are discussed.

Keywords: information overload, news use, survey, digital literacy, information processing

About 25 years ago, sociologist Orrin Klapp (1986) wrote in *Overload and Boredom*, "This is a high-input society" (p. 2). The claim still remains true. Thanks to the development of electronic information communication technology, people today are exposed to thousands of pieces of information. The Internet in particular changed the way people create and exchange information. Consumers benefit from the abundance of information, but they may also suffer from too much information when they lack the capacity to process the wealth of information.

Qihao Ji: qji@fsu.edu
Louisa Ha: louisah@bgsu.edu
Ulla Sypher: Ulla.sypher@cci.fsu.edu
Date submitted: 2013-08-06

While information overload (IO) has been a prominent phenomenon attracting tremendous amount of attention ever since the beginnings of the printing industry, comprehensive academic interest in this phenomenon was not ignited until IO was proved to exist by Jacoby, Speller, and Berning's (1974) pioneering experiment, in which subjects were presented with various brands and asked to rate them and choose the best one. Results showed that many subjects could not successfully pick out the brand they rated highest when too many brands were presented, indicating that people tend to make poorer decisions when they are presented with increasing amounts of information. A study by Eppler and Mengis (2004) surveyed nearly all academic studies on IO and found that the issue has been investigated by scholars from disciplines including sociology, psychology, marketing, business management, and accounting.

Against this background, it is rather surprising that among those myriad studies on IO, few approached it from the communication perspective. Hargittai, Neuman, and Curry (2012) observed that the relationship between typical media consumption and IO is rarely examined outside the workplace. Hence, researchers are not able to answer questions about whether and how different types of media use might impact IO at home. To address this issue, Hargittai and her colleagues conducted qualitative interviews on people's perception of news use on TV and the Internet. They found that IO is not as pervasive as they expected in the American home. The researchers noted that their methodology limited the results' generalizability, and they called for survey research to further examine this issue. Indeed, other qualitative studies have suggested news consumption actually can lead to IO in some cases (Aldoory & Van Dyke, 2006). Therefore, the primary purpose of the current project was to continue the investigation of news use and IO in both traditional and new media outlets.

Additionally, although a handful of studies on IO have revealed that many personal characteristics and demographic variables are associated with IO, a systematic examination of all demographic characteristics and IO is absent. We intend to fill this gap with a study focusing on individual characteristics.

Another important path of inquiry involves the ways in which people cope with IO. The topic of coping strategy represents a substantial proportion of the existing IO literature (Eppler & Mengis, 2004). It has been stated that people are not passive when confronting IO; rather, they became more selective and efficient in their information searching behavior (Janssen & Poot, 2006; Reuters, 1998; Schultze & Orlikowski, 2004). In this regard, information searching efficiency seems helpful for alleviating IO. From a slightly different perspective, literature on the notion of digital literacy also noted information searching efficiency as an important construct (Bawden, 2008), and some argued that there is a clear theoretical connection between digital literacy and IO (e.g., Koltay, 2011). Therefore, we intend to test the impact of information searching efficiency with our quantitative empirical evidence.

Theoretical Considerations

The Theory of Information Overload

Despite various definitions that have been suggested for the concept of information overload, the general notion refers to a person receiving more information than s/he can process in a certain period of

time; "it occurs when [information] supply exceeds the [individual's processing] capacity" (Eppler & Mengis, 2004, p. 326). The underlying assumption is that a person can only digest a certain amount of information in any given time. In addition, Davis (2011) emphasized that IO happens within a domain (e.g., computer screen or workplace), and it triggers failure of intention, which can lead to lower working efficiency.

Broadly speaking, scholars distinguish between two main types of IO: objective and subjective (Eppler & Mengis, 2004; Malhotra, 1984). Objective IO refers to the characteristics or quality attributes of information (including the amount of information, processing time, level of information complexity, and intensity) that are affiliated with overload. This particular perspective drove many experimental IO studies that primarily were administered by consumer and marketing researchers (Merz & Chen, 2006). In contrast, subjective IO refers to each individual's personal feeling when confronted with information, such as confusion, cognitive strain, and other similar dysfunctional consequences. Experiments are not appropriate with regard to subjective IO, because time constraints in laboratory settings do not always happen in real-life situations (Bock, Mahmood, Sharma, & Kang, 2010). Research often adopted surveys and qualitative interviews to capture the complexity of perception (Bakker, 2007; Bock et al., 2010; Hargittai et al., 2012).

In the context of news media use, the subjective definition of IO appears to be more appropriate. This is because news use (as well as other typical media use) is not identical to information use in the working environment, which requires information to be processed in a very limited time span. Rather, news media use is consumed on an as-needed basis. Therefore, we operationalized IO as a perception of feeling overwhelmed by information. Accordingly, we chose survey over experiment to compensate for the shortcomings of the qualitative method in IO research.

Although the notion of IO is well established in the working environment (e.g., Schultze & Vandenbosch, 1998), it is important to understand the effect of IO generally. From a sociopsychological perspective, Klapp (1986) proposed the key concept of boredom as a result of IO. He argued that too much information can be noise-like, because it is hard to extract meaning or interest from the flood of information. Individuals, then, would feel cluttered, dissatisfied, lonely, isolated, tedious, or distracted, all of which cause boredom. In other words, IO affects people's psychological well-being. In that sense, understanding whether and how typical media use (news media use, in this case) influences IO is valuable in terms of guiding people's daily media consumption.

IO undoubtedly is a complicated perception that can be caused and influenced by various factors. According to Jackson and Farzaneh's (2012) conceptual IO model, IO is generally associated with two groups of factors. *Intrinsic* factors refer to the fundamental elements of IO, including the amount of information, information-processing capacity, and available time. *Extraneous* factors have an indirect impact on IO but a direct impact on intrinsic factors. These variables typically involve characteristics of information, quality of information, task and process parameters as well as personal factors. Clearly, although both intrinsic and extraneous factors are causes of IO, intrinsic factors influence IO more directly. Moreover, Jackson and Farzaneh (2012) argued that "personal factors directly affect the information processing capacity, [and] these [personal] factors cannot be entirely distinguished from

information processing capacity" (p. 527). Thus, quantity of information, personal factors, and time are the three key elements of IO. Due to these theoretical considerations, we decided to focus on the role of the first two elements in the news use context: quantity of information (news media use) and personal factors (demographic variables and information searching efficiency).

Demographic Factors and Information Overload

Several studies have provided empirical evidence regarding IO and individual differences. One study regarding radio content and cognitive effort took age into account (Lang, Schwartz, Lee, & Angelini, 2007). It found that participants' cognitive overload did not occur for radio arousal content. The study also found that teens and college students showed different levels of cognitive effort while exposed to arousing radio messages. In other words, the study established age as a significant demographic variable in influencing people's information processing. Similarly, in a study commissioned by the Associated Press in 2007 (Nordenson, 2008), researchers examined young adults' news use patterns around the world and concluded that young generations are suffering from news fatigue—a condition closely related to IO. Another preliminary survey study found that IO among college students is positively correlated with gender (female), age, and education (Williamson & Eaker, 2012). Therefore, our first set of hypotheses is:

H1a: Controlling for gender, young adults are more likely to encounter IO than older adults.

H1b: Controlling for age, women are more likely to encounter IO than men.

H1c: Controlling for age, gender, and education, people with relatively higher household incomes are more likely to perceive IO than those who have lower incomes.

H1d: Controlling for age, gender, and income, people with relatively higher levels of education are less likely to perceive IO than those who have relatively lower levels of education.

News Media Use and Information Overload

News consumption today is far beyond a singular behavior that merely involves newspapers, television, and radio. Channels such as computers, mobile phones, and social media join the "media repertoire" (Yuan, 2011) from which people select news information. Perhaps the term "technostress" (Rosen & Weil, 1997) captures the relationship between increased information channels and IO, because it refers to the possibility that the changing patterns of information and communications technology might lead to a stressful psychological state when people confront countless pieces of information.

However, as we have suggested earlier, empirical studies of typical media use and IO are scarce among the IO literature. Hence, we first turned to some early media effects literature that examined the relationship between different media usage and cognitive overload (usually a substitute term for IO). In a conceptual study of how people process television messages, Lang (2000) proposed a limited capacity model, which suggested that message processors have limited capability (in terms of recognition memory, resource allocation, orienting behavior, reaction time, etc.) when they are exposed to media content. In

other words, people's ability to process the messages they receive is limited, because processing mediated message requires users to constantly devote cognitive effort, a finite capacity in everyone. Over decades, many empirical studies have supported Lang's model. For instance, Lang, Bolls, Potter, and Kawahara (1999) found a curvilinear relationship between camera cuts (whether related or unrelated cuts) and cognitive overload in visual media. Interestingly, in a group working environment, Schultze and Vandenbosch (1998) found that, as information load increases, one's processing capacity also increases to protect oneself from being overwhelmed, but only up to a certain point. Similar results were observed at the individual level as well (Jacoby, 1984; Schroder, Driver, & Streufert, 1976). Based on these results, we hypothesize that, as news consumption increases, the probability of information overload occurrence (and the intensity of IO) will increase accordingly. However, as the overload reaches a relatively high level, people will refuse to—or will simply be unable to—process more information, which, in turn, decreases the likelihood of encountering IO. Therefore, the relationship between time spent on news media (an indicator of the quantity of information) and the probability of experiencing IO can be shown in a bell-shaped curve (see Figure 1), where mid-level news media use predicts a higher probability of IO occurrence than lower or higher levels of news media use.

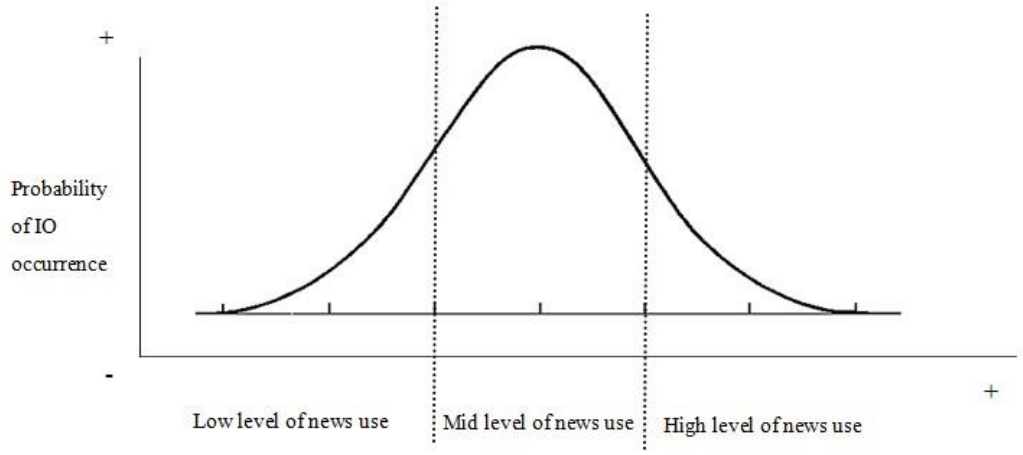

Figure 1. The proposed relationship between news use and probability of IO occurrence.

In light of the notion of media repertoire, which emphasizes the coexistence of multimedia usage, and the fact that people rely on multichannel news sources, we divided news media use into two components: use of traditional news media and use of Internet news media. Consequently, we hypothesized that mid-level traditional news media use on traditional media predicts a higher probability of encountering IO than lower or higher levels of news media use.

However, since the effects of information transmitted through computer-mediated communication channels is different from those transmitted through traditional mass media channels (Lang, Borse, Wise, & David, 2002), we suspect that news use on the Internet might not predict the probability of encountering IO in the same pattern as it would for traditional news media.

H2: *Controlling for demographic variables and Internet news use, those with mid-level traditional news media use will be more likely to perceive IO than those with lower or higher traditional news media use.*

RQ2: *How does a person's Internet news media use predict one's probability of encountering IO, controlling for demographic variables and for traditional news use?*

Information Searching Efficiency and Information Overload

As noted earlier, previous IO literature has established information searching efficiency as a coping strategy among those perceiving IO (Janssen & Poot, 2006; Reuters, 1998; Schultze & Orlikowski, 2004). Studies on digital literacy—a notion that refers to the personal capability of identifying, processing, and creating information through all media platform (Bawden, 2008)—also addressed the importance of information searching capability. Koltay (2011) argued that there is a clear theoretical connection between digital literacy and IO, so the relationship between information searching efficiency and IO can be assumed. Moreover, the IO model also suggested that a person's information-processing capability plays an active role in decreasing the probability of IO occurrence (Jackson & Farzaneh, 2012). Hence, we hypothesized that:

H3: *Controlling for demographic variables and news media use, people with relatively higher information searching efficiency are less likely to perceive IO than those who have relatively lower levels of information searching efficiency.*

Method

This study is part of a larger mail survey and parallel online survey conducted in northwest Ohio in 2011. Samples were comprised of two parts: students from a public university in northwest Ohio and residents of northwest Ohio. By using the tailored design method (Dillman, 2007), randomly selected residents of northwest Ohio (N = 1,500) were sent a questionnaire package including a cover letter, a visually attractive questionnaire booklet, a stamped reply envelope, and a fresh one-dollar bill as incentive for participation. The nonrespondents of the first mailing were sent a postcard reminder 3 weeks after the initial contact. We recruited college students from among 32 general education and large introductory lecture classes with various majors and class standings. Students received extra credit for participating in the study online. A total of 661 responses were received, of which 216 were residents of northwest Ohio and 445 were college students.

Respondents were asked about their media use and attitudes. The questionnaire contained two parts: The first part asked about use of various media, such as how much time one spends reading

newspapers every week, how many years of experience one has using the Internet, what kind of news one prefers, one's attitude toward different media, and one's perception of the probability of information overload. The second part included demographic variables.

Measures

Demographic variables: gender, income, education, and age. Respondents were asked to report their age and gender. Respondents selected annual income from among the following categories: (1) under US$30,000, (2) $30,001–$60,000, (3) $60,001–$90,000, (4) $90,001–$150,000, (5) over $150,000. Education was measured by (1) completion of grade 8 or less, (2) completion of grades 9 to 11, (3) high school graduate or equivalent, (4) 1 to 3 years of college or technical school, (5) college graduation (4 years), (6) attended or completed graduate school.

Probability of IO occurrence. Based on the subjective IO definition, respondents were asked whether they had perceived information overload via this question: "Have you ever felt overwhelmed in terms of the information provided by various media?" Possible answers were (1) yes, frequently; (2) sometimes, or (3) not at all. The scale was ordinal in nature, which enabled us to compare different levels of IO to the null IO group. The decision of assessing the probability of IO occurrence with a single-item measure was made based on several considerations. First and foremost, a similar one-item measure of IO has been used in related research using an ordinal scale (Dubosson & Fragniere, 2009). Second, as Misra and Stokols (2012) have pointed out, most studies measure IO with context-specific items. An instrument with proper levels of universality was not available when we administered the study. Third, our primary goal was to find how certain demographic characteristics and news media use related to people's perception of the probability of encountering IO. In other words, we were interested in the subjective perception of IO rather than the actual IO, which involves many other considerations (Haksever & Fisher, 1996). Finally, because this study is more interested in *media-based* sources of IO as opposed to *place-based* sources (Misra & Stokols, 2012), instruments containing place-based items were eliminated.

Traditional and Internet news media use. Traditional news media use was measured by the number of hours per week that people used traditional news media (television, radio, news magazines, and newspapers). Internet news media use was measured by the number of hours per week that people used digital news media (online newspapers, online portals, social media, and mobile phones). It is important to note that time spent on news media is in fact a better measure of the quantity of news information in the survey setting because: (1) Unlike information use in the workplace, news consumption is more active, which means that time spent on news use reflects people's actual interest in news (Yuan, 2011). (2) Compared to asking how much news information people use every day, time spent on news media use is more easily recalled by respondents.

Information searching efficiency. Because we did not find a scale for information searching efficiency, we asked respondents to what extent they believed they had devoted too much time to searching for valuable information. Possible answers for this item were: (1) frequently, (2) sometimes, (3) never. We developed this item based on theoretical discussion about the concept from both the IO and

digital literacy literature (e.g., Bawden, 2008; Janssen & Poot, 2006). Reverse coding was applied for this variable.

Data Analysis and Findings

Respondents' Profiles and Perceived IO

Data analysis was based on the merged samples of residents and students to create a sample with more age variance, because the data from the resident sample turned out to contain mostly older adults and seniors (M_{age} = 55.6). Among the 661 college and resident respondents, 59.5% were women. The average age was 30.79 after the two samples were merged. A total of 354 participants (51.4%) had attended 1 to 3 years of college or technical school, 172 (27.2%) had completed high school or a lower level of education, and 135 (21.3%) had a 4-year college degree or higher. For household income, nearly half of the respondents (48.9%) reported income of less than $30,000 per year, 111 (16.8%) respondents' household income was between $30,001 and $60,000 annually, 15.2% respondents reported income between $60,001 and $90,000, and 106 (17.5%) respondents had an income higher than $90,000.

In regard to respondents' perceived IO, 141 (24.5%) respondents said they had never experienced IO; 434 (75.5%) either said yes (31.3%) or sometimes (44.2%).

We used multinomial logistic regression (MLR) to test the hypotheses. Since our dependent variable is categorical in nature, this data analysis technique is appropriate. MLR divides the regression into several binary regressions and compares them separately to a baseline group (Long, 1997). It allows the predicted variable to have more than two levels of response. Also, it is possible to consider multiple predictor variables simultaneously, just as in other regression analyses. The advantage of this technique, as Visser (2004) suggests, is that "it does not require the assumptions associated with many other tests (such as normality and homogeneity of variance) to be met" (p. 62). However, the technique assumes the existence of well-populated tables, an adequate sample size, the absence of significant outliers, and independence of observations. To conduct the regression, each predictor measure was recoded into three levels based on percentile values. Specifically, the data were categorized into education (high school, 3 years college, 4 years college or higher); total news media use (1–8 hours, 9–16 hours, 17 hours or more); Internet news media use (1–4 hours, 5–10 hours, 11 hours or more); traditional media use (0–2 hours, 3–6 hours, 7 hours or more); and Internet experience (0–8 years, 9–11 years, 12 years or more). Respectively, respondents in each of the three groups are considered "lower level," "mid-level," and "higher level" on the measures. Considering the young age of college students, we divided age into two categories: 25 and younger, and 26 and older.

For all hypotheses tests, the reference category for the dependent variable was "no, never felt overwhelmed about information." Each hypothesis was tested twice by a two-level predicted variable IO (yes, no) and a three-level predicted variable IO (frequently, sometimes, never). Two-level MLR tests the existence of relationships, and three-level MLR determines the extent to which the variables predict consistent future intentions. For each multinomial regression, odds ratios (*ORs*), *p* values, and confidence

intervals (*CIs*) are reported. As a measure of effect size, *ORs* reveal to what extent a trait in one group is higher or lower than the baseline group.

Hypotheses Tests and Results

H1a considered age and IO. The overall models are statistically significant (two-level comparison: log likelihood = 21.642, $df = 2$, $p < .001$; three-level comparison: log likelihood = 41.867, $df = 4$, $p < .05$). Controlling for gender, young adults are 1.4 times ($p < .05$, 95% *CI*, *OR* = 0.9–2.1) more likely than older adults to experience IO. Young adults are 1.5 times ($p < .05$, 95% CI, *OR* = 1–2.3) more likely than older adults to experience IO sometimes. Therefore, H1a was partially supported.

H1b considered gender and IO. The overall models are the same as H1a. Controlling for age, men are 0.6 times ($p < .01$, 95% *CI*, *OR* = 0.4–0.9) less likely to experience IO than women. Men are 0.5 times ($p < .01$, 95% *CI*, *OR* = 0.4–0.8) less likely than women to experience IO sometimes. Therefore, H1b was partially supported.

H1c predicted that people with lower household income would have lower perceived IO. The overall models are statistically significant (two-level comparison: log likelihood = 272.308, $df = 14$, $p < .01$; three-level comparison: log likelihood 141.043, $df = 7$, $p < .01$). Controlling for age, gender, and education, people with a household income of $30,001 to $60,000 are 0.4 times ($p < .01$, 95% *CI*, *OR* = 0.2–0.8) less likely to perceive IO than people who have household incomes of more than $90,000. People who have household incomes of $60,001 to $90,000 are 0.5 times ($p < .05$, 95% *CI*, *OR* = 0.3–1.1) less likely to experience IO than people who have household incomes over $90,000. People who have household incomes of $60,001 to $90,000 are 0.4 times ($p < .01$, 95% *CI*, *OR* = 0.2–1) less likely to experience IO sometimes than people who have household incomes of more than $90,000. Similarly, people who have household incomes of $30,001 to $60,000 are 0.4 times ($p < .01$, 95% *CI*, *OR* = 0.2–0.8) less likely to sometimes experience IO than people who have household incomes of over $90,000. Therefore, H1c was partially supported.

H1d considered education and IO. The overall models are the same as H1c. However, two-level MLR tests suggest no existing relationship ($p > .05$). Therefore, H1d was not supported.

Table 1. MLR Analysis: Using Demographic Variables and Traditional News Use to Predict Encountering IO.

Variables	Probability of encountering IO			
	p	Exp(B)	*SE* B	β
Two-level MLR, "yes"				
Male	< .05	.656	.239	−0.421
Education, 3 years of college	< .05	.542	.359	−0.613
Income, $30,001–$60,000	< .05	.406	.402	−0.902
Traditional news use, 0–2 hours	< .05	1.756	.310	0.563
Traditional news use, 3–6 hours	< .05	1.695	.311	0.528
Three-level MLR, "frequently"				
Traditional news use, 3–6 hours	< .05	1.810	.363	0.593
Three-level MLR, "sometimes"				
Male	< .001	.530	.262	−0.635
Education, lower than high school	< .05	.464	.419	−0.767
Education, 3 years of college	< .05	.469	.379	−0.757
Income, $30,001–$60,000	< .001	.359	.427	−1.024
Income, $60,000–$90,000	< .05	.393	.453	−0.934
Traditional news use, 0–2 hours	< .05	1.838	.337	−0.609

Note. All nonsignificant results are omitted for simplicity. Tables displaying full results are available from the first author upon request.

H2 considered traditional news media use and IO. The overall models are statistically significant (two-level comparison: log likelihood = 288.101, *df* = 11, $p < .05$; three-level comparison: log likelihood = 569.071, *df* = 22, $p < .05$). As shown in Table 1, controlling for age, gender, income, education, and Internet news media use, people who use traditional news media for 3 to 6 hours every week are 1.7 times ($p < .05$, 95% *CI*, *OR* = 0.9–3.2) more likely to experience IO than people who use traditional media more than 7 hours every week. Meanwhile, people who use traditional news media 0 to 2 hours every week are 1.8 times ($p < .05$, 95% *CI*, *OR* = 0.9–3.2) more likely to experience IO than people who use traditional media more than 7 hours every week. People who use traditional media for 0 to 2 hours every week are 1.8 times ($p < .05$, 95% *CI*, *OR* = 1–3.6) more likely to experience IO sometimes than people who use traditional media more than 7 hours every week. People who use traditional news media for 3 to 6 hours every week are 1.8 times ($p < .05$, 95% *CI*, *OR* = 0.9–3.7) more likely to experience IO often than people who use traditional media more than 7 hours every week. In other words, those with higher levels of traditional news media use (more than 7 hours per week) are less likely to experience IO than those with a mid-level of news media use (3 to 6 hours per week) and are less likely to experience IO sometimes than those with lower levels of news media use. We ran the same model again with the lower-level news media use group set as the reference group to compare the mid-level traditional news media group with the lower-level news media use group, but the two-level MLR model was not significant, indicating no existing relationship. Therefore, H2b was partially supported.

RQ2 examined Internet news media use and IO. The overall models are the same as H2b. However, two-level MLR tests suggest no existing relationship. Therefore, we could not confirm a specific relationship between Internet news media use and people's probability of experiencing IO.

H3 considered information searching efficiency and IO. The overall models are statistically significant (two-level comparison: log likelihood = 359.939, df =13, $p < .01$; three-level comparison: log likelihood = 707.91, df = 26, $p = .01$). Controlling for demographic variables, traditional news media use, and Internet news media use, those with lower levels of information searching efficiency are 3.7 times ($p < .001$, 95% *CI*, *OR* = 1.8–7.5) more likely to experience IO than those with higher levels of information searching efficiency, and information searching efficiency are 2.1 times ($p < .01$, 95% *CI*, *OR* = 1.2–3.5) more likely to experience IO than those with higher levels of information searching efficiency. Those with lower levels of information searching efficiency are 5.7 times ($p < .001$, 95% *CI*, *OR* = 2.5–13) more likely to experience IO frequently and 2.8 times ($p < .001$, 95% *CI*, *OR* = 1.3–6) more likely to encounter IO sometimes than those with higher levels of information searching efficiency. Those with a mid-level of information searching efficiency are 2.9 times ($p < .01$, 95% *CI*, *OR* = 1.5–5.5) more likely to encounter IO frequently and 1.7 times more likely to encounter IO sometimes than those with higher levels of information searching efficiency. In other words, the higher one's perceived information searching efficiency, the lower the probability that one will encounter IO. Therefore, H3b was supported.

Discussion

Building upon the information overload theory, this study investigated how demographic characteristics, news media use, and information searching efficiency relate to IO. It is important to note that more than 75% of participants reported having encountered IO. This supports the argument that IO is a widespread phenomenon. IO exists beyond the limited scenarios of consumer decision making, the workplace, and computer-mediated communication scenarios that have been explored by previous research.

The first set of hypotheses explored whether demographic variables predict IO. To a certain extent, our results replicated Williamson and Eaker's (2012) findings that gender and age influence the probability of experiencing IO. Specifically, young adults and women are generally more likely to encounter IO. Likewise, higher household income was linked to a higher probability of experiencing IO. There are several possible reasons for these results. The development of information and communications technology has created many different information sources. The younger generations, having more exposure to various information outlets, can be expected to be more susceptible to IO. Household income is a reflection of different types of work, which may require processing higher amounts and different types of information. Socioeconomic status and cognitive differences might help to explain the finding of gender-related differences in perceptions of IO. Our data indicated a nonsignificant association between education level and IO, which is quite surprising, because people who have higher levels of educational presumably have to process more complex information to attain this educational level, and possibly in their careers afterward. However, it is possible that relatively highly educated individuals are also more cognitively capable than those with less education of not only consuming more information but processing more information.

Next, we examined the role of news media use—one of the most common media consumptions outside the work environment—in predicting the likelihood of encountering IO. Based on the notion of media repertoire, which emphasizes the coexistence of multimedia usage, news consumption was operationalized as traditional news media use and Internet news media use. Based on our data, a number of significant results emerged. First, Internet news media use was not related to the likelihood of encountering IO, which resonates with Hargittai, Neuman, and Curry's (2012) finding that people are generally not overloaded by news use on the Internet. Hence, the assertion that quantity of information is the key to IO (Bakker, 2007) is not valid in terms of Internet news use. In contrast, our proposed relationship between traditional news media use and IO received partial support as mid-level traditional news media use suggested a significantly higher probability of encountering IO than higher-level traditional news media use. However, we found that lower-level traditional news media use also suggests significantly higher odds of encountering IO than higher-level traditional news media use. We do not have a ready explanation for this particular finding. Our best explanation is that the finding may be due to low cognitive capability that is not explained by demographic characteristics. A person with low traditional news media use might not have a strong concern or interest in public affairs, which in turn leads to low cognitive capability to process news information in the traditional media. Of course, this claim must be carefully examined in future studies.

What makes the traditional news use and Internet news use different in terms of predicting IO? A possible reason is that information from traditional media is filtered and organized (Koltay, 2011), while Internet information is more fragmented and relatively unorganized. Thus, time spent using traditional news media may explain the amount of traditional news use but not necessarily explain the amount of information one consumes on the Internet. Thus, news media use may not be a good measure of the quantity of news consumed online. If, however, our measurement is proper, we argue that it is probably because the information provided by traditional media and Internet media is different by nature, which leads to different cognitive processing patterns. In other words, the information architectures are different in traditional media and on the Internet; thus, different ways of human processing are required. Therefore, IO might be about a quantitative (how much) precondition in terms of traditional news media use. However, when it comes to Internet news media use, it is more about a qualitative (what type) precondition.

Another important finding of this study is that our data supported the relationship between information searching efficiency and one's possibility of encountering IO. Hence, we argue that improving people's information searching efficiency as part of their digital literacy can help to ease IO. Shirky (2008) claimed that "there's no such thing as information overload, it's the filter failure." To some extent, our study indicates that, regardless of the possible media's filter failure, one's personal capacity for organizing, processing, and creating information through media decreases one's probability of encountering IO.

However, it is crucial to note that most hypotheses in our study are partially rather than fully supported through the MLR analysis technique, and the results from MLR also posed some difficulties for our interpretation. Future studies are needed to address this issue with other analysis tools so that potential linear relationships could be revealed. Moreover, because the different constructs of subjective

IO (time, information processing, technical tools, user experience, etc.) are weighted differently, future inquiries regarding IO should tease out major factors that are related to the variables through factor analysis and construct a more encompassing measure of IO that is suitable for IO research in the communication discipline.

This study has a few limitations. First, the survey was conducted in a local rather than national setting; thus, the results lack generalizability. Second, to provide a relatively equally distributed sample in terms of demographic characteristics, our data analysis was based on a merged resident and student sample, which may have affected our results. The proportion of student and resident respondents was not balanced, which also might have affected the results. Finally, due to the there being no generally embraced operationalization of IO occurrence and information searching efficiency, we used single-item measures for these two variables, which may limit the construct validity of the study. However, we suggest the creation of a more robust definition and explication of IO occurrence and information searching efficiency to support the development of a measure that has satisfactory content and construct validity.

Conclusion

The purpose of this study was to fill several gaps in the communication literature. First, despite the prevalence of information overload, studies on IO (particularly outside the work environment) are scarce in the communication area. Second, the information overload theory tells us that personal factors and quantity of information are two major factors causing IO, but the field lacks quantitative empirical evidence to support such a claim. In addition, we know little about whether coping strategies (information searching efficiency, in this case) can really alleviate the probability of encountering IO. Our findings suggest that demographic characteristics (gender, income, and age) do predict the possibility of encountering IO. Moreover, people with middle and low levels of traditional news media use were found to have significantly higher odds of encountering IO, but similar results were not found for Internet news media use. In addition, information searching efficiency was found helpful in terms of alleviating the likelihood of encountering IO. Of course, the results are quite elementary and preliminary. Regardless, we hope that this work will encourage more communication scholars to examine how communication behaviors affect (either positively or negatively) information overload.

References

Aldoory, L., & Van Dyke, M. (2006). The roles of perceived "shared" involvement and information overload in understanding how audiences make meaning of news about bioterrorism. *Journalism and Mass Communication Quarterly*, *83*(2), 346–361.

Bakker, S. (2007, [September]). *Information overload within organizational settings: Exploring the causes of overload*. Paper presented at the International Communication Association Annual Meeting, San Francisco, CA.

Bawden, D. (2008). Origins and concepts of digital literacy. In C. Lankshear & M. Knobel (Eds.), *Digital literacies: Concepts, policies and practices* (pp. 17–32). New York, NY: Peter Lang.

Bock, G., Mahmood, M., Sharma, S., & Kang, Y. (2010). The impact of information overload and contribution overload on continued usage of electronic knowledge repositories. *Journal of Organizational Computing and Electronic Commerce*, *20*(3), 257–278.

Davis, N. (2011). Information overload, reloaded. *Bulletin of the American Society for Information Science and Technology*, *37*(5), 45–49. Retrieved from www.asis.org/Bulletin/Jun-11/JunJul11Davis.html

Dillman, D. A. (2007). *Mail and Internet surveys: The tailored design method.* Hoboken, NJ: Wiley.

Dubosson, M., & Fragniere, E. (2009). The consequences of information overload in knowledge based service economies: An empirical research conducted in Geneva. *Service Science, 1*(1), 56–62.

Eppler, J, M., & Mengis, J. (2004). The concept of information overload: A review of literature from organization science, accounting, marketing, MIS, and related disciplines. *The Information Society*, *20*, 325–344.

Haksever, A. M., & Fisher, N. (1996, October). *A method of measuring information overload in construction project management*. Paper presented at the *International Council for Research and Innovation in Building and Construction CIB) W89 Beijing International Conference*, Beijing, China.

Hargittai, E., Neuman, W., & Curry, O. (2012). Taming the information tide: Perceptions of information overload in the American home. *The Information Society*, *28*(3), 161–173.

Jackson, T., & Farzaneh, P. (2012). Theory-based model of factors affecting information overload. *International Journal of Information Management*, *32*, 523–532.

Jacoby, J. (1984). Perspectives on information overload: Reflections on information overload paradigm in consumer decision making. *Journal of Consumer Research*, *10*(4), 432–440.

Jacoby, J., Speller. D. E., & Berning, C. K. (1974). Brand choice behavior as a function of information load: Replication and extension. *Journal of Consumer Research*, *1*, 33–42.

Janssen, R., & Poot, H. (2006). Information overload: Why some people seem to suffer more than others, In *Proceedings of the 4th Nordic conference on Human-computer interaction: Changing Roles*, pp. 397–400, October 14–18, 2006, Oslo, Norway.

Klapp, O. E. (1986). *Overload and boredom: Essays on the quality of life in the information society*. New York, NY: Greenwood Press.

Koltay, T. (2011). Information overload, information architecture and digital literacy. *Bulletin of the American Society for Information Science and Technology, 38*(1), 33–35.

Lang, A. (2000). The limited capacity model of mediated message processing. *Journal of Communication*, *50*(1), 46–70.

Lang, A., Bolls, P., Potter, R., & Kawahara, K. (1999). The effects of production pacing and arousing content on the information processing of television messages. *Journal of Broadcasting and Electronic Media*, *43*(4), 451–476.

Lang, A., Borse, J., Wise, K., & David, P. (2002). Captured by the World Wide Web: Orienting to structural and content features of computer-presented information. *Communication Research*, *29*(3), 215–246.

Lang, A., Schwartz, N., Lee, S., & Angelini, J. (2007). Processing radio PSAs: Production pacing, arousing content, and age. *Journal of Health Communication*, *12*, 581–599.

Long, J. S. (1997). *Regression models for categorical and limited dependent variables.* London, UK: SAGE Publications.

Malhotra, K. N. (1984). Reflections on the information overload paradigm in consumer decision making. *Journal of Consumer Research*, *4*(10), 436–440.

Merz, M., & Chen, Q. (2006). Consumers' Internet and Internet consumers: Exploring Internet-based electronic decision aids. *Advances in Consumer Research*, *27*, 412–432.

Misra, S., & Stokols, D. (2012). Psychological and health outcomes of perceived information overload. *Environment and Behavior*, *44*(6), 737–759.

Nordenson, B. (2008, November 30). Overload! Journalism's battle for relevance in an age of too much information. *Columbia Journalism Review*. Retrieved from http://www.cjr.org/feature/overload_1.php?page=all

Reuters. (1998). *Out of the abyss: Surviving the information age*. London, UK: Reuters.

Rosen, L., & Weil, M. (1997). *Technostress: Coping with technology @work, @home, @play*. New York, NY: Wiley.

Schroder, H. M., Driver, M. J., & Streufert, S. (1967). *Human information processing: Individuals and groups functioning in complex social situations*. New York, NY: Holt, Rinehart & Winston.

Schultze, U., & Orlikowski, J. W. (2004). A practice perspective on technology-mediated network relations: The use of Internet-based self-serve technologies. *Information Systems Research*, *15*, 87–106.

Schultze, U., & Vandenbosch, B. (1998). Information overload in a groupware environment: Now you see it, now you don't. *Journal of Organizational Computing and Electronic Commerce*, *8*(2), 127–148.

Shirky, C. (2008). It's not information overload. It's filter failure. *Web 2.0 Expo NY*. Retrieved from http://blip.tv/web2expo/web-2-0-expo-ny-clay-shirky-shirky-com-it-s-not-information-overload-it-s-filter-failure-1283699

Visser, M. (2004). *The impact of individual differences on the willingness of teachers in Mozambique to communicate about HIV/AIDS in schools and communities* (Unpublished doctoral dissertation). Florida State University, Tallahassee, FL.

Williamson, J., & Eaker, P. E. (2012, October). *The information overload scale.* Paper presented at *The Association for Information Science & Technology (ASIST),* Baltimore, MD.

Yuan, E. (2011). News consumption across multiple media platforms. *Information, Communication & Society*, *14*(7), 998–1016.