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The anatomy of tweet overload: How number of tweets received, number of friends, and egocentric network density affect perceived information overload

Yuichi Sasaki [a,*], Daisuke Kawai [b], Satoshi Kitamura [a]

[a] Department of Communication Studies, Tokyo Keizai University, 1-7-34 Minami-cho, Kokubunji-shi, Tokyo 185-8502, Japan
[b] Graduate School of Interdisciplinary Information Studies, The University of Tokyo, 7-3-1 Hongo, Bunkyo-ku, Tokyo 113-0033, Japan

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ABSTRACT

More than 21 million monthly active users (MAUs) in Japan read, communicate, and share information with others via Twitter (in May 2013). In this study, we focused on perceived information overload by analyzing the number of tweets received, number of friends, and density of a user's egocentric network. These three variables were examined using objective data collected through Twitter's open Application Programming Interfaces (APIs). We collected data concerning tweet overload through a web-based survey, and we used an ordered logistic regression analysis to examine the combined data ($n = 1277$). Results demonstrated that only the number of friends had a significantly positive effect on perceived tweet overload, while the number of tweets received did not produce a significant effect. Although the density of a user's egocentric network did not demonstrate any significant effect on perceived tweet overload, a significant interaction effect appeared between the number of friends and the density of this network. In other words, findings indicated that a large number of friends strengthened the network density's effect; by contrast, a smaller number of friends strengthened network density but reduced perceived tweet overload. The findings are discussed in detail in this article.

1. Introduction

Social media technologies enable individuals to communicate and share information with any number of peers. Several research studies have pointed out that these technologies empower people both politically (Auer, 2011; Youmans and York, 2012; Mueller and Van Huellen, 2012) and economically (Mangold and Faulds, 2009; Powers et al., 2012). Some researchers have noted, however, that social media affect people negatively, causing information overload (Bawden and Robinson, 2009; Bucher et al., 2013; Chen and Lee, 2013). In this article, we focus on the information overload experienced by Twitter users in Japan; thus, we address how the number of tweets received, number of friends, and density of a user's egocentric network affect information overload. Further, we use explanatory variables examined in relation to objective data collected through Twitter's open Application Programming Interfaces (APIs).

The number of monthly active users (MAUs) of Twitter in Japan was estimated at 21.5 million in May 2013 (comScore, 2013). As of December 2012, 96.5 million people in Japan were reported to be Internet users (The Ministry of Internal Affairs and Communications, 2013). A peculiar aspect of Twitter's history in Japan is that it gained popularity beginning

* Corresponding author. Tel.: +81 42 328 7920.
E-mail address: yssk@tku.ac.jp (Y. Sasaki).

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in the latter half of 2009, which was earlier than Facebook became popular. Since there were 21 million MAUs of Facebook as of August 2013 (ITmedia, 2013), we could say that the popularity of Twitter in Japan has lasted longer than that of Facebook; additionally, it has been more stable.

2. Theoretical background

2.1. Information overload

The term "information overload" first appeared in the work of Gross (1964), and it became widely known after it was used by Toffler (1970). The "classic" definition of information overload was explained via the following formula: information processing requirements > information processing capacities (Eppler and Mengis, 2004). The terms "requirements" and "capacities" in this definition can be measured in terms of available time. "Requirements" refers to a given amount of information that must be processed within a certain period. The primarily interest of disciplines such as management information systems, organization science, and consumer research is how the decision making of an individual varies with the amount of information to which he or she is exposed. Researchers have found a positive correlation between the quality of an individual's decisions and the amount of information he or she receives, up to a certain point, and that if further information is provided beyond this point, the quality of decisions will rapidly decline (Schroder et al., 1967; Chewning and Harrell, 1990). This finding is connected to the "classic" definition of information overload.

Another perspective defines information overload based on subjective experience. In this "subjective" view (Eppler and Mengis, 2004), the crucial factors of information overload extend beyond the amount of information received, also including feelings of stress, confusion, pressure, and anxiety that may be experienced by the individual who is exposed to the information (O'Reilly, 1980; Malhotra, 1982; Haksever and Fisher, 1996). Accordingly, proponents of this view have employed interviews or survey methods to measure the subjective feelings of information recipients, as opposed to experiments to measure the load time of information processing. Regarding the information processing of consumers, amounts of information processing differ by amounts of prior knowledge and experience of consumers (Bettman and Park, 1980; Payne et al., 1988). In addition, significant individual differences were found in the subjective efforts involved in information processing (Bettman et al., 1990). In this study, therefore, the "subjective" view of information overload was applied.

Eppler and Mengis (2004) divided information overload situations into three processes: (1) the information retrieval, organization, and analysis process; (2) the decision process; and (3) the communication process. Our study focuses on the communication process. In this context, following the introduction of information communication technology, many studies focused on e-mail communication (Speier et al., 1999; Bawden, 2001; Ingham, 2003; Zeldes et al., 2007). Regarding social media, some research results show that information overload on social media negatively affect organization management (Hemp, 2009; Tarafdar et al., 2010, 2011; Maier et al., 2012; Bucher et al., 2013). In the context of marketing, researchers have been accumulating empirical data on how the contagion of information on social media by general users is affected by users' information overload (Cheng et al., 2010; Hodas and Lerman, 2012, 2014).

2.2. Uses of Twitter and information overload

Numerous studies have clarified the types of people who use Twitter and their motivations for using it (Java et al., 2007; Zhao and Rosson, 2009; Honey and Herring, 2009; Boyd et al., 2010; Chen, 2011). After reviewing research focused on the continued use of Twitter, we noted that two motivations stand out: social interaction and information gathering. The latter correlates positively with continued use of Twitter (Johnson and Yang, 2009). Liu et al. (2010) have reported that Twitter users are gratified by content (which includes information sharing), new technology, and social advantages and process. Content and new technologies are the key gratifications influencing continued Twitter use (Liu et al., 2010). Another study, however, reveals that Twitter users who had ceased using the service actively were motivated initially by the anticipated benefit of social interaction (Coursaris et al., 2013). From these studies, we can assume that inactive members found that Twitter is not well suited for social interaction.

However, information overload can easily be perceived as another possible reason for discontinuing Twitter use. Based on this assumption, Twitter introduced its "Lists" feature, which enables users to divide the tweet streams they receive into smaller sub-streams (Stone, 2009). Attempts are being made to develop new content-recommendation technologies for social media streams that take into account users' contexts (e.g., location, situation, time) (Loeb and Panagos, 2011; Grineva and Grinev, 2012).

In a study regarding a different social media service—Facebook—researchers found that higher levels of users' social interaction overload lessened their intentions to continue using the service (Laumer et al., 2013). The researchers also identified the following features of information overload:

1. Gender and extent of usage do not correlate with the level of social interaction overload.
2. Greater interest generated by the content of interactions lowers the level of social interaction overload.
3. Users who are younger and who have a large number of friends experience greater social interaction overload.

The second finding cited from this research (Laumer et al., 2013) shows that subjective factors affect information overload experienced by Facebook users.