Antecedents of News Consumers' Perceived Information Overload and News Consumption Pattern in the USA

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ABSTRACT

This exploratory study examines the critical factors associated with news consumers' perception of information overload and news consumption patterns. An online survey was conducted with Qualtrics panels (N = 1001). The demographics and three antecedent factors of perceived information overload were considered including the frequency of news access through multiple media platforms, level of attention to news, and interest in news. Three news consumption patterns were investigated as possible consequences of perceived information overload: news avoidance, selective exposure, and willingness to pay for news. The results of hierarchical regression analyses revealed a meaningful distinction between general and news information overload. Overall, news consumers who paid more attention to news through newer media/platforms/devices perceived higher levels of information overload, were more willing to pay for the news, and often avoided news or selectively exposed themselves to certain sources of news to manage news information overload.

Key words: *Information Overload, News Overload, News Consumption, News Avoidance, Selective Exposure, Willingness to Pay.*

1. INTRODUCTION

Various news information platforms compete to deliver news quickly to consumers. The consumption of online news is ever increasing, which also implies a competition with non-news contents [1]. This increasing competition produces not only more information overall, but also a variety of information platforms. Given the changing news media environment, consumers and practitioners need to be aware of potentially negative effects of information surplus.

As technology advances, a revolution in distribution and consumption of information occurs [2]. According to Technorati, a commonly used search engine in blogosphere, more than 5000 news blogs were created between 2010 and 2013, and about 200 million videos are watched on YouTube daily. One in five people worldwide has a Facebook profile [3], interacting with average more than 300 others [4], and more than 316 million active users post an average of 500 million Tweets per day [5]. These numbers just represent a few popular platforms of information delivery, and many other platforms and emerging media are used for news information search and consumption [6].

This change in news media environment brought information surplus, namely a glut of information facilitated by expansion of the Internet's distribution capacity [7]. People often experience inconvenience during the process of selecting news information that overflows in their daily lives. For example, some report feeling stressed when checking emails and/or experience a fear of missing out (FOMO) when managing their social network sites [8]. DeGrandpre [9] claims that the increase in the available amount of information provides constant stimuli to information consumers and may negatively affect their brain functions.

Chyi [7] introduced two relevant concepts of information surplus. On one hand, information explosion indicates a

phenomenon that the quantity of information supply increased with an enormous speed; for example, the amount of information in New York Times' Sunday edition is larger than the amount of information that an average 17th century reader encountered during lifetime [10]. On the other hand, information overload indicates the psychological effect of information explosion that reduces efficiency users experience due to the increased amount of relevant and potentially useful information [11].

As a negative psychological and physiological response of information technology users, information overload has been studied in the field of information science [12], [13], management of information systems [11], organization science [14], and marketing [7], [15]. However, research dealing with the overall ecosystem of news contents from a communication or journalism perspective is scarce. The reason for such scarcity of news information overload research might be that before the adoption of the Internet, news consumers relied on fixed forms of news sources, which were available at predictable times and places, such as morning and evening news delivered in the form of newspapers, radio, or television news. The adoption of cable news established 24-hour news delivery system, and as a result, the amount of available news increased greatly by cable news channels filling their expanded hours with programs such as weekly news reviews and commentaries [16].

News consumption has become a continuous "process" [17] as news becomes ubiquitous through global news channels, such as CNN, and always-on forms of Internet news, social media, and blogs. Furthermore, news consumers now take the role of news mediators or producers themselves as they participate directly (or indirectly) in the process of collecting, distributing, and discovering news [17], [18]. Nevertheless, the problem of information surplus has been growing with diffusion of user-generated content enabled by production and delivery of various content with lower cost and greater availability. The altered availability of news suggests a need to study news processes in the context of content consumption. Especially, the recent change in the news environment that came with sharing and consuming news over social network sites or smartphones let us pose many questions related to the theory and practice of journalism, and to the crisis discourse about the future of journalism. This is why more research is needed on information overload and its effects in the area of communication and journalism studies.

Considering the immense increase in news information availability, this paper focuses on news consumers' perceptions of information overload and their utilization of available news content. Specifically, the issue of news information surplus has been overlooked during the crisis of decreasing credibility of journalism as a social institution, along with the overall decrease of news consumption via newspapers [6]. In the current media environment, characterized by the information surplus, it is inevitable that various news media and platforms will compete to gain attention from consumers. Online, print, radio, and television news sources all try to attract news consumers nowadays. The large information surplus is one of the core factors that explain changes in information seeking behaviors of news audiences [6].

Against this background, the current study aims to (a) explore factors influencing the perception of both general and news information overload and (b) examine the relationships between the perceived information overload of news consumers and their news consumption patterns. The following section presents a review of the previous literature and research questions.

2. THEORETICAL BACKGROUND AND HYPOTHESIS

The concept of information overload is not new. Miller's [19] research found that human beings could remember only up to seven (plus or minus two) digits and prompted the study of information overload in many fields. Despite the lack of a common definition used across all academic fields, information overload generally refers to a state when the efficiency of information usage is reduced during an individual's information processing due to an influx of available information [12]. If not dealt properly, information overload can create stress [13] and negatively affect both psychological and physiological health [20]. Since the 1990s, information overload has been viewed as a major issue in various fields including business [21] and management [22], and the seriousness of the issue has been heightened due to the increased use of new communication technologies such as emails [7] and the Internet in general [23].

Research reports of large-scale survey showed managers and employees experienced negative influence of information overload on both their work efficiency and health [12]. LexisNexis [24] investigated this issue by asking business managers about their perceived information overload. Results showed that two thirds of the managers reported information overload influenced their job satisfaction and interpersonal relationships negatively. One thirds of the managers reported health issues related to information overload, and almost half of the respondents answered that major decision-making was delayed due to feeling overwhelmed by the large volume of information.

Information scientists emphasized the psychological effect of information explosion, or the rapid increase in both raw and processed knowledge, and its consequential surplus on information users [25]. Williamson, Eaker, and Lounsbury [26] focused on subjective experiences of information overload by defining information overload as perceptual distress about abundant information. Using new psychometric scales to measure information overload, they studied the relationships between information overload, demographics, and life satisfaction. According to Williamson et al.'s study [26], perceived information overload was overall negatively associated with life satisfaction. Further, women reported higher level of perceived information overload, and age and educational level were positively associated with perceived information overload. The following section reviews literature on news information overload, presents some potential antecedents, and suggests news consumptions patterns that

might be related to perceived overload. The literature review concludes with several research questions and a hypothesis.

2.1 News Information Overload

Producers of news media content today compete with bloggers, microbloggers, and other independent content producers on social media to grab attentions of news consumers. This competition not only contributes to the saturation of news contents and platforms, but also produces psychological perception of information overload. Perceived general information overload arises when the amount of available contents increases to the extent that content users cannot process them efficiently, which causes negative emotion from users [11]. Technology development made it possible to provide these contents in various forms, but just the amount of news content is already overflowing and can burden users. The Pew Research Center [27] reported 38% of American adults perceived information overload in terms of the amount of news contents, and women and those younger than 25 and older than 50 reported particularly higher level of news information overload.

The venues where people can access news have become very diverse today. Nine out of ten adults access news contents through multiple platforms such as cable TV, website, radio, and local and national newspapers, and 46% of research participants reported using four to six news sources daily [28]. Uses of multiple platforms for accessing news seem to be a global trend now [29], [30].

2.1.1 Antecedents of news information overload: Holton and Chyi [31] studied news consumers' perceived information overload relative to the amount of available news. More precisely, they examined relationships between various news media platforms and perceived information overload after controlling for the effect of demographics and interest in news. More than 72% of research participants reported perceived information overload to some extent with regard to the amount of news contents. Results showed women, younger, and lower income persons reported higher level of overall perceived information overload. After considering the effect of demographics, those who were less interested in news perceived higher level of information overload than those interested in news. Holton and Chyi [31] found that respondents who accessed news through computers, e-readers, and Facebook reported higher level of perceived information overload as compared to those who accessed news through TV and iPhone.

Findings, then, suggest that women experience higher level of perceived information overload [26], [27], [31]. Perhaps this is because women engage in more multi-tasking during daily routines and adopt technologies with more caution, which might cause more direct and higher level of inconvenience given the information surplus. Additional studies are needed to confirm this gender difference in perceived information overload and find exact reasons for the gender difference. In addition, why certain media platforms such as Facebook were associated with perceived information overload while other media (like TV or smartphone) led to less

overload [31] need to be investigated. These questions are particularly poignant as news producers actively consider adopting social media into their production and distribution of news [32], [33]. Facebook users might not expect to be exposed to news as the medium is primarily used to keep in contact with friends [34]. On the contrary, iPhone usage was negatively associated with perceived information overload [31] possibly due to its news application that affords easier collection of news and information.

Misra and Stokols [20] found a significant moderating effect of individuals' sensation-seeking between the perceived information overload and health outcomes; those with higher sensation-seeking perceived lower level of information overload, which led them to better outcomes than people with lower sensation-seeking. As such, previous research findings suggest that demographic and other individual-level variables (e.g., sensation-seeking, interest in news) and technological features of traditional and newer media platforms are significantly associated with perceived information overload. Based on the review of previous literature, we propose the following set of research questions to examine further the various factors influencing perception of information overload:

RQ1. What are the relationships between news consumers' demographic characteristics and their perceived information overload?

RQ2. What are the relationships between (a) the frequency of news access through multiple media platforms, (b) news attention, and (c) level of interest in news and perceived information overload?

2.1.2 The influence of information overload on news consumption: Before the recent information explosion via the Internet [6], news consumption was primarily investigated with a focus on frequency of usage and number of news subscription. However, news consumption in the context of information surplus needs to be considered from a different perspective including a more nuanced approach. News consumers' information seeking behaviors have been studied as a complex decision-making process; for example, information avoidance behavior [35], [36], selective exposure [37], and incidental exposure [38] to news have been discussed related to information surplus. The following section reviews potential news consumption patterns as they relate to news information overload.

2.2 News Consumption Patterns

2.2.1 News fatigue and news avoidance: The amount of news information available to individuals has exploded [6]. Consumers now have to make decisions not only about what news to receive through which channel, but also how much news information they will receive, with whom they share, how often they need to search and sometimes, which news to avoid. The perception of information overload leads to a higher level of fatigue felt by news consumers [20], [39]. As consumers experience fatigue, they tend to avoid news materials both intentionally and unintentionally [36].

2.2.2 Selective exposure: Exposure to media is always selective. Media users allocate a finite amount of time to reading or watching materials [40]. The increased number of media, channels, and expansion of content in their quantity and diversity inevitably complicate individuals' selection. For this reason, selective exposure, or selective media consumption, is hypothesized to be even higher now than the past with both platforms used to access news and media through which individuals access other non-news information [41]. Among various factors, individuals' interest, relevance of the news to them, visual salience, accessibility, and social significance of the news could influence selective news exposure [40]. Thus, selective exposure to news is a likely method by which consumers manage news information overload.

2.2.3 Willingness to pay for news: Charging for digital media contents can be a 'double-edged sword' [42]. Companies will profit if they have more subscribers, but as previous visitors stop using the service, they might have less advertising sponsors, which could bring a different and potentially larger crisis. Nevertheless, a global transition is happening that digital contents, provided for fee previously, are now being placed behind paywalls. Naturally, some users who are accustomed to free services resist this change; thus, further research is needed to find out the characteristics of consumers who are willing to pay the news. Going above and beyond the issue of media companies' profit generation, consumers' willingness to pay the cost of news might have more significant implications for their evaluations of news contents as well. Those who identified quality news sources might be willing to pay the cost and use those sources consistently as a way to deal with the problem of information overload.

Given this background, in order to examine the relationships between perceived information overload and news consumption patterns, we propose the following research hypothesis with three subparts:

H1. News consumers' perceived information overload is positively associated with (a) news avoidance tendency, (b) selective exposure to news, and (c) willingness to pay for news.

3. METHOD

In order to examine various factors influencing news consumers' perception of information overload, and its relationships with their news consumption patterns, the current study utilized a large-scale online survey (N = 1001) with a sample of American citizens. The researchers employed Qualtrics' panels to perform quota sampling that matches US Census data. Data were collected in August 2015.

3.1 Samples

The Qualtrics panel sample was evenly split between male (49.8%) and female (50.2%) respondents that participated in the online survey. Participants' age ranged between 18 and 90 (M = 43.3, SD = 16.6, SE = .53, Skewness = 0.19, Kurtosis = -1.16). A test of normal distribution for the age variable produced a slightly less than an ideal result based on the score

of Kurtosis; however we believed thanks to the quota sampling that matched US Census data, the sample was representative enough of various ages. One fifth of the participants reported education to the high school or below, 29.5% had some or were currently in college, 33.5% were college graduate, and 16.7% had some graduate education or degree. Approximately one third of the participants (33.8%) reported $2000 or less of monthly income, 33.1% reported between $2000 and $4000, and 18.7% reported between $4000 and $6000, and the rest (14.5%) reported over $6000. We asked which state participants currently lived, and except for Alaska, South Dakota, Vermont, and Puerto Rico, all other states of the United States were represented in the sample; 18.3% of participants lived in Northeast region (New England and Middle Atlantic divisions), 22.5% lived in the Midwest (East and West North Central divisions), 36.4% in the South (South Atlantic, East and West South Central divisions), and 22.7% lived in the West (Mountain and Pacific divisions).

In addition to demographic information, we asked participants' monthly telecommunication fees including cable TV, Internet, and cellular phone bills and any paid news subscription fees such as website, newspapers, and magazine subscriptions. For the telecommunication bill, 26.7% of the participants reported paying $90 or less monthly, 33.8% reported $91-150, 23.8% reported $151-210, and 15.6% reported paying over $210 monthly. A significant number of participants (26.7%) reported they did not subscribe to news, and among those who subscribe, almost half (47.8%) reported paying $20 or less for the monthly news subscription.

3.2 Measures

3.2.1 Antecedents of perceived information overload: As factors influencing the perception of news information overload, we considered three groups of variables: the frequency of news access through multiple media platforms, level of attention to news, and level of interest in news. First, we asked how many days (1 = zero day, 8 = 7 days) participants consumed news through each of 14 news media/platform/device in the past week (i.e., newspaper, TV, radio, magazine, computer, smartphone, tablet, e-reader, internet news portal, Facebook, Twitter, YouTube, blog, and podcast). This measurement was adopted from a previous study [31] and slightly modified to reflect a current media environment. An exploratory factor analysis (EFA) of these 14 items of media platforms produced a two-factor structure: one with six items of newer media (M = 3.3, SD = 2.0, α = .86) and the other with four items of traditional news media (i.e., TV, newspaper, and radio) and computers (M = 4.4, SD = 1.8, α = .63). Participants of this study seemed to consume news through traditional news media more often, three to four days a week, than through newer media platforms such as smartphones or social media, two days a week, t(935) = 15.5, p < .001.

Second, for the level of attention, we asked how much participants paid attention to news through each of the 14 media/platform/device (1 = very little, 7 = very much). Similarly with the result of news consumption media, an EFA of these 14 items measuring the level of attention to news

produced a two-factor structure: one with eight items of newer media (M = 3.1, SD = 1.7, α = .92) and the other with three items of traditional news media (i.e., TV, newspaper, and radio) (M = 4.3, SD = 1.6, α = .69). Participants seemed to pay more attention to news when they used traditional news media than newer media, t(932) = 19.7, p < .001.

Third, adopted from previous studies [31], we asked how much participants were interested in news using eight measurement items. The measurement included statements such as "I enjoy hearing about the trends in news" and "I want to catch up on latest issues or events" and participants rated how strongly they agreed with each of the eight statements (1 =

strongly disagree, 7 = strongly agree). An EFA of the eight items produced a single factor structure (M = 5.1, SD = 1.3, α = .93).

3.2.2 Perception of information overload: Synthesizing other empirical research findings [15], [20], [26], [31], we created a scale for perceived information overload to better capture the dynamic nature of news consumption in diverse media environment. Although there were several efforts to measure the perception of information overload, they were either measured by using a single item [31] or contextualized in a general setting [20], not in journalism specifically.

Table 1. Bivariate Correlations between Major Variables with Means and Standard Deviations (N = 1001)

Variables	M (SD)	1	2	3	4	5	6	7	8	9	10
1. NewsNM	3.3 (2.0)	-									
2. NewsTM	4.4 (1.8)	.28**	-								
3. AttNM	3.1 (1.7)	.86**	.27**	-							
4. AttTM	4.3 (1.6)	.26**	.69**	.38**	-						
5. Interest	5.1 (1.3)	.38**	.35**	.46**	.46**	-					
6. GIO1	3.2 (2.0)	.32**	.10**	.34**	.10**	.13**	-				
7. GIO2	3.3 (1.9)	.28**	.06	.29**	.06	.09**	.59**	-			
8. NIO	3.1 (1.6)	.42**	.15**	.44**	.14**	.16**	.46**	.42**	-		
9. Avoidance	4.1 (2.0)	.23**	.04	.23**	-.02	-.01	.35**	.33**	.75**	-	
10. Selective	4.9 (1.8)	.29**	.21**	.34**	.22**	.41**	.24**	.20**	.49**	.47**	-
11. WilltoPay	4.0 (2.2)	.38**	.31**	.42**	.31**	.34**	.27**	.22**	.51**	.33**	.54**

NM: Newer News Media, TM: Traditional News Media, Att: Attention, GIO: General Information Overload, NIO: News Information Overload.

* p < .05, ** p < .01, *** p < .001

In this particular study, the perception of information overload was measured by two sets of scales: one focusing on the psychological stress from information overload in general (12 items) and the other focusing on news information overload (10 items). Each set of scales was measured by a 7-point scale, and explored further by performing EFA; perception of general information overload (GIO) had two sub-dimensions and perception of news information overload (NIO) had one.

A total of five measurement items related to the media usage consisted the first dimension of GIO (GIO1; M = 3.2, SD = 2.0, α = .86), and the measurement included statements such as "I often felt burdened about handling phone calls and messages simultaneously through various information and communication means" and "I often felt burdened about replying to emails." Another set of five items consisted of the second dimension of GIO (GIO2; M = 3.3, SD = 1.9, α = .84), and the measurement included psychological stress and negative emotion (i.e., feeling confused, stressed, overwhelmed, insecure, and less motivated) induced by the amount of information participants had to process. A total of seven measurement items consisted of NIO (M = 3.1, SD = 1.6, α = .96) and the measurement also included perceptions of psychological stress and negative emotion, such as feeling stressed and overwhelmed, induced by the large amount of news (e.g., I often felt that there was too much variety of news; I often felt there was more news than I could process).

3.2.3 News consumption patterns: Participants' news consumption patterns were measured with 21 items and an EFA resulted with three sub-dimensions: avoidance, selective exposure, and willingness to pay for news. Adopted from previous studies [31], [43], the first dimension of news consumption, news avoidance, included five measurement items (M = 4.1, SD = 2.0, α = .92) such as "I think it is better not to watch/read news due to the large amount of unnecessary news" and "I do not want to watch/read news as much as possible because there is a large amount of low quality news." The second dimension of news consumption included four measurement items of selective exposure to news (e.g., I always watch/read news from a certain company) (M = 4.9, SD = 1.8, α = .84). The third dimension included three measurement items (e.g., I am willing to keep consuming news even if I have to pay the cost) related to participants' willingness to pay for news (M = 4.0, SD = 2.2, α = .94). Table 1 presents bivariate correlations between major variables of the study.

3.2.4 Analysis: In order to answer our research questions on the relationships between antecedent factors including demographics and information overload perception (RQ1 & RQ2), we utilized a hierarchical regression modeling. Participants' demographic variables (i.e., age, gender, income, education) and three other antecedents (i.e., multiple media

platforms for news consumption, attention to news, and interest in news) were considered as predictors of general and news information overload perception. To test H1, we also performed regression analyses on the relationships between perceived information overload and news consumption patterns. The results of our analyses are reported in the following section.

Table 2. Hierarchical Regression Analyses Predicting Perceived Information Overload

	Standardized Betas (t-scores)		
	Model 1: GIO1	Model 2: GIO2	Model 3: NIO
Gender: Women	-.052 (-1.522)	-.033 (-0.954)	-.126*** (-3.828)
Age	-.243*** (-7.124)	-.229*** (-6.634)	-.326*** (-9.850)
Education	.036 (0.989)	.051 (1.400)	.103** (2.952)
Monthly Income	.017 (0.471)	.019 (0.513)	.071* (2.056)
Adjusted R^2	.055***	.047***	.124***
Gender: Women	-.036 (-1.053)	-.015 (-.428)	-.107** (-3.278)
Age	-.121** (-2.794)	-.120** (-2.717)	-.165*** (-4.064)
Education	.002 (0.064)	.023 (0.647)	.062† (1.867)
Monthly Income	-.038 (-1.072)	-.027 (-0.747)	.002 (0.065)
News Consume NM	.041 (0.597)	.027 (0.380)	.088 (1.354)
News Consume TM	.098† (1.885)	.078 (1.491)	.098* (2.025)
Attention News NM	.239** (3.344)	.230** (3.167)	.280*** (4.165)
Attention News TM	-.070 (-1.381)	-.039 (-0.757)	-.054 (-1.144)
Interest in News	.004 (0.096)	-.047 (-1.142)	-.022 (-0.596)
Adjusted R^2	.115***	.090***	.222***

GIO1: General Information Overload Related to Media Usage, GIO2: General Information Overload Related to Psychological Stress, NIO: News Information Overload, NM: Newer News Media, TM: Traditional News Media.
† $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$.

4. RESULTS

4.1 RQ1 & RQ2. Antecedents of Information Overload Perception

The perception of general information overload (GIO) had two sub-dimensions: one related to the media usage (GIO1) and another related to the psychological stress and negative emotion (GIO2). News information overload (NIO) had one dimension. To examine RQ1 and RQ2 in terms of both GIO and NIO, three hierarchical regression analyses were performed in which GIO1, GIO2, and NIO served as criterion variables and two blocks of predictors were entered: one for RQ1 (demographics) and another for RQ2 (frequency of news media use, news interest, and news attention). A summary of these regressions is reported below and in Table 2.

4.1.1 Factors associated with general information overload (GIO) perception: The first regression examined GIO1, with the first block testing demographic variables (i.e., gender, age, income, education). Among the demographic variables, participant's age was negatively associated with GIO1, β = -.24, t = -7.12, p < .001, meaning older participants tended to perceive less information overload in terms of media usage. The four demographic variables explained 5.5% of variance in GIO1, F(4, 826) = 13.1, p < .001 (see Table 2).

The five antecedent variables (i.e., interests in news, attention to newer news media, attention to traditional news media, and frequency of news consumption via newer and traditional news media) were additionally entered in the regression as the second block. Results showed, the level of attention to news through the newer media was significantly associated with the perceived information overload related to the media usage (GIO1), β = .24, t = 3.34, p = .001. The higher the level of attention participants paid to news through the newer media such as social media, smartphones, and tablets, the more information overload they perceived. The frequency of news consumption through the traditional news media was marginally associated with GIO1, β = .10, t = 1.88, p = .06. Together with the demographic variables, the five predictor variables explained 11.5% of variance in GIO1, F(9, 821) = 12.97, p < .001.

Second, when the same set of demographic and predictor variables were regressed onto GIO2, the result was very similar with the case of GIO1. Demographic variables, including age (β = -.12, t = -2.72, p = .007) statistically predicted GIO2, R² = .047, F(4, 821) = 11.27, p < .001. When the five predictors were added to the regression, the model also explained unique variance in GIO2, R² = .09, ΔR² = .048, F(9, 821) = 11.27, p < .001. Among the predictor variables, the level of attention to news through the newer media was significantly associated with the perceived information overload related to the psychological stress and negative emotion, β = .23, t = 3.17, p = .002.

4.1.2 Factors associated with news information overload (NIO) perception: Another hierarchical regression modeling was performed to examine factors associated with news information overload (NIO) perception as the criterion. All four demographics variables (i.e., gender, age, education, income) were statistically associated with NIO; women participants reported statistically lower level of NIO (M = 2.9, SD = 1.5) than men (M = 3.3, SD = 1.7), t(954.4) = 3.59, p < .001, and

older participants reported less NIO perception, $\beta = -.33$, $t = -9.85$, $p < .001$. Participants with higher education ($\beta = .10$, $t = 2.95$, $p = .003$) and income ($\beta = .07$, $t = 2.06$, $p = .04$) reported higher level of NIO. The four demographic variables explained 12.4% of variance in NIO, $F(4, 818) = 30.1$, $p < .001$

After accounting for the effect of demographic variables, the five predictor variables statistically explained unique variance in NIO, $R^2 = .22$, $\Delta R^2 = .10$, $F(9, 813) = 27.12$, $p < .001$. Particularly, the level of attention to news through the newer media ($\beta = .28$, $t = 4.16$, $p < .001$) and the frequency of news consumption through traditional news media ($\beta = .10$, $t = 2.02$, $p < .05$) were positively associated with NIO perception. Thus, the more attention participants paid to news through the newer media such as social media and smartphones and the more days they spent consuming news through the traditional news media such as TV and newspapers, the more information overload in terms of news (NIO) they perceived.

Table 3. Hierarchical Regression Analyses Predicting News Consumption Pattern

	Standardized Betas (*t*-scores)		
	News Avoidance	Selective Exposure	Willingness to Pay
Gender: Women	-.032 (-1.290)	-.031 (-1.042)	-.055[†] (-1.848)
Age	.017 (0.557)	.053 (1.406)	-.010 (-.258)
Education	.028 (1.106)	.060[*] (1.988)	.113[***] (3.786)
Monthly Income	-.053[*] (-2.095)	.027 (0.872)	.034 (1.135)
News Consume NM	-.002(-0.040)	.021 (0.349)	.090 (1.517)
News Consume TM	-.027 (-0.724)	-.001 (-0.020)	.054 (1.220)
Attention News NM	-.044 (-0.842)	-.043 (-0.680)	.019 (0.303)
Attention News TM	-.066[†] (-1.851)	-.047 (-1.072)	.089[*] (2.072)
Interest in News	-.062[*] (-2.169)	.385[***] (11.143)	.168[***] (4.908)
GIO1	-.001 (-0.034)	-.029 (-0.795)	.013 (0.345)
GIO2	.047 (1.586)	.031 (0.870)	-.040 (-1.133)
NIO	.765[***] (26.428)	.441[***] (12.567)	.399[***] (11.513)
Adjusted R^2	.566[***]	.364[***]	.222[***]

NM: Newer News Media, TM: Traditional News Media, GIO1: General Information Overload Related to Media Usage, GIO2: General Information Overload Related to Psychological Stress, NIO: News Information Overload
† $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$.

4.2 H1. Perceived Information Overload and News Consumption Patterns

In order to examine the relationships between news consumers' perceived information overload and their news consumption patterns, we performed three additional hierarchical regression analyses.

4.2.1 News avoidance: First, the current study proposed a positive association between the level of information overload and news avoidance tendency (H1a). Several demographic variables were significant predictors of news avoidance: participants' gender and age ($\beta = -.22$, $t = -6.46$, $p < .001$) were negatively associated with news avoidance tendency, meaning men and younger participants tended to avoid news more than women and older participants. The level of highest education was also statistically associated with news avoidance, and participants with higher education tended to avoid news more than those with lower education ($\beta = .09$, $t = 2.43$, $p = .015$). The four demographic variables explained 6.0% of variance in new avoidance tendency, $F(4, 797) = 13.7$, $p < .001$ (see Table 3 for a summary of regression).

Next, other antecedents of information overload (i.e., attention, interest, and news media usage) were entered as the second block into regression. Results showed, level of attention to news via traditional media ($\beta = -.10$, $t = -2.02$, $p = .04$) and interest in news ($\beta = -.08$, $t = -2.04$, $p = .04$) were negatively associated with news avoidance tendency, which makes sense because those who paid attention to news and were interested in news would naturally seek news, rather than avoid. The second block of antecedent variables explained 3.3% of additional variance in news avoidance tendency, $F(5, 792) = 5.9$, $p < .001$.

After controlling for the effects of demographics and other antecedent variables of information overload, participants' NIO perception statistically explained 47.5% of unique variance in news avoidance tendency, $R^2 = .57$, $\Delta R^2 = .48$, $F(12, 789) = 87.98$, $p < .001$. Particularly, perceived news information overload (NIO) was very strongly associated with news avoidance tendency, $\beta = .76$, $t = 26.43$, $p < .001$. Therefore, H1a was supported for NIO but not for GIOs suggesting that general information overload and news information overload differentially affect news avoidance tendency.

4.2.2 Selective exposure: As a way of dealing with information overload, some participants might prefer to consume news from a certain company or source and look up their preferred topics. The current study proposed a positive association between the perceived information overload and this tendency of selective exposure to news (H1b). The result of a hierarchical regression analysis supported the hypothesis for NIO, but not for GIOs. All four demographic variables were statistically associated with selective exposure to news and explained 4.1% of the variance, $F(4, 794) = 9.5$, $p < .001$. Women and older participants were less selective in their exposure to news than men and younger participants. Participants with higher education and income were more selective in their exposure to

news. Regarding the other antecedents of information overload (i.e., attention, interest, and news media usage), only the level of interest in news (β = .37, t = 9.67, p < .001) positively predicted selective exposure suggesting that those who were highly interested in news tended to prefer consuming news from selective sources/companies, (ΔR^2 = .18, F(5, 789) = 35.99, p < .001).

However, perceived NIO statistically explained 15% of the variance in selective exposure above and beyond demographic and other antecedent variables of information overload, R2 = .36, ΔR^2 = .15, F(12, 786) = 77.25, p < .001. The result indicated that those who perceived a higher level of information overload in terms of news (NIO) tended to prefer consuming news from a certain company or source of their choice and look up their preferred topics instead of exposing themselves to all available news, β = .44, t = 12.57, p < .001. Thus, H1b was supported for NIO but not GIOs. Specifically, the result suggests that news information overload predicts selective exposure but general information overload does not.

4.2.3 Willingness to pay for news: H1c proposed a positive association between perceived information overload and willingness to pay for news. The result of a hierarchical regression analysis with demographic variables as the first block entered showed that all four of them were statistically associated with willingness to pay for news, R^2 = .099, F(4, 801) = 23.11, p < .001. Women and older participants were less willing to pay for news than men and younger participants. Participants with higher income and education were more willing to keep consuming news even if they had to pay the cost. Second, the frequency of news consumption through the newer media, β = .13, t = 4.25, p = .038, and the level of interest in news, β = .16, t = 4.29, p < .001, were both positively associated with willingness to pay. Thus, participants who accessed news through newer media such as smartphones or social media were more willing to pay the cost of news, and those who were interested in news were also more willing to keep consuming news even with paid services.

Finally, entering perceived information overload in the regression showed support for H1c showing that the group of information overload variables (i.e., GIO1, 2, and NIO) statistically explained a significant amount of variance in news consumers' willingness to pay, R^2 = .38, ΔR^2 = .12, F(12, 793) = 125.04, p < .001. Similarly with the previous two cases (i.e., news avoidance and selective exposure), only perception of news information overload (NIO) was statistically associated with willingness to pay, β = .40, t = 11.51, p < .001. Perceptions of general information overload (i.e., GIO1 & GIO2) were not significant.

5. CONCLUSION

5.1 Discussion
The current study examined various factors associated with news consumers' perception of information overload. For antecedent factors of perceived information overload, we considered demographics (RQ1) and three other potential

sources: the frequency of news access through multiple media platforms, level of attention to news, and interest in news (RQ2). For consequences of perceived information overload, we also considered three aspects of news consumption patterns: news avoidance (H1a), selective exposure (H1b), and willingness to pay for news (H1c). In the following section, we will discuss implications of the results of hierarchical regression analyses by focusing on a few notable findings.

Among the three antecedent factors, the level of attention to news through newer media/platforms/devices was strongly associated with both general information overload (GIO) and news information overload (NIO) perception. The result held even after controlling for the effect of participant age, which showed younger participants tended to perceive higher level of information overload. Thus, regardless of age, those who paid higher attention to news through social media, smartphones or tablets reported higher level of information overload. Since the level of attention to news through the traditional news media was not associated with GIO or NIO, the significant relationships with the level of attention via newer media might have something to do with unique characteristics of the newer media, such as higher interactivity and faster speed, and how people pay attention to news through them.

Compared to the traditional news consumption in which audiences mostly receive news with a fixed amount and schedule, especially when they use outlets such as TV or newspapers, news consumers can be proactive and search more news quickly when they use newer media/platforms/devices such as smartphones. In addition, when participants pay attention to news they find on social media, they not only become exposed to news, but also to all the other information such as their friends' posts, likes, and advertising customized to their social media usage patterns. Therefore, they might inadvertently feel a higher level of information overload while interacting with the extra sources of information related to the news.

While the frequency of actual news consumption through newer media/platforms/devices was overall not statistically associated with the perception of general information overload (GIO), there was a significant relationship between the news consumption through the traditional media and news information overload (NIO) perception. The result held after controlling for the effect of participant gender, age, and education, which means the more days participants spent consuming news through TV, newspapers, or radio, the higher level of NIO they perceived. The fact that news consumption frequency was not associated with GIO, but with NIO perception substantiates GIO and NIO as independent constructs. Thus, there might be a unique impact of news consumption through the traditional media, on NIO perception, but the relationship to newer media remains unclear. Participants' interest level in news was overall negatively, but not statistically, associated with perceived information overload. Holton and Chyi [31] found differences in the level of perceived information overload between respondents who accessed news through computers, e-readers, and Facebook and those accessed through TV and iPhone. Their findings seemed inconsistent with ours in terms of media characteristics because

platform choices of both traditional medium (e.g., TV) and newer medium (e.g., iPhone) were associated with lower levels of information overload. In contrast, a finding consistent with Holton and Chyi's [31] is the amount of attention paid on social media (e.g., Facebook) associated with perceived information overload. Holton and Chyi however did not differentiate between the level of attention and frequency of media consumption in their research of information overload.

In investigating the relationships between demographic variables and the various types of information overload (i.e., GIO1, GIO2, & NIO), we found results both different and similar to past findings. Contrary to previous research findings about gender and income difference [26], [27], [31], we found men and higher income participants reported a higher level of information overload, specifically in terms of news (NIO). The Pew Research Center [27] reported specific age blocks (i.e., younger than 25 and older than 50) that experienced a higher level of information overload; but our research found that age was overall negatively associated with perceived GIOs and NIO, consistent with Holton and Chyi's [31]. Our finding related to education level was consistent with the previous literature [26], [27] that participants with a higher level of education perceived a higher level of NIO.

Next, we examined how perceptions of information overload were related to three kinds of news consumption patterns: avoidance, selective exposure, and willingness to pay. Based on the previous research findings, we hypothesized positive associations between these three aspects of news consumption with perceived information overload. We expected some participants might show those patterns of news consumption as a type of strategy to deal with the problem of information overload. The result of our regression analyses showed one consistent finding across the three patterns: News information overload (NIO) was strongly associated with all three aspects, particularly strongly with news avoidance, and GIO was not a significant predictor. This result has a significant implication since it held even after controlling for the effect of participant demographics and interest in/attention to news. It appears many participants felt avoiding news would be the most convenient and comfortable way to handle abundant news information, instead of making a proactive decision about what news to consume and how much to consume. This adds to Van den Bulck's [36] research showing that news consumers avoid news both intentionally and unintentionally. Avoiding news to cope with information overload would be considered as an international behavior.

While the level of interest in news was negatively associated with news avoidance, it was positively and strongly associated with selective exposure to news. After controlling for the effect of participant education and interest in news, perception of news information overload (NIO) was statistically associated with selective exposure to news as well. Following Van den Bulck's [36] typology of news avoidance, we suspect that interest level interacts with avoidance of news and selective exposure. On one hand, news consumers who are not interested in news in general may choose to avoid news when they feel overwhelmed. On the other hand, it may also be the case that those who are interested in news expose themselves selectively to their favorite news sources or companies.

Perhaps not surprisingly, education had an effect in most relationships examined. Participants who had higher levels of education paid higher level of attention to news through the traditional news media, were more interested in news, and were more willing to pay for news than their counterparts. After considering these factors, when participants were overloaded with news information (i.e., NIO), they were still willing to pay for news. A global transition is occurring that much online news content is becoming subscription-based. It is notable that participants who were willing to pay for news were those who accessed news more frequently through newer media/platforms/devices, not traditional news media in our study. Therefore, news producers could consider the implications of charging for online news content as the most willing users are already new media savvy.

All in all, we found statistically different results when comparing the relationships between three antecedent factors and perceived information overload for general information overload (GIO) and news information overload (NIO) perception. Two aspects of GIO (i.e., media-related and psychological stress-related) were not associated with any dimension of news consumption patterns, but NIO was strongly associated with all three dimensions (i.e., avoidance, selective exposure, and willingness to pay for news). Thus, we believe our study suggests a distinctive nature of NIO from GIO, but more studies are needed to confirm this difference based on refinement and repeated testing of measurement scales of information overload.

5.2 Limitations and Directions for Future Research

Despite the large sample matching the demographic characteristics of US Census data, our survey did not include race and ethnicity information. Part of the reason was that previous studies did not report any meaningful differences in information overload with regards to race/ethnicity, but gender, education, and income level. However, if included, the result of our analysis could have been richer and stronger. Moreover, survey items measuring general information overload (GIO) and news information overload (NIO) need to be refined as some of the items were overlapped particularly in questioning psychological stress and negative emotion induced by perception of overload. Also, given the finding that only NIO was statistically and strongly associated with the three news consumption patterns examined in this study, we might not necessarily include GIO dimensions in a future study when examining the impact of information overload on journalistic practices.

The study was part of a larger project aiming to develop valid and reliable scales of information overload (IO) and investigating the relationships between IO and news consumers' perception of journalistic practices. Future research should examine differences in perceptions of overload from different contexts of news consumption to determine precisely why viewers perceive greater overload via newer media usage than they do via traditional news media.

Additionally, research should explore user motivations for news avoidance and selective exposure more in depth. One of the most significant findings of our study was that perception of NIO was associated with willingness to pay for news. Perhaps users are willing to pay to access higher quality (and lower quantities) of information. The cause of this relationship between NIO and willingness to pay requires further examination. Finally, in line with Van den Bulck's [36] typology of TV news avoidance, future research should test an interaction effect between interest in news and news-related information overload in predicting selective exposure and avoidance.

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