EMPIRICAL RESEARCH

Giving too much social support: social overload on social networking sites

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Abstract
As the number of messages and social relationships embedded in social networking sites (SNS) increases, the amount of social information demanding a reaction from individuals increases as well. We observe that, as a consequence, SNS users feel they are giving too much social support to other SNS users. Drawing on social support theory (SST), we call this negative association with SNS usage 'social overload' and develop a latent variable to measure it. We then identify the theoretical antecedents and consequences of social overload and evaluate the social overload model empirically using interviews with 12 and a survey of 571 Facebook users. The results show that extent of usage, number of friends, subjective social support norms, and type of relationship (online-only vs offline friends) are factors that directly contribute to social overload while age has only an indirect effect. The psychological and behavioral consequences of social overload include feelings of SNS exhaustion by users, low levels of user satisfaction, and a high intention to reduce or even stop using SNS. The resulting theoretical implications for SST and SNS acceptance research are discussed and practical implications for organizations, SNS providers, and SNS users are drawn.
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Introduction
Social networking sites (SNS) have become well-established online services in the daily lives of individuals. A key functionality of SNS such as Facebook is networking with others (Koroleva *et al*, 2011). The primarily function of SNS is to post private or public messages to contacts (Krasnova *et al*, 2010; Tow *et al*, 2010). While some messages exchanged over SNS provide neutral information (*I am waiting for the bus*), others are social requests demanding reaction and assistance (*Help me! I need an apartment in New York!*, *I am sick. Cross your fingers for my recovery!*; *I'm bored – entertain me!*). The number of messages a user receives increases with the number of her social relationships embedded in SNS (Manago *et al*, 2012). As a result, SNS users might be confronted with an increasing number of social requests that require some form of reaction. This raises questions about the consequences of increasing SNS usage on a user's life (Brandtzaeg, 2012; Amichai-Hamburger, 2013). On the one hand, social embeddedness through SNS can benefit SNS users, who experience more social support than non-SNS users (Hampton *et al*, 2011). On the other, users can be drawn into exhausting social situations. In particular, the many social relations enabled in SNS might cause users to feel they are giving too much social support in SNS to individuals embedded in their social network out of a sense of duty to respond to social support requests. We call this newly observed phenomenon 'social overload', and we

will develop a theory of its impact in this paper. Social overload might have negative psychological and behavioral consequences. Such consequences, as elaborated in studies based on non-IT enabled social networks (Bliese & Britt, 2001) and social support theory (SST) (Caplan, 1974; Cassel, 1976; Cobb, 1976), emphasize the need to better understand the social exhaustion phenomenon, its drivers, and consequences in IT-enabled SNS as well. Some consequences may range from short-term exhaustion to long-term physiological, social, and/or psychological harm (Tarafdar *et al*, 2010) and could result in users reducing or complete stopping platform usage.

This research aims at identifying the possible negative effects of SNS usage on the individual (Brandtzaeg, 2012; Turel & Serenko, 2012; Amichai-Hamburger, 2013), as SNS replace other individual communication channels. In addition to being used to post personal messages to private and public social networks, SNS are also used by organizations in marketing (Culnan *et al*, 2010) and recruiting (Weitzel *et al*, 2009; Leidner *et al*, 2010) to communicate with external stakeholders, and for internal business communication (Majchrzak *et al*, 2009; Koch *et al*, 2012). In addition to causing stress, if social overload leads to reduction or stopping SNS channel usage, it could threaten user participation in social media. A better understanding of SNS is necessary to avoid such negative consequences, as well as those observed with other communication media (e.g., Barley *et al*, 2011).

The goal of this paper is to understand the phenomenon of social overload, its antecedents, and its consequences for the individual. As defined above, social overload is the negative perception of SNS usage when users receive too many social support requests and feel they are giving too much social support to other individuals embedded in their virtual social network. Increasing SNS usage for both private and professional communication and the societal need to understand drivers of possibly negative physiological, social, and psychological consequences of IT-enabled SNS motivate our research question:

What are the antecedents of social overload and its consequences for SNS users?

In the following, we first discuss SNS as a technology enabling social connections among individuals and organizations and introduce SST as the theoretical base for developing the concept of social overload. Second, we develop social overload as a theoretical variable and derive hypotheses for its drivers and consequences. Third, using a study with 571 SNS users, we empirically evaluate social overload and the hypotheses. We then discuss the results, limitations, and implications for research and for practice.

Related research

Social networking sites
We have witnessed extraordinary growth in usage and dispersion of SNS, which are web-based services that enable users to create profiles and connect with other users. From the corporate perspective, SNS are important in two ways. First, organizations can use closed internal SNS to facilitate communication, file sharing, and knowledge exchange among organizational members. Some organizations have considered using SNS instead of e-mail for internal communication (e.g., Majchrzak *et al*, 2009; Koch *et al*, 2012). Second, organizations might consider SNS an additional tool for supporting a wide range of primary and secondary business processes such as recruiting (Laumer *et al*, 2010) or marketing (Culnan *et al*, 2010). Several studies report successful hiring strategies using SNS (Weitzel *et al*, 2009; Leidner *et al*, 2010) and identify a large potential audience that can be used for branding purposes (Culnan *et al*, 2010; Gallaugher & Ransbotham, 2010; Hoffman & Fodor, 2010).

As organizations can only benefit from SNS to the extent that individuals use them, a wide range of recent research has investigated why and how individuals integrate SNS into their daily routines. Findings reveal different actions by and benefits to individuals using SNS (Koroleva *et al*, 2011). These range from alleviating boredom (Wilson *et al*, 2012) over enhancing one's social standing (Maier *et al*, 2012a) to having different modes for staying in continual contact with others (Koroleva *et al*, 2011). One study finds a median number of 300 SNS friends, which reflects those SNS members you chose and they agreed to be your friend – or the other way around – in such platforms, with some users having thousands of virtual friends (Ellison *et al*, 2011). Hence, these benefits and perceived pleasure when using SNS are reasons why individuals continuously use SNS (Maier *et al*, 2012a), develop habitual usage patterns, or even become addicted to using SNS (Turel & Serenko, 2012). Krasnova *et al* (2012) identify user self-disclosure as a key to ensuring that individuals maintain their interest in using SNS in the long run. The drawbacks associated with SNS usage include privacy concerns (e.g., Krasnova *et al*, 2010, 2012), facilitation of criminal activities such as cyber-stalking and identity theft (Tow *et al*, 2010), as well as SNS as a source of stress (Maier *et al*, 2012a) and envy (Krasnova *et al*, 2013). Another focus is on the nature of social relationships enabled by or embedded in SNS, communication patterns in SNS, and the well-being of users (Manago *et al*, 2012; Amichai-Hamburger, 2013). This research indicates that SNS can facilitate expansive social networks with people one is only remotely associated with. Larger networks enabled by SNS predict higher levels of perceived social support; this explains the psychological importance of large network sizes in virtual environments (Manago *et al*, 2012). Nonetheless, by providing a broader audience and enabling a larger social network, SNS not only increase the perceived social support but also the need for actions by others giving social support. Both aspects are elemental in SST, which we will introduce in the next section.

Social support theory
In general, social networks depict social connections between individuals. They differ regarding their structure,

such as size or density, and their function, such as providing information, emotional support, or material assistance (Procidano & Heller, 1983). SST (Caplan, 1974; Cassel, 1976; Cobb, 1976) evaluates the influence of social network characteristics on an individual's capacity to cope with negative life events, identifying three types of social support. First, social embeddedness covers the actual connections among individuals in the social environment (Barrera, 1986; Thoits, 1995). It focuses on the structure of the social network of individuals in terms of size or density. Second, perceived social support is used to explain the effects on those individuals confronted with negative events. It focuses on an individual's beliefs about whether or not members of one's social network provide support and the positive as well as negative consequences of these beliefs (Barrera, 1986; Thoits, 1995; Cohen *et al, 2000*). Third, enacted social support (Barrera, 1986) is used to explain behavioral actions and their consequences performed by others to provide social support (Thoits, 1995). It focuses on network members who perform behavioral actions when giving assistance to a certain individual in their networks. This concept evaluates an individual's actual behavior when providing support and the associated consequences (Goldsmith *et al, 2000*; Seidman *et al, 2006*).

In summary, SST focuses on the ways individuals are embedded in a social network through social connections, and how these connections are used to request or offer support. As SST distinguishes different perspectives of social support in social networks and consequently encompasses the phenomenon of giving too much social support on SNS, SST and especially the enacted social support perspective is used in the following to develop the concept of social overload in SNS.

Theorizing social overload on SNS

SST emphasizes that enacted social support from members of social networks is beneficial for network members confronted with negative life events (Thoits, 1995). But the theory is largely silent about the burden of giving social support that might, in fact, strain network participants especially in larger networks with more requests. SNS that embed social relationship are thus technologies that might lead to positive and negative effects of social support (Koroleva *et al, 2011*). On the positive side, intense SNS usage is associated with higher perceptions of emotional support (Ellison *et al, 2007*) and users indicate that SNS have brought them closer to their friends (Subrahmanyam *et al, 2008*). On the negative side, as SNS users' networks have grown larger over the past few years (Manago *et al, 2012*), more social support requests can be communicated to more individuals embedded in an individual's social network (Krasnova *et al, 2010*; Amichai-Hamburger *et al, 2013*; Sherman & Greenfield, 2013). Hence, more enacted social support is required to provide the amount of support needed to constitute positive effects on the receiver's side; but an individual demanding more support from her network than it supplies might

strain the network by overburdening, or overloading, network contacts with postings and support requests.

Consequently, as outlined above, we propose the concept of social overload to describe a situation when an individual perceives she is giving too much social support to other individuals embedded in her SNS-enabled social network. A potential effect of this exposure to too many support requests seems to be the perception of a general loss of control over the immediate situation. In line with traditional theories of social network embeddedness, there is a conflict between the spatial or virtual arrangement, number of people, and nature of interactions in high-density environments such as SNS on the one side and the achievement of individual goals like privacy, behavioral freedom, or the control over social interaction on the other (Baum & Koman, 1976; Langer & Saegert, 1977). Hence, it is not network size *per se* that causes these negative perceptions but the experience of intensive social encounters and the associated exposure to too many social support requests. When the network asks for more than what an individual is comfortable in offering, the perception of losing control over the social situation is a negative consequence of network participation (Wiesenfeld, 1987; Evans *et al, 2000*).

As the usage of SNS facilitates easy and efficient social connections to many other people, it increases the probability that SNS users feel socially well embedded and expect social support when they request it. At the same time, this exposes other users to frequent demand for supplying social support from friends in SNS (Ellison *et al, 2007*; Koroleva *et al, 2011*). As a consequence, they can feel that additional and too much enacted social support is required to provide the amount of social support needed. Social overload on SNS is thus a negative consequence of technology usage. To validate this newly proposed concept of social overload, we have developed a measurable variable for the described phenomenon, examined the relationship between different network and individual characteristics and social overload, and identified psychological and behavioral reactions induced by social overload.

Antecedents of social overload

On the basis of the proposed understanding of social overload, different factors can influence whether a SNS user experiences giving too much social support. We will introduce these factors grouped into three categories as indicated by prior research – especially by SST research (Thoits, 1995) – which finds that individual characteristics (Agarwal & Prasad, 1999; McAndrew & Jeong, 2012), prior behavior (Kim, 2009), and social relationship characteristics (Gibbs, 2006; Subrahmanyam *et al, 2008*) influence users' perceptions of SNS.

Individual characteristics SST research identifies age as an important demographic variable, as different age groups rely on or benefit from friends or family to

different extents (Thoits, 1995). For example, social support decreases when people get older (Turner & Marino, 1994). Similarly, age is important when looking at users' reactions to technologies (Agarwal *et al*, 2009). Research findings indicate a significant negative relationship between age and perceived negative consequences because elderly individuals are more experienced in coping with negative stimuli (Ragu-Nathan *et al*, 2008) such as perceiving to give too much social support on SNS. Consequently, we hypothesize that:

H1a: *The older an individual, the lower the social overload.*

SST also reveals gender differences, as women show greater investment and intimacy in their social relationships (Belle, 1987). In addition, SNS research shows that women have more SNS friends and engage more in SNS activities than men (McAndrew & Jeong, 2012; Moore & McElroy, 2012). Hence, since females participate in social networks more extensively and intensely (McAndrew & Jeong, 2012), they are more often confronted with disclosed information in SNS, they value them more, and subsequently they are more likely to respond to social support requests. We thus hypothesize:

H1b: *Women experience greater levels of social overload than men.*

SNS usage characteristics   Longitudinal IS research in general (Kim, 2009) and SNS research in particular (Maier *et al*, 2012b) identify individual usage behavior as a significant source of technology-related perceptions. This is essential because SNS users follow different usage behavior patterns. Some users integrate SNS excessively in their daily routines, such that their daily life is 'invaded' by SNS (Brandtzaeg, 2012; Turel & Serenko, 2012; Maier *et al*, 2012a). These power users are hence confronted more frequently with social requests on SNS than infrequent users. Notably, regular exposure to social requests is a significant precondition of whether or not a user perceives social overload. The extent to which an individual uses SNS is then crucial for whether or not social overload is likely. Hence, we hypothesize that:

H2a: *The higher the extent of an individual's usage of SNS, the higher the social overload.*

Furthermore, SST has discussed social network characteristics like population density as an essential factor influencing an individual's beliefs and behaviors (Nasar & Julian, 1995). The more people there are in a social network, the higher are the perception of available social support (Barrera, 1986; Thoits, 1995) but also the number of social support requests (Baum *et al*, 1982; Evans & Lepore, 1993). In particular, in large social networks there is a higher probability that an individual will meet others and hence that such uncontrolled contacts will request some form of social support (Wilson & Baldassare, 1996). Thus, the size of an individual's social network is related to how much social support is requested or received

(Barrera, 1986; Wellman & Wortley, 1990) and is correlated with enacted social support (Barrera, 1981). In addition, density and network size have also been shown to be significant factors in virtual worlds and in SNS, in particular (Manago *et al*, 2012). Animesh *et al* (2011) theorize that users participate in virtual worlds to be part of high-density places in order to increase their social presence. However, this might be perceived as a negative stimulus and an intrusion in an individual's life. Furthermore, larger social networks enabled by SNS predict higher levels of perceived social support (Manago *et al*, 2012). Network size in SNS is defined as how many SNS friends an individual has (Manago *et al*, 2012). Due to the fact that a high number of friends in SNS increases the probability of receiving social support requests, we hypothesize that:

H2b: *The higher an individual's number of friends in SNS, the higher the social overload.*

Social relationship characteristics   SST describes network cohesiveness and relationship types as important social relationship characteristics that predict both perceived and enacted social support (Barrera, 1986; Wellman & Wortley, 1990). The type of relationship, as one important characteristic of social relationships embedded in SNS, is defined as the extent to which SNS friends are also embedded in a user's offline network (Amichai-Hamburger *et al*, 2013). Due to the offline-to-online phenomenon, most of an individual's social relationships embedded in SNS are derived from the offline world (Ellison *et al*, 2007; Ross *et al*, 2009); accordingly, the majority of research shows that SNS users connect and reconnect with existing friends and family members on these platforms (Subrahmanyam *et al*, 2008; Wilson *et al*, 2012). Nonetheless, while using SNS new relationships can also be established (Amichai-Hamburger *et al*, 2013). Mainly individuals with shared interests in particular topics, or interested in online dating, are found to have more online-only friends in their SNS-enabled social network (Gibbs, 2006; Subrahmanyam *et al*, 2008).

Both types of relationships, online and offline, are thus regularly included in lists of friends in SNS. However, social support requests by close friends and family members also known from the offline world are often perceived to be more important as the *simplest and most powerful measure of social support appears to be whether a person has an intimate, confiding relationship or not* (Thoits, 1995, p. 64). Consequently, as users receive social demands from all members of a social network embedded in SNS, the likelihood of social overload increases when a higher number of SNS friends are exclusively online friends, that is, not part of one's offline network. In other words, when the relationships embedded in SNS can be characterized as online-only, a user is less willing to provide support to each request and instead perceives that he is giving too much social support. We thus hypothesize:

H3a: *The less SNS friends are also embedded in one's offline network, the higher the social overload.*

Examining beliefs and behavior, prior research also emphasizes the importance of subjective norms (Ajzen, 1991; Eckhardt *et al,* 2009) and *the perceived social pressure to perform or not to perform the behavior* (Ajzen, 1991, p. 188). Adapted to SNS usage and disclosed social requests, a subjective social support norm is defined as individuals perceiving different degrees of whether or not one's social environment expects a reaction to this form of disclosed information. This phenomenon is related to reciprocity as a general moral norm (Gouldner, 1960) and manifests as individuals feeling obliged to provide benefits to their social network (Uehara, 1995). Consequently, SNS users might feel the subjective social support norm to provide social support to their networks even to an extent that exceeds their perception of what is fair or right. We thus hypothesize:

H3b: *The higher the subjective social support norm, the higher the social overload.*

Consequences of social overload

Exposure to social overload can cause different reactions (Tarafdar *et al,* 2010) that, according to SST, are either psychological or behavioral (Barrera, 1986; Thoits, 1995; Evans *et al,* 2000).

Psychological reactions to social overload Social overload might explain why an increasing number of SNS users feel exhausted while using social media and especially SNS (Gartner, 2011). Exhaustion represents an individual's aversive, potentially harmful, and unconscious psychological reaction to stressful situations such as perceiving social overload when using SNS (Cooper *et al,* 2001; Ayyagari *et al,* 2011). In the case of SNS, we define these feelings as SNS exhaustion. It describes a user's feeling of being tired of activities related to the usage of SNS. This means that an individual who reports feeling exhausted by SNS is tired of using it. As the usage of SNS includes interpersonal relationships, SNS exhaustion is caused in particular by virtual social demands. Hence, it is theorized that social overload is a contributing factor to SNS exhaustion; high regard for the social demands of SNS friends induces the feeling among users of being exhausted by SNS more frequently. Consequently, it is assumed that:

H4: *The more an individual perceives social overload, the greater the feeling of SNS exhaustion.*

In addition to an increase in an individual's feeling of exhaustion, psychological consequences of experiencing negative perceptions related to a technology become visible in changed levels of satisfaction (Tarafdar *et al,* 2010; Cenfetelli & Schwarz, 2011; Maier *et al,* 2013). In the context of SNS, social overload decreases an individual's level of SNS satisfaction (Au *et al,* 2008). In more

detail, it is assumed that negative stimuli encountered by an individual from too many virtual requests for social support decrease the user's SNS satisfaction, so we hypothesize:

H5: *The more an individual perceives social overload, the lower the SNS satisfaction.*

Behavioral reactions to social overload Beside psychological consequences, social overload can also cause behavioral reactions by an individual (Tarafdar *et al,* 2010) such as decreasing SNS usage intensity or, more radically, avoiding previous behavioral patterns by stopping using SNS completely. Such a behavioral reaction first becomes visible as an individual's low desire to repeat certain behaviors (Bhattacherjee, 2001). On the basis of Bhattacherjee's (2001) concept of continuous usage intention, technology acceptance research (Dwivedi *et al,* 2008; Williams *et al,* 2009), and the discussion on user resistance (Kim & Kankanhalli, 2009), we refer to this as discontinuous usage intention. This reflects an individual's intention to change behavioral patterns by decreasing usage intensity or even taking the radical step of stopping their behavior. Applied to the context of SNS, an individual's discontinuous usage intention is reflected in the intention to decrease SNS usage intensity or even to quit the SNS platform and delete accounts.

Discontinuous usage intentions are therefore possible behavioral reactions to social overload when using SNS. More precisely, an individual receiving too many virtual social requests will reconsider whether to log in to the SNS platform several times a day. We hypothesize that:

H6: *The more an individual perceives social overload, the higher the SNS discontinuous usage intention.*

Figure 1 summarizes the antecedents and consequences of social overload when using SNS.

Empirical evaluation

Research methodology
We used a research approach common for investigating technology usage (Choudrie & Dwivedi, 2005). To develop and validate a construct for the newly proposed concept of social overload and to empirically evaluate the research model on drivers and consequences of social overload, 23 SNS users were interviewed (12 interviews to identify why and how individuals use SNS; 11 interviews to develop items for the scale social overload) and 3 surveys were performed (2 surveys to validate the new scale social overload, 1 survey to evaluate the research model). Furthermore, an additional survey was conducted to gather empirical evidence for the proposed research model.

Associated interviews
To identify why and how individuals use SNS, we first interviewed 12 SNS users in March of 2011 (Table 1). All
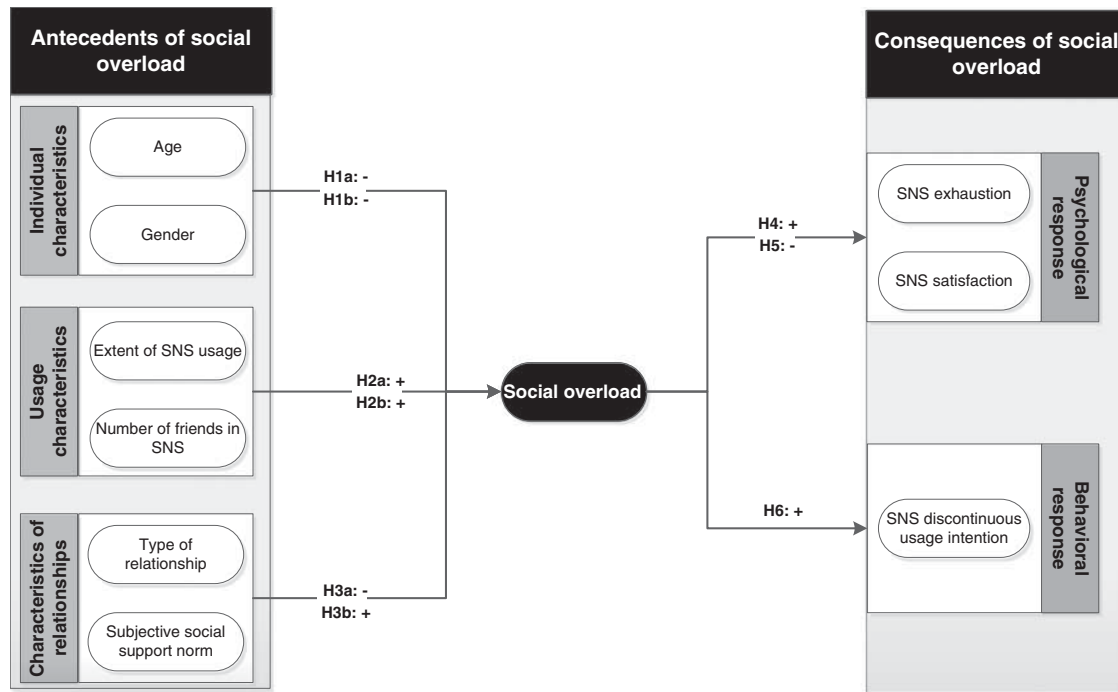
Figure 1 Research model.

interviews were conducted by the same two researchers in our group and lasted between 1 and 2 h. On the basis of a two-step approach, SNS-related attitudes, beliefs, emotions, and behaviors were captured using the critical incident technique (Flanagan, 1954). In line with this method, the interviewed SNS users were asked about critical occurrences during their use of SNS as well as major positive and negative reactions. In response to the resulting answers, the sources of these occurrences and reactions were analyzed. On the basis of the recorded and transcribed interviews, which depict the basis for the qualitative data analysis (Fielding & Schreier, 2001; Yin, 2009), the data were structured and a frequency analysis was performed (Kohlbachter, 2005; Chhokar *et al*, 2007) to identify incidents mentioned several times. Eventually, the results were classified and coded to identify statements indicating social overload. In total, nine interviews indicated at least one incident related to social overload as defined above. In the following, we focus on the statements related to the incident 'social overload' to illustrate that interviewees are of the opinion they have to deal with too many social demands and requests disclosed by their SNS friends.

For example, one interviewee reported that she received several messages per week requesting social support when many of her SNS friends posted messages such as *I am a sick* or *I feel bad*. The interviewee indicated a responsibility to take care of her SNS friends, since she stated that *I started to worry about my friends and to react to the messages by chatting with them and by sending some funny videos. However, while answering all these messages I started to believe that I give too many benefits to my Facebook friends*. Another

Table 1 Demographics of the interviewed individuals

Demographics	Gender	Women	50.0
(in percentage)		Men	50.0
	Age (in percentage)	13–17	16.7
		18–25	25.0
		26–34	25.0
		35–44	16.7
		45–54	8.3
		55–65	8.3
Characteristics of	Extent of usage	Hourly	8.3
SNS usage	*(in percentage)*	Several times a day	50.0
		Once daily	8.3
		Several times a week	8.3
		Once a week	8.3
		Several times a month	8.3
		Once a month	8.3
	Number of friends	0–50	8.3
	(in percentage)	51–100	8.3
		101–150	16.7
		151–200	16.7
		200–250	8.3
		251–300	8.3
		301–350	16.7
		> 350	16.7

person reports that *always when I log into my Facebook profile I have too many private and public messages. Last week a friend of mine posted a picture of his grandmother with the comment 'RIP' which is just one example of these types of messages. I really feel the duty to respond to these messages*. Another person told us that a casual acquaintance shared a

link to a survey for her master thesis. The interviewee stated that reading this message made her participate in the survey. However, she also continued that *I receive messages like this several times a month*. A comparable situation was described by another person. *When I log on to Facebook I always get notified about my Facebook friends' birthdays. I always start to congratulate them although I do not know them very well*. Two SNS users also indicated that their SNS friends recommend forthcoming events, fan pages, and career pages. Here, both interviewees reported that they consider whether or not they should 'like' these sites, and if they do not they feel bad because they are deviating from their SNS friends' suggestions and, additionally, the SNS friends will see whether they deviate. Hence, they always start supporting their SNS friends although *I think it is not the best idea to react to all these requests*. Another situation was described by an interviewee who told us that she was directly addressed by a friend's disclosed message *I have a MATH exam. Ellie, you have to help me or I will fail*. The interviewee said that she felt obliged to help because everyone else could read that she was responsible for whether or not her friend passed the exam and the friend did not show any kind of consideration for the fact that she had to learn for her own exam. *I care too much about my friend's well-being although I should use the time for myself. Facebook made me take too much care of my friends' well-being*. Another interviewee reported that someone wrote *She dumped me! And now – what should I do?* on Facebook. *If I respond to all of these crises my Facebook friends have on Facebook I would have to spend several hours a day*. These examples show that many SNS users think they give too much social support on SNS. In order to generalize these examples, we conducted empirical studies as described in the following.

Data collection

To develop a measurement model for the proposed new construct of social overload and to validate the proposed research model assuming different antecedents and consequences of social overload while using SNS, we targeted SNS users. Several data sets were needed to validate the new scale and to evaluate the research model. Besides the interviews, we conducted several online surveys to collect data from SNS users.

To obtain the required samples, individuals were invited via email to participate in our study. The email addresses to which invitations were sent had been collected over the previous years using two different methods. First, individuals could voluntarily register their email address, including some demographic data and technology usage characteristics, on our university website in order to take part in forthcoming surveys. Individuals providing their email address in this way are mostly current or former students or individuals who are interested in our research topics. Second, several large surveys had been set up in the past which were related to distinct issues, such as human resource management. Here, each participant was invited

using customer databases of different industry partners and participants were asked whether or not we might contact them again for new and different research projects. On the basis of these two methods, an email list was set up including individuals of different ages and cultural backgrounds.

Using this procedure to identify the demographic and technology usage characteristics of potential survey participants gave us a high level of control and the ability to identify SNS users and invite them to take part in one of our surveys. We evaluated our research model using Facebook as the SNS of choice because it is the largest SNS in Germany. Nonetheless, to ensure that all respondents are Facebook members, we asked again: *Are you registered on Facebook?* Only those answering affirmatively were used for the study, thus ensuring that our participants are members of the desired population of Facebook users.

Construct and scale development of social overload

In this section, we develop and validate a scale for social overload in five steps.

Step 1: Item development of the scale SNS-induced stress In scanning[1] recent IS-related articles discussing the usage of SNS, we did not identify any articles focused on the phenomenon of social overload. After scanning social psychological research, we identified a few articles on social overload in the context of SST and crowding (Baum *et al,* 1982). Because most articles are non-empirical, we developed a scale and adapted it to the context of Facebook. We developed and redefined items by interviewing 11 Facebook users. In the end, we had a pool of seven items that reflected both the authors' and the interviewees' understanding of social overload in the context of Facebook (Table 2). These steps are in line with methods used in prior research in which new scales were developed (e.g., Chin *et al,* 1997; Salisbury *et al,* 2002; Ragu-Nathan *et al,* 2008) and are described in detail in the following.

Step 2: Assessing reliability and construct validity of the new items For the second step of the construct and scale development process, we set up an online survey. We contacted 180 individuals by email and invited them to participate in our scale validation survey. Their task was to assign the seven newly designed items and the well-researched items of other negative technology perceptions (e.g., technostress; see Ragu-Nathan *et al,* 2008) to the corresponding constructs. The procedure was as follows. We presented and defined the concept of social overload as well as the five technostress creators

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[1]We scanned the Senior Scholars' Basket of Journals with its eight journals (*MISQ, ISR, JMIS, JAIS, EJIS, ISJ, JSIS,* and *JIT*) for the period 2002–2013 using stress-, social support-, and SNS-related search terms. For the identified articles, we performed forward and backward search as proposed by Webster and Watson (2002).

Table 2   Pool of items for the construct social overload

Construct		Items	Mean	SD	Reliability α	
Social overload	SO-1	I take too much care of my friends' well-being on Facebook.	3.36	1.69		
	SO-2	I deal too much with my friends' problems on Facebook.	3.04	1.61		
	SO-3	My sense of being responsible for how much fun my friends have on Facebook is too strong.	2.99	1.63		
	SO-4	I am too often caring for my friends on Facebook.	3.41	1.74	0.91[a]	0.90[b]
	SO-5	I pay too much attention to posts of my friends on Facebook.	3.84	1.75		
	SO-6	I congratulate Facebook friends as a consequence of the birthday reminder, although I would not congratulate them in real life.	4.64	2.08		
	SO-7	I receive too many friend requests from casual acquaintances.	4.87	1.83		

[a]Calculated with items SO-1 to SO-7.
[b]Calculated with items SO-1 to SO-6; as SO-7 is removed in Step 2.

(Ragu-Nathan *et al*, 2008) to each participant. Next, we gave them two examples to illustrate how items should be assigned. For example, we indicated that the item *I often find it too complex for me to understand and use Facebook* (Ragu-Nathan *et al*, 2008) should be assigned to social overload or one of the five technostress creators.[2] Afterwards, individuals assigned each newly developed item as well as additional control items to these constructs.

On the basis of 51 responses, we calculated ratios to which participants correctly matched the newly developed items to social overload. As suggested in prior research (Landis & Koch, 1977; Nahm *et al*, 2002), we rejected all items assigned correctly by less than 61% of the respondents. Hence, one item (SO-7) had to be removed (Table 3). Nevertheless, this step indicated that the identified items have semantic coherence.

Step 3: Exploratory and confirmatory factor analysis   To provide empirical evidence that these items not only belong together semantically but also statistically, we used exploratory factor analysis. Again, data were necessary, so we set up an additional online survey focusing on Facebook as an example of SNS. We invited 1500 individuals to participate in a survey in which they only had to fill out the six items of social overload and the technostress items of Ragu-Nathan *et al* (2008). In the end, 657 participants completed all items without any missing value. Consistent with prior research, we split the data set randomly into two subsamples (e.g., Ragu-Nathan *et al*, 2008). The first one (Set 1) consists of 537 cases, and the second one (Set 2) of the remaining 120 cases. We utilized Set 1 to develop the construct and Set 2 to validate the results of Set 1, so that this set represents a holdout sample.

First, we performed an exploratory factor analysis with Set 1. The results revealed a six-factor structure, with the newly developed social overload items grouped together into one component so that no item had to be deleted. This means that all the six items of social overload fell on one factor and the Ragu-Nathan *et al* (2008) items of technostress fell on five other factors.

[2]Techno-complexity would be the correct answer for this item.

Second, a confirmatory factor analysis was performed with AMOS 20. Due to the fact that the results revealed no high correlations among their error terms (the highest modification index is 9.87 between SO-4 and SO-6), no item had to be removed. We then repeated both steps with Set 2 ($N_2 = 120$). Since this provides the same results, we did not have to remove any item in this step.

Step 4: Construct reliability   In order to ensure construct reliability, Table 2 includes means, standard deviation, and reliability. These statistical data are calculated based on the whole data sample (Set 1 and Set 2) of Step 3 with 657 respondents. The reliability values are above the recommended minimal threshold of 0.7 (Nunnally & Bernstein, 1994; Hair, 1995; see Table 2: Reliability).

Step 5: Discriminant validity of the conceptual model through a correlated measurement model of all items   Again, the data sample of 657 respondents (see Step 3) was used to investigate discriminant and convergent validity. For this purpose, we conducted a first-order correlated measurement model in AMOS 20. There were no significant error correlations among any items (the highest modification index is 9.76 between SO-5 and SO-6) so discriminant and convergent validity were characterized as good. The evaluation is based on different indices such as χ^2/df, Goodness-of-Fit Index (GFI), Adjusted Goodness-of-Fit Index (AGFI), Normal Fit Index (NFI), Root Mean Square Error of Approximation (RMSEA), Standardized Root Mean Square Residual (SRMR), Incremental Fit Index (IFI), Tucker–Lewis Index (TLI), and Comparative Fit Index (CFI).[3] Furthermore, we

[3]χ^2/df represents the minimum discrepancy divided by the degrees of freedom. GFI indicates the relative amount of variance and covariance that is explained by the model, whereas the AGFI adjusts GFI for the degrees of freedom. NFI and CFI indicate the percentage enhancement in fit over the baseline model. The RMSEA is a standardized estimation that is used to represent closeness of fit. SRMR represents the standardized difference between observed and predicted covariance. The IFI is used to address the issue of parsimony and sample size. The TLI adjusts NFI for the degrees of freedom and penalizes for model complexity.

Table 3 Assessing reliability and construct validity

Construct	Label	Social overload (in percentage)	Techno-overload (in percentage)	Techno-invasion (in percentage)	Techno-complexity (in percentage)	Techno-insecurity (in percentage)	Techno-uncertainty (in percentage)	No assignment (in percentage)
Social overload	SO-1	94.1	2.0	2.0	0.0	0.0	0.0	2.0
	SO-2	82.4	5.9	3.9	0.0	0.0	0.0	7.8
	SO-3	80.4	3.9	3.9	0.0	2.0	0.0	9.8
	SO-4	66.7	11.8	2.0	0.0	0.0	0.0	19.6
	SO-5	78.4	2.0	5.9	0.0	0.0	0.0	13.7
	SO-6	68.6	7.8	3.9	2.0	0.0	0.0	17.6
	SO-7	43.1	13.7	5.9	2.0	2.0	0.0	33.3

Note: No assignment means it was not assigned to social overload or one of the technostress creators; SO-7 removed in this step.

Table 4 Goodness-of-fit measures for social overload

Criterion	Recommended cut-off criterion	Reference	Value
χ^2/df	> 1 and < 5	Salisbury *et al* (2002), Chin *et al* (1997)	3.67
GFI	> 0.90	Jöreskog & Sörbom (1989)	0.98
AGFI	> 0.80		0.94
NFI	> 0.95	Salisbury *et al* (2002)	0.98
RMSEA	< 0.06	Hu & Bentler (1999)	0.05
SRMR	< 0.08		0.04
IFI	> 0.95		0.98
TLI	> 0.95		0.97
CFI	> 0.90	Bentler & Bonett (1980)	0.98
CR	> 0.70	Fornell & Larcker (1981)	0.94
AVE	> 0.50		0.71
MSV	< AVE	Hair *et al* (2009)	0.43
ASV	< AVE		0.26

Table 5 Demographics of the 571 Facebook users

Demographics	Gender (in percentage)	Women	45.0
		Men	55.0
	Age (in percentage)	<19	10.4
		19–24	41.1
		25–34	36.7
		35–44	6.2
		45–54	4.0
		> 54	1.6
Characteristics of SNS usage	Extent of usage (in percentage)	Hourly	9.6
		Several times a day	53.1
		Once daily	12.9
		Several times a week	12.7
		Once a week	4.7
		Several times a month	3.1
		Once a month	4.0
	Number of friends (in percentage)	0–50	12.9
		51–100	11.3
		101–150	15.5
		151–200	19.8
		200–250	7.9
		251–300	7.7
		301–350	10.7
		> 350	14.2

investigated convergent validity using composite reliability (CR) and average variance extracted (AVE). In addition, discriminant validity was evaluated by using Maximum Shared Squared Variance (MSV) and Average Shared Squared Variance (ASV). Since Table 4 shows that all criteria are fulfilled, the overall fit is good.

Validation of the research model
To assess the proposed research model, we used SmartPLS (Ringle *et al,* 2005). Due to the fact that negative perceptions, such as social overload, were identified as a source for skewed distributions (Turel *et al,* 2011), the partial least squares (PLS) method seems to be the most suitable method as it does not require normally distributed data. In addition, our research can be characterized as explorative so that PLS should be used.

Sample characteristics   To gather data for estimating our proposed research model, we contacted a group of 1800 individuals using contact information known from prior studies and invited them to participate in an online survey on Facebook usage. Because the survey would take up to 15 min, and to increase the response rate, we raffled three prizes (an iPad, an iPod, and a GPS navigation

device). This procedure was performed between July and August 2011.

Overall, 832 individuals completed the questionnaire, but only 571 respondents were users of Facebook and also completed the survey without any missing values, resulting in a response rate of 31.7%. Table 5 shows the demographic characteristics and Facebook usage characteristics of these 571 individuals, whereby less than 50% describe themselves as students.

Common method bias   In line with Podsakoff *et al* (2003), we consider that self-reported data, such as in our survey, could imply common method bias (CMB). We conducted two statistical analyses to identify the extent of CMB. First, Harman's single factor test indicates whether the majority of the variance can be explained by one single factor. The test reveals that solely 23.0% can be

explained by one single factor. Second, we added a CMB factor into the PLS model (Podsakoff *et al*, 2003; Williams *et al*, 2003) that contains every indicator of the original model. The remaining original factors were transformed into single-item constructs. Next, we compared the ratio of coefficient of determination (R^2) with CMB factor to R^2 without CMB factor. As the method factor explains a delta of R^2 of 0.005 and the R^2 without this factor of 0.768, we got a ratio of 1:154. By comparing this with prior research investigating CMB, we can state that CMB does not seem to influence our results significantly (Liang *et al*, 2007).

Measurement model   As social overload and its antecedents and consequences are measured by reflective indicators, content validity, indicator reliability, construct reliability, and discriminant validity need to be observed to validate the measurement model (Bagozzi, 1979).

Content validity   As elaborated in the measures section, the items we used have proven to be robust in prior research or were developed and validated within this paper. Hence the items are suitable measurement items. To ensure content validity, the items were discussed with active Facebook users and a pre-test was performed with a small sample of students from our institute. In the empirical survey, we used existing scales, which were adapted to our context, whenever possible. In more detail, we adapted scales for SNS exhaustion and satisfaction. For social overload, a scale was newly developed. This is described in detail below. For the dependent variable discontinuous usage intention, we used existing scales in the fields of user resistance and continuous usage research. All items are included in the Appendix (see Table A1).

Individual characteristics: We captured an individual's age and gender to measure individual characteristics of SNS users.

SNS usage characteristics: For capturing the extent of Facebook usage, participants could state whether they log in on Facebook hourly, several times a day, once daily, several times a week, once weekly, several times a month, or less than once weekly (Ross *et al*, 2009). In order to measure the number of an individual's Facebook friends, we asked participants directly how many friends they have in their friends list on Facebook.

Characteristics of relationships: To investigate the type of relationship, we used a 7-point Likert scale (1 = totally disagree; 7 = totally agree) (Manago *et al*, 2012). In addition, subjective social support norm was measured based on general research in the domain of subjective norm and social support (e.g., Barrera, 1986; Ajzen, 1991; Manago *et al*, 2012). We thus captured participants' feelings of whether or not their SNS friends, close friends, and social environment expect to assist them on Facebook. We draw on Ho *et al* (2003) and capture the construct with the help of three items and a 7-point Likert scale as above.

Social overload: We captured an individual's social overload using six items and a 7-point Likert scale (1 = totally disagree; 7 = totally agree). As no prior research discusses this concept in an empirical manner, we developed the scale based on the theoretical literature focusing on SST (see section 'Construct and Scale Development of Social Overload').

SNS exhaustion: To capture this variable, we employed the general information and communication technologies strain scale used by Ayyagari *et al* (2011), adapting it to the Facebook usage context and asking participants on their extent of SNS exhaustion using four items (1 = never; 7 = daily).

SNS satisfaction: We measured an individual's satisfaction with the SNS with the help of the scale provided by Au *et al* (2008), adapting the items to fit our Facebook context. Participants were asked to indicate their satisfaction on three items. A 7-point-Likert scale was used (1 = totally disagree; 7 = totally agree).

SNS discontinuous usage intention: We developed our own measure for the dependent variable discontinuous usage intention based on Bovey & Hede (2001) and Bhattacherjee (2001) by proposing a user resistance variable measuring discontinuous usage intention. We asked participants to specify their intention to discontinue using Facebook on a 7-point Likert scale ranging from 1 (totally disagree) to 7 (totally agree).

Indicator reliability   The indicator reliability indicates the rate of the variance of an indicator that comes from the latent variables. To explain at least 50% of the variance of a latent variable by the indicators, each value must be 0.707 or greater (Carmines & Zeller, 2008). This condition was fulfilled (see Appendix Table A1). In addition, all loadings have a significance level of at least 0.001 and hence are highly significant. This was tested by bootstrapping with 5000 samples.

Construct reliability   We used the concepts CR and AVE to determine quality at the construct level (Fornell & Larcker, 1981). CR should be higher than 0.7 and AVE higher than 0.5. As Table 6 shows, both criteria are fulfilled.

Discriminant validity   Discriminant validity describes the extent to which measurement items differ from one another (Campell & Fiske, 1959). Therefore, the square root of AVE is contained on the diagonal of latent variable correlation (Table 6). As these square root values are greater than the corresponding construct correlations (Fornell & Larcker, 1981; Hulland, 1999), we can state that this requirement has been fulfilled and the measurement model is valid.

Structural model   We made use of the coefficient of determination (R^2) as well as the significance levels of each path coefficient to evaluate the structural model (Chin, 1998). Figure 2 indicates that the six antecedents explain 36.7% of the variance of an individual's social

Table 6 Measurement model validation and bivariate correlation coefficients

Construct	Mean	Median	SD	AVE	CR	1	2	3	4	5	6	7	8	9	10
1 Age	26.1	24.0	8.31	1.00	1.00	*Single-item construct*									
2 Gender	1.55	2.00	0.50	1.00	1.00	0.11	*Single-item construct*								
3 SNS usage	6.29	7.00	1.44	1.00	1.00	−0.31	−0.09	*Single-item construct*							
4 Number of friends in SNS	193	175	115	1.00	1.00	−0.42	−0.07	0.43	*Single-item construct*						
5 Type of relationship	4.95	5.00	1.53	1.00	1.00	−0.07	−0.14	0.07	−0.04	*Single-item construct*					
6 Subjective social support norm	3.47	3.33	1.53	0.80	0.92	−0.03	−0.05	0.19	0.17	−0.08	0.89				
7 Social overload	3.67	3.33	1.37	0.65	0.92	−0.09	−0.05	0.36	0.29	−0.08	0.53	0.80			
8 SNS exhaustion	2.50	2.00	1.48	0.75	0.92	−0.07	0.03	0.17	0.18	−0.20	0.44	0.62	0.86		
9 SNS satisfaction	4.93	5.00	1.26	0.67	0.86	−0.07	−0.06	0.13	0.11	0.28	−0.24	−0.30	−0.59	0.82	
10 SNS discontinuous usage intention	2.96	2.67	1.36	0.68	0.86	0.07	0.17	−0.07	−0.06	−0.26	0.21	0.31	0.52	−0.60	0.82

Square Root of AVE is listed on the diagonal of bivariate correlations.

overload. Furthermore, social overload explains 37.9% of SNS exhaustion, 9.3% of SNS satisfaction, and 9.4% of an individual's discontinuous usage intention. Concerning the path coefficients, we can state that two hypothesized paths are not significant in the presented research model as age and gender are not significantly correlated with social overload. However, our results reveal that the extent of SNS usage, number of friends in SNS, type of relationship, and subjective social support norm are significant antecedents of social overload and that SNS exhaustion, satisfaction, and discontinuous usage intention are all significant psychological and behavioral reactions to social overload.

Post-hoc analyses

The mediating effect of social overload In the proposed research model, social overload serves as a mediator that mediates the influence of usage intensity, number of friends in SNS, type of relationship, and subjective social support norm on psychological and behavioral consequences. To test whether this mediation can be validated statistically, we used a bootstrapping method as suggested by Preacher & Hayes (2004).

The results support the argument that social overload serves as a mediator for three out of four antecedents. Table 7 includes the indirect effects for each independent variable through social overload on the three psychological and behavioral reactions: exhaustion, satisfaction, and discontinuous usage. Besides, the associated 95%-bias-corrected confidence intervals are presented (1000 bootstrap resamples). As zero is not within three out of four bias-corrected intervals, the results of the bootstrapping indicate that there is an indirect mediating effect for the extent of SNS usage, number of SNS friends, and subjective social support norm. Only type of relationship has no indirect effect through social overload on psychological and behavioral reactions.

The mediating effect of age on social overload through number of friends and usage Although age has no significant effect on social overload, bivariate correlations indicate a relationship between an SNS user's age and the two SNS usage characteristics extent of usage and number of friends in SNS (Table 6). On the basis of this, it might be justified to say that the effect is mediated on social overload through these two variables. Here, results of a bootstrapping mediation analysis (Preacher & Hayes, 2004) support this assumption (Table 8) since the indirect effect of age on social overload through usage extent and number of friends is −0.02 with a 95% bias-corrected confidence interval between −0.029 and −0.010 (1000 bootstrap resamples).

Discussion of social overload as a consequence of SNS usage

This research aims to explain social overload in SNS, its antecedents, and consequences. Rooted in sociology, we
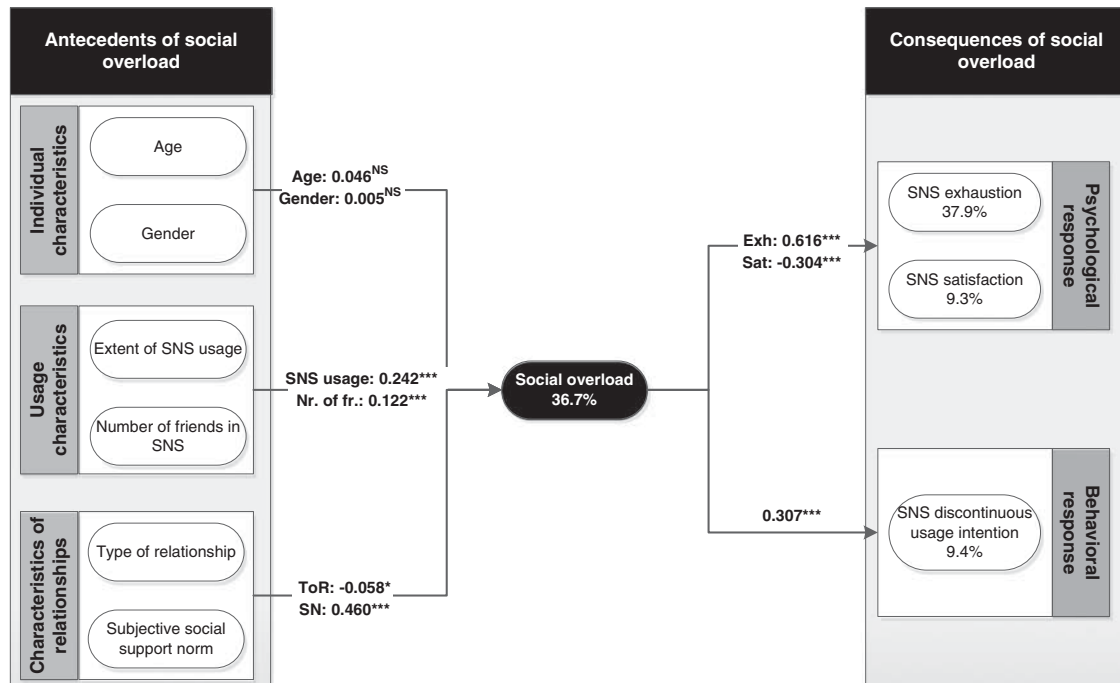
Figure 2 Structural model with research results.
$^{NS}P > 0.05$; * $P < 0.05$; ** $P < 0.01$; *** $P < 0.001$; $N = 571$.

Table 7   **Results of mediation effect of social overload**

Independent variable	Mediator	Dependent variable	Bootstrapping results		
			Indirect effect	Lower	Upper
				Bias-corrected confidence interval	
Extent of SNS usage	Social overload	Exhaustion	0.25	0.182	0.317
		Satisfaction	−0.12	−0.173	−0.071
		Discontinuous usage intention	0.14	−0.084	0.195
Number of friends in SNS		Exhaustion	0.03	0.001	0.004
		Satisfaction	−0.01	−0.003	−0.001
		Discontinuous usage intention	0.02	0.001	0.003
Type of relationship		Exhaustion	−0.04	−0.105	0.026
		Satisfaction	0.01	−0.050	0.035
		Discontinuous usage intention	−0.02	−0.050	0.004
Subjective social support norm		Exhaustion	0.25	0.189	0.322
		Satisfaction	−0.08	−0.141	−0.023
		Discontinuous usage intention	0.12	0.052	0.178

introduce the concept of social overload and discuss its importance in the context of SNS usage. For presenting the results, we first focus on the new concept of social overload, followed by its antecedents and, finally, its consequences.

We first clarified the concept of social overload in a series of interviews and found that users experience disclosed social demands as a negative side of SNS usage. Furthermore, a quantitative study empirically validates that SNS users experience social overload. In addition to

verifying the existence of social overload as one particular dark side of SNS usage, we identify several antecedents and consequences of social overload that will be discussed in the following.

Antecedents of social overload
To better understand the phenomenon of social overload, we focused on factors causing this perception. Notably,

Table 8 **Results of mediating effect of age on social overload**

Independent variable	Mediators	Dependent variable	Bootstrapping results		
			Indirect effect	Lower	Upper
				Bias-corrected confidence interval	
Age	Extent of SNS usage Number of friends in SNS	Social overload	−0.02	−0.029	−0.010

36.7% of the variance in social overload was explained by individual characteristics (age and gender), usage characteristics (number of friends and extent of usage), and relationship characteristics (type of relationship and subjective social support norm).

Elderly people use SNS differently and experience social overload less frequently Despite earlier literature suggesting that elderly people have lower risks of suffering from social overload because of their greater experience in dealing with negative stimuli (H1) (Ragu-Nathan *et al*, 2008), age turned out to be not a significant predictor of social overload ($\beta = 0.046$, $t = 1.395$). Interestingly, though, *post-hoc* analyses reveal an indirect effect of age on social overload through number of friends in SNS and usage extent (Table 8). The rationale is that older SNS users, indeed, experience social overload less frequently, yet not because of their age but because, on average, they have a smaller number of SNS friends and use Facebook less excessively.

Extensive usage and high numbers of SNS friends create social overload Accordingly, the extent of SNS usage and the number of friends are two direct and significant antecedents of social overload (H3 and H4; Usage: $\beta = 0.242$, $t = 6.221$; Friends: $\beta = 0.122$, $t = 3.025$). Intensity of SNS usage and number of friends in SNS go along with the experience of social overload.

Social relationship characteristics cause social overload Social subjective norm, that is, an individual's assumption that one is obliged to respond to SNS requests, and the type of SNS relations, that is, the number of online-only friends as compared to contacts that are offline friends as well, are significantly related to social overload (H5 and H6; Type: $\beta = -0.058$, $t = 1.682$; Norm: $\beta = 0.460$, $t = 13.038$). This supports our argument that individuals experience social overload more frequently when they have more online-only friends, that is, SNS contacts that are not part of the individual's offline network, and when

there is a strong social expectation to respond to social requests posted on SNS.

Consequences of social overload

In addition to antecedents of social overload, we also evaluate reactions of SNS users to the perception of social overload.

Social overload as source of SNS exhaustion and low user satisfaction The presented model proposes psychological reactions to social overload. In more detail, we propose that users feel exhausted and show low levels of satisfaction with the SNS when they experience social overload (H4 and H5). The analysis reveals that both variables are significant (Exhaustion: $\beta = -0.616$, $t = 18.691$; Satisfaction: $\beta = -0.304$, $t = 7.326$) and that 37.9% of the variance in exhaustion and 9.3% of the variance in satisfaction is explained by the newly proposed variable.

Individuals reduce or stop using SNS because of social overload Overall, 9.4% of the variance in discontinuous usage intention is explained by social overload (H6) and the correlation between both concepts is empirically significant ($\beta = -0.307$, $t = 5.756$). This confirms that individuals react in a behavioral manner to social overload and that users might reduce usage intensity or even radically stop using SNS because they experience giving too much social support to their SNS-enabled social network.

Implications, limitations, and future research

On the basis of the findings, the following subsections discuss the contributions to research, contributions to practice, limitations, and opportunities for future research.

Contributions to research

Social overload is a SNS-specific usage inhibitor and technostressor Social overload has been conceptualized as a negative consequence of technology usage. These perceptions are defined by prior research as either technology inhibitors or stressors. Inhibitors are perceptions that solely discourage usage (Cenfetelli & Schwarz, 2011) while stressors induce feelings of exhaustion (Ayyagari *et al*, 2011). As the proposed concept of social overload can be understood as both an SNS-specific inhibitor and stressor, the results contribute to both research streams and can be used in future studies revealing additional negative consequences of SNS usage and analyses on stress caused by SNS.

SNS can have negative consequences for social support providers Our proposed concept of social overload has been theoretically developed based on SST and, in particular, a perspective of enacted social support (Barrera, 1986) that focuses on those individuals who provide social support to their social network. Our results clearly show that those individuals can give too much social support on SNS and

hence suffer from exhaustion and lower levels of satisfaction. The results thereby contribute to SST by proposing and evaluating the negative consequences of enacted social support for the social support provider himself/herself. As SST studies largely focus on the benefits of receiving social support and how social embeddedness can provide care to individuals with problems, we extend SST by also considering the role of the caregiver and illustrate that giving social support does not just have positive effects for support requesters. The results do not indicate that providing social support *per se* is good or bad; but with increasing overall SNS usage and a growing numbers of social relationships embedded in SNS, and especially those that are online-only friends, our findings show that there is a so far unidentified risk of perceiving social overload that manifests as feelings of giving too much social support in a digital-enabled social network.

Extensive technology usage does not always foster continuous usage intentions   From a technology adoption and usage perspective, another interesting conclusion is that social overload mediates the relationship between extent of usage and discontinuous usage intention. Previous studies have revealed a direct and positive influence of usage on behavioral intention (Kim, 2009) so that more intense technology usage will predict a higher intention to continue using this technology in the future. Our results extend this understanding and indicate that – in the presence of social overload – higher usage intensity can also be associated with lower intention to continue using the technology as users perceive a negative consequence of using that technology.

Age has no direct effect on technology perceptions, but a mediated effect through usage and number of friends
While the age of individuals is discussed widely when evaluating user reactions to technologies (Agarwal *et al*, 2009), there is no clear picture yet. For instance, Burton-Jones & Hubona (2005) report that age and perceived ease of use are significantly related. In contrast, Sipior *et al* (2010) could not support this finding. Similarly, much IS research focusing on negative consequences of technology usage find somewhat surprisingly that age is not related to computer phobia or stress (Hudiburg, 1989). But other recent IS research could identify a significant relationship between age and the perception of negative consequences in a way that stress decreases when age increases (Ragu-Nathan *et al*, 2008). Our analysis might offer a unifying argument in this context as our results reveal that age does, indeed, have an impact on technology perception; but this impact is not direct but mediated through usage characteristics like number of friends or extent of usage. In other words, elderly users are less stressed through SNS, but the reason is not so much that they have more life experience, for example,

but that they have fewer online SNS friends and log in to SNS less often.

Contributions to practice
The presented research also has implications for organizations, SNS users, and SNS providers.

Organizations should consider introducing policies for internal SNS to avoid social overload   As described earlier, organizations use SNS for internal (Majchrzak *et al*, 2009; Koch *et al*, 2012) as well as external (Culnan *et al*, 2010) communication. When using internal closed SNS for communication or file sharing between employees, organizations have to be aware that these SNS can also cause unintended consequences like social overload. However, when employees experience negative perceptions while using the internal SNS, higher levels of exhaustion will reduce their usage behavior and they will establish workarounds or show resistant behaviors (Kim & Kankanhalli, 2009). In line with our findings, these psychological and behavioral consequences are to be feared in particular when employees ask others for assistance in closed SNS. Firms could reduce the risk of social overload by publishing policies that state how internal SNS should be used and what is to be avoided. Our results suggest that a policy for internal SNS usage that restricts the number of social connections, limits usage intensity, and fosters offline relations between the online collaborators can avoid such negative consequences.

SNS users could actively reduce social overload   Our analysis indicates that social overload can have psychological and behavioral consequences. While much research is needed to identify and evaluate different coping mechanisms, our results suggest that an individual is likely to reduce social overload and the perception of giving too much social support by reducing the number of friends in SNS, particularly those only known in the online world, by reducing usage frequency, and possibly by challenging the social support norms.

SNS providers might consider filtering users' disclosures to exist over the long run   Our findings place SNS providers in a dilemma. On the one hand, SNS providers competing for attention and advertisement revenue want many highly active users. On the other, as the analyses have shown, too many too active users might cause social overload and thereby some users to reduce their usage. Before more research on this fine balance is available, platform providers might consider offering a critical mass of messages to each user and offering filter mechanisms that allow users to see the commercially and socially most relevant messages but avoid suffering from social overload.

Limitations and future research
There are some limitations to the results we provide in this paper. For the empirical evaluation, we only used Facebook.

The advantage is that this SNS has the most users and is, at this point in time, the most relevant. We therefore cannot rule out other results in other public or firm internal SNS, particularly when users have different numbers and types of relations on those SNS or use them mandatorily. Also, as all participants are from Germany, social overload may be perceived differently in other countries and in different cultures. In addition, our research is based solely on beliefs at a single point in time. As a consequence, a user's behavioral reaction to social overload is measured with behavioral intentions. Future longitudinal research should examine whether these intended behavioral reactions are also transferred into behavior.

The results of our research might also not be replicable without modifications to social support behavior outside the world of SNS. For example, the bystander effect known from sociology assumes that, in public, the more people are present, the less inclined is an individual to step forward and provide social support. Future research might compare differences and similarities in offline and online worlds. In this context, it might be also important to focus more on the interplay between SNS usage behavior, actual social support behavior, and the perception of social overload by SNS users, which has not been investigated by this study.

In addition, we do not discuss any coping strategy on how to avoid social overload induced while using SNS. Hence, future research might identify and evaluate measures to avoid negative perceptions of SNS usage and their consequences. In this context, we also do not include other negative perceptions (e.g., technology-based stressors) that have been discussed by prior research and might have an impact on the dependent variables analyzed.

Therefore, we encourage future research to compare different negative perceptions like technology-based stressors and their impact on different outcome variables.

Furthermore, the perception of social overload might vary from individual to individual. In order to address this shortcoming, in addition to investigating the individual characteristics included in our study, future research should also investigate the influence of personality traits, such as extraversion or altruism, on social overload. Among other results, this might reveal whether there is a predisposition for social overload on SNS.

Conclusion

This research introduces and evaluates social overload as a negative consequence of SNS usage. Social overload is when SNS users perceive they are giving too much social support to their friends in SNS. Consequently, they feel exhausted or unsatisfied with SNS. In addition to the physiological reaction of exhaustion, a behavioral consequence can be reducing SNS usage intensity. Among the tested causes of social overload, the number of friends in SNS, extent of usage, type of relationship, and subjective social support norm are disclosed as direct influencing factors. We conclude by realizing that social overload is part of our online lives, and that we need to manage it. The truth is, however, that we create most of it ourselves.

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Appendix

Table A1   Measurement items

Construct	Items	Factor loadings	Reliability α
Extent of SNS usage[a]	Actual, I am using Facebook …	1.000	—
Number of friends in SNS[b]	How many friends do you have in Facebook?	1.000	—
Type of relationship	Many of my Facebook friends are also friends in my real (offline) life.	1.000	—
Subjective social support norm	My Facebook friends expect me to assist them on Facebook.	0.900	0.88
	My close friends expect me to assist them on Facebook.	0.884	
	My social environment expects me to assist them on Facebook.	0.897	
Social overload	I take too much care of my friends' well-being on Facebook.	0.836	0.90
	I deal too much with my friends' problems on Facebook.	0.855	
	My sense of being responsible for how much fun my friends have on Facebook is too strong.	0.807	
	I am too often caring for my friends on Facebook.	0.773	
	I pay too much attention to posts of my friends on Facebook.	0.790	
	I congratulate Facebook friends as a consequence of the birthday reminder, although I would not congratulate them in real life.	0.763	
SNS exhaustion[c]	I feel drained from activities that require me to use Facebook.	0.821	0.89
	I feel tired from my Facebook activities.	0.860	
	Using Facebook is a strain for me.	0.877	
	I feel burned out from my Facebook activities.	0.895	
SNS satisfaction	I am very contented with Facebook.	0.771	0.81
	I am delighted with Facebook.	0.760	
	Overall, I am very satisfied with Facebook.	0.915	
Discontinuous usage intention	I will unregister in Facebook.	0.892	0.80
	In the future, I will use another social network site.	0.771	
	In the future, I will use Facebook far less than today.	0.798	

[a]Scale ranges from several times a day (1) to once a month (8); Extent of SNS usage was reversed coded.
[b]Any random number could be stated.
[c]Scale ranges from daily (7) to never (1) otherwise, a 7-point Likert scale is used (1 = totally disagree; 7 = totally agree).