

**Twitter Breaks the News:  
Influencing Factors on Sharing News in Twitter**

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# *Chapter 1 | Introduction and Overview*

## Twitter Breaks the News

“New York plane crash: Twitter breaks the news, again”<sup>1</sup> was the headline of the Telegraph January, 26, 2009 (Beaumont, 2009, [www.telegraph.co.uk](http://www.telegraph.co.uk)) about the plane crashing in the New York’s Hudson River. It is only one example of events that reveals some of the crucial characteristics that Web 2.0 brought along: First, spreading news is easy; the manifold options of social media applications, such as Facebook or Twitter, allow for people to spread news by a simple mouse click. Second, spreading news can be done in real time, also because of the various social media channels and because of the mobile access options that people have. Finally, everybody can take part in this game, which means that professional journalists and news media do not hold the monopoly of spreading news any longer.

This trend is important as news is an integral part of daily life: News gives information and orientation, builds and shapes public opinion, helps people to reduce uncertainty and helps to create impressions of the world. News is an object of discussions among housewives as well as among politicians. News can be good or bad; no news usually is interpreted as good news, which means that breaking news often is referred to as bad news. News is a commodity (Shoemaker, 2006) not only since Lippmann in the early 1920s asked for the value of news (Lippmann, 1922); people buy newspapers; advertisers pay for ads broadcasted before the main daily news program on TV; public relation managers sell news for attention. Taken together, modern civil life without any news is hardly imaginable. This applies even more ever since Web 2.0 and its changed conditions and opportunities came up.

The popular microblogging system Twitter allows users to write, read, and share short messages, so-called tweets. It is a Web 2.0 application that plays an important role in

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<sup>1</sup> <http://www.telegraph.co.uk/technology/twitter/4269765/New-York-plane-crash-Twitter-breaks-the-news-again.html>



breaking news (e.g., Whitney Houston’s death in February 2012, or the Boston Marathon bombing in April 2013) but also in planning and orchestrating mass protests and demonstrations (e.g., the “Arab Spring”, or the “London’s G20 riots”, Hachman, 2013, [www.pcmag.com](http://www.pcmag.com))<sup>2</sup>. Hence, Twitter has become an essential factor for information dissemination, viral marketing, search, expertise and influence discovery, or for mobilizing people (Lerman & Gosh, 2010). Because of its viral power (Hansen, Arvidsson, Nielsen, Colleoni, & Etter, 2011) and its potential to touch the masses, Twitter has been object of research in many respects. Among other things, research interests have been addressing user intentions in the past years (Java, Song, Finin, & Tseng, 2007). In one of the first studies on Twitter, Java et al. (2007) found that users had three main intentions for using Twitter: daily chatter, conversations, sharing information and reporting news. This might have been a first indication of the potential that Twitter has as a news and information source. The authors further concluded from their network analysis of the link structure, first, that there existed three main categories of users: information sources, friends, and information seekers, and second, that the adoption of Twitter was the highest in Tokyo, New York, and San Francisco (Java et al., 2007). Regarding network structure, Lerman and Gosh (2010) investigated information spread in different social networks. They claimed to have done the first study that made network structures actually visible compared to only inferring the network by observing the information flow. As a result, they found that Twitter networks are less dense compared to other networks and that news is spread initially more slowly but more constantly and farther within the network (Lerman & Gosh, 2010). This would be in line with the assumptions of Granovetter (1973) that so-called weak ties (which exist in a less dense and less interconnected network) are the most important ones for getting new and

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<sup>2</sup> <http://www.pcmag.com/slideshow/story/310559/6-stories-that-broke-on-twitter/2>

helpful information. Kwak, Chun, and Moon (2011) investigated at first a behavior that they call unfollowing, that is, terminating relationships in Twitter. To do this, they collected Twitter data and conducted interviews. As a result they found that the main motives for unfollowing other Twitter users are if those Twitter users “left many tweets within a short time, created tweets about uninteresting topics, or tweeted about the mundane details of their lives” (Kwak et al., 2011, p. 1091). Thus, although daily chatter was identified as a main intention for usage (Java et al., 2007), information should reach a minimum of interestingness or relevance for the recipient in order to keep up the relationship. As information and news should be not only interesting but also of high quality, source credibility moved into the focus of research, too. For instance, Morris, Counts, Roseway, Hoff, and Schwarz (2012) concluded that users are influenced more by heuristics such as user names than by content alone in order to judge credibility. Similarly, Westerman, Spence, and Van Der Heide (2012) found that the number of followers influences users’ perception of expertise and trustworthiness of the information source. Further, Twitter was also considered within research on political involvement (Park, 2013), on sentiments in Twitter messages (Kim, Bak, & Oh, 2012; Thelwall, Buckley, & Paltoglou, 2011), on processes of word-of-mouth (e.g., Jansen, Zhang, Sobel, & Chowdury, 2009), on impression management (Marwick & Boyd, 2011), on rumor (Mendoza, Poblete, & Castillo, 2010; Oh, Agrawal, & Rao, 2013) or on diffusion of innovations (Cha, Haddadi, Benevenuto, & Gummadi, 2010; Chang, 2010), and in the contexts of social presence, and learning (e.g., Dunlap & Lowenthal, 2009; Rinaldo, Tapp, & Laverie, 2011).

Further, a subject of interest was also how Twitter changed journalism practices and work routines in news organizations, and how it emerged as an complementary journalism tool driven by non-professional journalists, that is, by citizens (e.g., Ahmad, 2010; Armstrong & Gao, 2010; Bandari, Asur, & Huberman, 2012; Bruns & Burgess, 2012; Hermans &

Vergeer, 2009; Hermida, 2010; Papacharissi & de Fatima Oliveira, 2012; Poell & Borra, 2012). For instance, Bandari et al. (2012) noticed that because in Twitter news media can spread their news effectively and to a large population, it is common for many major news sources to have active accounts to take advantage of Twitter's spreading mechanisms. Further, Ahmad (2010) argued, on the one hand, that journalists and editors use Twitter as marketing tool and collaborative research tool. On the other hand, however, Twitter allows for forms of real-time participation in news spreading by citizens, which actually raises questions of identity for journalists (Ahmad, 2010). In a similar manner, Hermans and Vergeer (2009) had already found as a result of their survey that Internet use might have advantages and disadvantages for journalism: Whereas Internet allows for fast and easy research and provides new information sources and thus enriches journalism, it also threatens professional values since time pressure increases, leading to hasty and sloppy work. Twitter not only influences first-hand journalism, that is, reporting about actually occurring events, but also ongoing discussions and additional information for further comprehension of events. In this sense, Bruns and Burgess (2012) discussed several research approaches to investigate reactions, discussions and ongoing news spreading from the Twitter base, including network analysis, development of topics and discussions over time, and identifying key users. Both types of Twitter usage first-hand reporting and ongoing discussions, might occur especially in times of crisis when there is no access to mainstream media. In this manner, Papacharissi and de Fatima Oliveira (2012) investigated news flow and storytelling with Twitter around the revolution in Egypt in 2011. They found that Twitter reporting and traditional mainstream reporting have several incompatibilities with respect to traditional journalistic values, as it is the case with, for example, real-time reporting versus fact checking (Papacharissi & de Fatima Oliveira, 2012). Finally, Hermida

(2010) suggested that Twitter with its fast sharing of news and events is an expression of a so-called ambient journalism as it provides news any time all around us.

A feature of Twitter that makes spreading news especially very quick and easy is *retweeting*. Retweeting means to forward a tweet to other users, namely, the followers. Followers are those people in Twitter who are subscribed to accounts of other Twitter users and receive their written or shared messages. Retweeting can be done by copying the respective tweet and adding “RT” to it or just by a simple mouse click. The latter way might be the one which made the idea of spreading information and news easily so popular. As retweeting is one of the mechanisms being responsible for the phenomena of virality and real-time information, it has been topic of interest to researchers in respect to various aspects of retweeting motivations and determinants. For example, Boyd, Golder, and Lotan (2010) studied retweeting from a conversational perspective. In case studies in which they asked Twitter users for retweeting reasons, they found that reaching new audiences, entertainment, and seeking for validation were among the most frequently mentioned reasons for retweeting (Boyd et al., 2010). In a content analysis, Kwak, Lee, Park, and Moon (2010) found that among the most retweeted tweets news made up a substantial part. They thus concluded that Twitter might be regarded as a news medium. Zarella (2009) came to a similar result and found that news was retweeted very often. In a large scale study, Suh Hong, Pirolli, and Chi (2010) found that using URLs and hashtags (i.e., metadata tags with the symbol # in order to group messages to a topic or meaning; hashtags are searchable) in a tweet was highly related to being retweeted. Among contextual factors, the number of followers seemed to affect retweeting decisions (Suh et al., 2010). This could be in line with findings that the number of followers is related to perceptions of expertise and trustworthiness (Westerman et al., 2012); and thus, expertise and trustworthiness might be related to retweeting. In the same vein, Liu,

Liu, and Li (2012) investigated retweeting on the basis of the Heuristic-Systematic Model (Chaiken, Liberman, & Eagly, 1989) and concluded that both, heuristic (source trustworthiness, source expertise, and source attractiveness) and systematic cues (number of multimedia features in information) had impact on retweeting. Further, retweeting is also connected to political communication as a study by Lee, Ryu, Mon and Park (2013) showed: They found that several retweeting patterns were related to actual voting poll results. In order to investigate which kind of news is going to be spread more easily than others, it makes sense to have a look at content characteristics of tweets. With respect to sentiments as a factor influencing retweeting decisions, research yielded inconclusive results. For example, Hansen et al. (2010) found that negative news has more viral potential than positive news. In contrast, Berger and Milkman (2012) showed that positive news was actually more viral. Finally, Pfitzner, Garas and Schweitzer (2012) found that overall sentiments did not influence retweeting, instead only emotional divergence did.

Most of these studies that have investigated Twitter and retweeting have at least one of the following characteristics: First, they investigated phenomena from a macro-perspective and gathered a huge number of real tweets. Second, many researchers followed a bottom-up approach in order to find out which tweets were retweeted most, meaning that their studies were data-driven. However, to my knowledge, there are no studies that have investigated retweeting under controlled conditions and with a top-down approach. This would allow for drawing causal conclusions about factors that influence retweeting by manipulating concrete factors while keeping other potential influences constant. Moreover, with respect to replicability and transparency, experimental studies have an advantage over data-driven field studies. The present dissertation aims to fill this gap by investigating retweeting of news,

first, under controlled conditions, and second, by proposing different, theoretical driven factors that are responsible for people's decisions of selecting news to share with others.

## **News Selection**

In order to investigate which kind of news is going to be retweeted more often than others, I suggest drawing on theory of news selection, a research field that includes several traditions and approaches of selection. In the field of news selection, which developed in the US and in Europe parallel to each other, Kepplinger (1989) identified three main traditions: studies about gatekeeping, studies about news bias, and studies about news value. Selection decisions are assumed to involve interactions of contents and actors (i.e., deciding persons). Thus, the approaches that investigate the journalistic selection process could be differentiated by whether they focus more on properties of actors or more on properties of events (Maier, Stengel, & Marschall, 2010). Among the actor-oriented approaches, studies on gatekeeping concentrated on the identity of journalists and organizational circumstances. Especially in the US, the gatekeeping approach is understood more as a general approach to explain news selection (e.g., Shoemaker, Eichholz, Kim, & Wrigley, 2001). Then, news bias studies focused on how news is presented, depending on the political color of the editorial board. Taken together, actor-oriented approaches focus on attitudes, knowledge, values, and working routines of journalists and editors. In contrast, research on news value theory could be understood as an event-oriented approach as properties of the content itself are considered to be used as selection criteria (Maier et al., 2010). Moreover, news value theory has an extended scope compared to gatekeeping or news bias approaches as it also considers the selection decisions of recipients. Therefore, news value theory seems to be applicable as a starting point for investigating selection decisions in Web 2.0 contexts, in which users easily change their roles between recipients and producers. Moreover, in Web 2.0 every user can

take part in the process of spreading news even without having professional constraints or sophisticated selection criteria. Thus, in the following, I will give a short overview of the approaches of gatekeeping, news bias, and news value while concentrating then on news value theory as basis for my further considerations.

At the beginning of the gatekeeper research tradition, there was the case study by White (1950), who asked the editor of a local newspaper to give a reason for all events that he did not publish. As a result, White (1950) concluded that it is the editor with his preferences and attitudes who is responsible for whether an event passes the editorial “gate” in order to get published or not rather than the events themselves. Therefore, the approach is named gatekeeping. For instance, the editor in White’s case study preferred political topics and disregarded human interest issues (White, 1950). In a broader sense, also Breed’s (1955) study about social control in the newsroom covers the aspect of how an editorial policy leads to individual and organizational constraints. These constraints then influence journalists and editors in their selection decisions. As a result of his interviews with journalists, Breed (1955) argued that a publisher sets a policy, which usually is followed by the journalistic staff. Several social forces, such as sanctions or group behavior in the newsroom, make the newspaper staff commit to the policy (Breed, 1955). Later, Reese and Ballinger (2001) reviewed both studies from a sociological perspective and concluded that both studies were among the first ones that asked about how news making does work and that journalism still has the power “to shape public life” (Reese & Ballinger, 2001, p. 654). In a similar manner, Shoemaker et al. (2001) conceptualized gatekeeping as “[...] the overall process through which the social reality transmitted by the news media is constructed, and [...] not just [as] a series of ‘in’ and ‘out’ decisions” (Shoemaker et al., 2001, p. 233). In the context of Twitter, for example, also processes of “gatewatching” occur (Bruns & Burgess, 2012, p. 802):

Twitter users highlight, share, and evaluate relevant material that was published by other sources in order to develop a better understanding.

At the beginning of the news bias tradition, there was an early study by Klein and Maccobby (1954) about newspaper objectivity. They found that newspapers prefer news that fits into their own political viewpoint and give such news more or at least more prominent space. To this line of research belong also the approaches of instrumental actualization (e.g., Kepplinger, Brosius, & Staab, 1991) and of opportune witnesses (Hagen, 1992). Instrumental actualization occurs within conflicts that are covered by news media and means that arguments and events that support one of the conflict protagonists (i.e., that are instrumental) are published. The question arises whether and how news media use instrumental actualization purposely. Kepplinger et al. (1991) conducted surveys and content analysis and found that many journalists accepted highlighting of information that supports their issue position and that the valence of the news coverage was correlated to the editorial tendency. Analogously, Hagen (1992) found that persons that take a position in a conflict were highlighted if they supported the newspapers' view of the conflict. In my master's thesis about the news bias phenomenon, I could show that Italian newspapers that belong to the Berlusconi-family reported about one of the bills that would have protected Berlusconi from accusation in 2008 more in favor of Berlusconi and against the political opposition. In contrast, newspapers that were independent from the Berlusconi-family took the opposite view (Rudat, 2009).

At the beginning of the news value tradition, there was Lippmann's (1922) essay about the actual value of news(papers). He argued that journalists neither report the world as it is nor do they publish events that nobody is interested in. Thus, only if events fulfill certain criteria, does the news value increase and journalists report about them (Lippmann, 1922). However, Lippmann did not empirically investigate what kind of characteristics these are. Later, in the



1960s and 1970s, two research traditions emerged parallel to each other and nearly independently: one in the US and one in Europe (Eilders, 2006; Staab, 1990b). In Europe, Galtung and Ruge (1965) identified and described criteria, the so-called *news factors*, which make events become news. Most of the following European research on news value was built on or at least inspired by their work (e.g., Østgaard, 1965; Rosengren, 1974; Sande, 1971; Schulz, 1982; Staab, 1990a). In the US, not only Lippman (1992) explored what makes events become news, but also other researchers investigated characteristics of news and selection criteria of journalistic publishing decisions (e.g., Badii & Ward, 1980; Breed, 1956; Buckalew, 1969; Schramm, 1949; Shoemaker, 1996, 2006; Shoemaker, Chang, & Brandlinger 1987, Shoemaker & Reese, 1996). For example, Shoemaker et al. (1987) could show that news that was deviant to existing norms was regarded as newsworthy by US news media. Hence, deviance was considered as a good predictor of which news is going to be selected for publication and which not (Shoemaker et al., 1987). However, although Galtung and Ruge (1965) published their work in English, it has not become widely known in the US (Eilders, 2006). This might be the reason for the fact that in the US tradition, research on newsworthiness has been broader and less concentrated on a single concept of news value but often includes approaches of gatekeeping and news bias. In contrast, European research on news value mainly focuses on news factors.

To conclude, whereas gatekeeping and news bias focus on journalistic actors, news value focuses on content characteristics. Moreover, news value theory describes and explains selection decisions not only by journalists but also by recipients. Thus, I regard news value theory as a reasonable basis for investigating selection decisions for retweeting.

This is where the story might have ended if this dissertation would have been written in a purely communication scientific research environment. At least it would have taken another direction such as, for example, comparisons of different media or media sources regarding the influence of news values on retweeting. However, the psychological research atmosphere that I have been exposed to inspired me not only to follow the path of experimental research, but also to rethink news values in the context of Web 2.0. Moreover, I was also inspired to ask for other reasons and phenomena that could further influence retweeting decisions. Therefore, I first re-examined news value and news factors from a rather psychological perspective and came up with the notion of *informational value*, which will be discussed in the following. Second, informational value as a criterion inherent in the news should not be the only influence on retweeting decisions. Instead, and this is what is easy to expect in the context of Web 2.0 and social media, contextual criteria regarding other users should also influence people in what to retweet and what not. However, due to my background in communication science, I regard informational value as a main influencing factor and therefore it was considered in all empirical studies, whereas the above mentioned contextual criteria were added consecutively as potential moderators. In the following, I will discuss all potentially influencing criteria on retweeting, starting with the content criterion informational value.

## **Informational Value**

Based on the approach of news value, I developed a concept that is applicable to retweeting decisions as it re-examined news factors and selection decisions in the Web 2.0 context from a more psychological perspective rather than considering professional criteria only. The concept is named informational value and I define it as a property that first, makes news meaningful for a large audience and that second, has the potential to impact the minds or

behavior of others. Both properties should be important for retweeting decisions for several reasons. First, Twitter users are supposed to take care of their (imagined) audience (Marwick & Boyd, 2011) in order to remain a meaningful news source for it. In doing so, Twitter users can reach a preferential attachment, which means that the more attractive the retweeted news is to the followers, the more the followers keep interested in what is going to be spread next (Lasorsa, Lewis, & Holton, 2012). Further, as Boyd et al. (2010) argued, tweeting and retweeting also means to bond to other users, that is, to establish relationships and to care about the audience. Finally, retweeting can bridge distinct communities as news can reach different network clusters and therefore, retweeting users might regard themselves as “information brokers” (Bruns & Burgess, 2012, p. 803). Hence, Twitter users intend to preserve their presence by keeping contact and caring about what to retweet to their audience. This refers also to reasons of social exchange value or generating reciprocity as motivations for sharing news (e.g., Berger & Milkman, 2012; Fehr, Kirchsteiger, & Riedl, 1998; Gantz & Trenholm, 1978; Homans, 1958). According to this line of reasoning, I conceptualized the notion of informational value. News factors have high informational value if they meet two requirements: if they concern a large audience and/or have the potential to impact the minds or behavior of the audience.

In the following, I will describe eight news factors that have turned out to be stable over years of research and that I will use for my studies (see Table 1). To start with, the news factor Aggression is contained in news that reports about threatened or practiced violence. For instance, if after a popular soccer game the fans start to fight with each other, the event’s characteristic Aggression could be the reason for the event getting published. Second, the news factor Controversy means that the news explicitly presents differences of opinions of two or more parties. The story does not have to present all existing viewpoints but it should

make clear that there is a conflict about an issue. For example, in the last German federal election campaign, there was a controversy among the political parties about whether and, if so, which taxes should be raised. By covering such a topic, news media usually respond to the news factor Controversy. Third, the news factor Negative Consequences comes into play if there are possible or actual negative consequences of events or developments. In such cases, those consequences will be mentioned explicitly in the news. Probably many people remember when the news reported about people who contracted listeriosis after having eaten a certain cheese. In this case, an actual negative consequence of a behavior was existent and news media covered this case by warning their audience. Fourth, the news factor Personalization occurs if individuals get a special meaning within an event. One person or a few people who stand for a group or a company are, regardless of their function, illustrated or even portrayed. Personalization might take place if, for example, out of a group taking part in an official strike, one person is interviewed and speaks about his or her motivations and goals. Fifth, the news factor Prominence means that news is about a popular person while his or her popularity exists regardless of the actual political or economic power. News about celebrities usually makes use of this news factor. A recent example was the birth of the British heir to the throne. Sixth, the news factor Proximity is contained in news that is about an event within a short geographical distance. For instance, local news of Tübingen such as a mayoral election is certainly more interesting for people in and around Tübingen than for people in Hamburg. Seventh, the news factor Relevance comes into play if an event or a development does already or will directly affect a large number of people. If the aforementioned controversial discussion about raising taxes would affect the sales tax, then the news additionally would benefit from the news factor Relevance (compared to if only the maximum tax rate would be raised). Finally and eighth, the news factor Unexpectedness means that news is about an event or a development that could not be predicted or stands in

contrast to existing expectations. After the last federal election, the news would have drawn on this news factor if the government coalition had actually become a conservative-green one.

Table 1

*Alphabetically Sorted List of News Factors, Their Meaning (cf. Ruhrmann & Göbbel, 2007; Translation by the Authors) and Psychological Functions Related to Selection Decisions of Twitter Users*

News factor	Meaning	Large audience and/or impact on the audience
Aggression	The message is about threatened or practiced violence.	No
Controversy	The message explicitly presents differences of opinions.	Yes
Negative Consequences	The possible or actual negative consequences of events are explicitly mentioned in the message.	Yes
Personalization	Individuals are given a special meaning within an event in the message. One person or a few people are illustrated or even portrayed standing for a group or a company.	No
Prominence	The message is about a popular person, popularity regardless of his or her actual political/economic power.	No
Proximity	The message is about an event within a short geographical distance.	No
Relevance	The message contains an event or a development that does already or will directly affect a large number of people.	Yes
Unexpectedness	The message is about an event or a development that cannot be predicted or stands in contrast to existing expectations.	Yes

Although all of these news factors in general have news value, that is, the power to turn events into news, I regard some of them as more meaningful for retweeting decisions than others. Four out of the eight news factors I assume to have high informational value, that is, the potential to affect a large audience and/or to impact the audience's mind (see Table 1). The four news factors with assumed high informational value are Controversy, Negative Consequences, Relevance, and Unexpectedness. In the following, I will explain why I regard these news factors as having high informational value: Controversy refers to conflicting viewpoints. From psychological research, it is known that conflicts might cause critical thinking and elaboration (e.g., Johnson & Johnson, 1993). As conflicts include different opinions or arguments, the aspect of deviance (Shoemaker et al., 1987; Shoemaker & Cohen, 2006) comes into play. Deviant information leads to elaboration as existing schemata need to be adapted in order to integrate new information (Rumelhart, 1980). Thus, Controversy has the potential to affect mental structures of the audience since people usually tend to avoid negative consequences. Imminent negative consequences make affected or potentially affected people reflect and plan how to escape the threat. However, plans and expectancies might not be satisfied and therefore need to be changed in order to reduce cognitive dissonances (Festinger, 1968). Hence, the news factor Negative Consequences has the potential to restructure the audience's mind. Further, Relevance is by definition a news factor which characterizes events that might be or are meaningful to a large audience. The higher the relevance the more it is likely that a person might be directly affected (Eilders, 1997). Events that are ascribed with the news factor Relevance are of high social significance as they are important for the social system (Shoemaker & Cohen, 2006). Further, such events are often complex and are perceived as problem-oriented concepts rather than as single events (Fretwurst, 2008). They are stored in the semantic memory (Kintsch, 1974; Tulving, 1972) and are therefore more deeply elaborated. Finally,

Unexpectedness refers to events that could not have been expected or that developed in another way than expected. In this case, expectancies need to be corrected in order to reduce cognitive dissonance (Festinger, 1968). In general, events and information that are deviant arouse attention (Shoemaker et al., 1987) and need to be integrated into mental structures by shaping and adapting existing schemata (Rumelhart, 1980). In contrast, the news factors Aggression, Personalization, Prominence, and Proximity do not meet any of these requirements that would be necessary for having high informational value. Therefore, these news factors are considered to have only low informational value.

To conclude, there are news factors that have the potential to affect a large audience and/or to impact mental models of the audience. I have summarized these potentials under the notion of informational value. According to this line of reasoning, the news factors Controversy, Negative Consequences, Relevance, and Unexpectedness have high informational value. In contrast, the news factors Aggression, Personalization, Prominence, and Proximity have only low informational value.

As already mentioned, due to the psychological research atmosphere that I have been exposed to, I assume that retweeting decisions are not only affected by the content characteristics of the tweets, that is, informational value, but instead, I expect that also contextual criteria that refer to other people should influence which tweets will be retweeted and which ones not.

## **Awareness and Social Navigation**

Crucial for influences in Web 2.0 and social media are not only content and technical media characteristics but undeniably also other users, and their behavior, attitudes, or expectancies

(Sassenberg, 2013). If and how these influence retweeting decisions might depend on how much and what is known about them. The lack of social cues and context information in computer-mediated communication (cmc) has been the focus of many researchers (e.g., Kraut et al., 1998; Kraut et al., 2002; Sproull & Kiesler, 1986). They compared cmc-settings, which are usually spatially distributed, to face-to-face settings in order to explain and predict various phenomena such as social influence, group polarization, or lurking (e.g., Preece, Nonnecke, & Andrews, 2004; Spears & Lea, 1992). While on the one hand, this lack of social cues was discussed as a shortcoming of cmc-settings, on the other hand, positive effects were obtained: Walther (1996) argued that cmc could even exceed face-to-face interpersonal communication as, for example, communication partners with different social status become more equal without social cues. In a more differentiated view, the SIDE model (social identity model of deindividuation; e.g., Reicher, Spears, & Postmes, 1995) postulates that under circumstances of anonymity, and when social identity is salient, social influence might increase. In contrast, when personal identity is salient, anonymity reduces social influence (Sassenberg, 2011).

The research tradition of (group-) awareness and awareness tools (Janssen & Bodemer, 2013) originally tried to imitate the richness of face-to-face-settings by providing information about communication partners or about the context, which would have been available also in face-to-face-settings. By providing such information and making it salient, communication partners should become aware of certain circumstances (e.g., who is online, who is doing what). Such information can be presented verbally as text, but also visualized by a tool. Actually, Hermida (2010) regarded Twitter as an awareness system because Twitter provides an awareness of topics and discussions taking place around a person. However, in the meantime, researchers went beyond this attempt and rather than only



making up for deficiencies, an added value (Buder, 2007) of cmc-settings compared to face-to-face-settings is aimed for and investigated. Hence, by providing awareness about the knowledge, interests, or attitudes of communication partners, cmc-settings offer a greater potential than face-to-face settings usually do. Accordingly, many studies could already show that awareness information has a positive impact on efficient communication behavior, orientation in information space, or learning (e.g., Bodemer & Dehler, 2011; Buder, 2011; Buder & Bodemer, 2008; Sangin, Molinari, Nüssli, & Dillenbourg, 2011).

People who are using Twitter and who are confronted with the selection decisions of which news to retweet and which not, can regard awareness information from two perspectives: First, information about the audience, that is, about people who will receive messages, can be provided and made salient. Second, information about other agents, that is, about other people who write and share messages, can be provided and made salient. Although in Web 2.0 these roles of receivers and producers are exchangeable, the kind of awareness information has different implications and follows different principles.

Regarding the first case, awareness information about the audience might lead to *audience design* (Clark & Murphy, 1982). Audience design means to adapt the communication behavior according to the audience's characteristics, knowledge or interests. Research has shown that increased audience design has positive effects on user behavior and efficient information exchange (e.g., Dehler-Zufferey, Bodemer, Buder, & Hesse, 2011). Moreover, successful audience design also ensures that recipients will understand or at least will read information. For example, if a Twitter user would know that many of his or her followers are interested in education-related topics, the Twitter user would probably retweet more educational tweets and disregard tweets about sports events.

Regarding the second case, awareness information about users who also write and share messages might lead to *social navigation* (Dourish & Chalmers, 1994). Social navigation means to follow “footprints in the snow” (Höök, Benyon, & Munro, 2003, p. 1); that is, following aggregated traces of the behavior of many other people. The phenomenon of social navigation is already wide spread in daily Internet life: People receive recommendations about what other people, who bought the same things as themselves, additionally bought or looked at; online newspapers rank as the most commented or most viewed articles; in online forums the best posts or answers are marked with a five star rating, indicating that many other people found a particular post relevant or helpful. If a Twitter user would know, for example, that a tweet has been retweeted by many other Twitter users, he or she could use this information as a social cue and could follow this behavior. Such footprints can also be regarded as social recommendations. Research on recommendations and recommender systems were originally prevalent only in the field of e-commerce. However, also in the context of information seeking and opinion formation, social recommendations have been found to be useful (Schwind & Buder, 2012; Schwind, Buder, Cress, & Hesse, 2012). Finally, also in the context of Twitter, some research has already been done to investigate whether and how content recommendations based on user preferences and/or user ratings might direct user attention (Chen, Nairn, Nelson, Bernstein, & Chi, 2010; Das Sarma, Das Sarma, Gollapudi, & Panigrahy, 2010; Sun, Cheng, & Zeng, 2009).

The principle of social navigation might refer to a social heuristic which reduces cognitive effort by allowing a person to jump on the bandwagon (Sundar, Oeldorf-Hirsch, & Xu, 2008). Moreover, such social cues might also refer to a social norm of a group and lead to norm based influence (Cialdini & Trost, 1998). Such social influence might further be moderated by how a person’s identity (e.g., Lee, 2006; Postmes, Spears, & Lea, 1998) or

self-categorization (e.g., Abrams, Wetherell, Cochrane, Hogg, & Turner, 1990) is shaped (e.g., Reicher et al., 1995). Similarly, I argue that the source of a recommendation might moderate the effect of social navigation. If the recommendation source refers to a group that is relevant to a person, he or she should seek to follow this norm in order to maintain belonging to a group (e.g., Turner, 1991).

Taken together, many factors possibly influence selection decisions for retweeting. Twitter users might not only read the messages and decide according to their own preferences. Instead, they might also consider how they can take care of their audience by selecting tweets that have high informational value. Twitter users might also select tweets for retweeting according to properties of audience, resulting in audience design. Further, prior selection decisions of other retweeting users might influence which tweets will be retweeted and which ones not. The present dissertation aims to answer the question of whether these proposed factors actually influence retweeting decisions and if so how they might interact with each other. In the following, an overview of the structure of the present dissertation will be given.

## **Overview of the Present Dissertation**

The following chapters contain empirical studies that tested whether and how the suggested factors influence retweeting decisions. All studies were experiments conducted either as online or as lab studies. Although all studies were conducted consecutively and draw partly on similar theories and assumptions, each chapter is prepared as a single manuscript. Therefore, some overlapping in the theoretical derivations was unavoidable.

However, in order to prevent too much redundancy, only in *Chapter 2* will the concept of informational value be explained. Then, the following chapters will not discuss the notion of

informational value in detail anymore. Instead, additional influencing factors that are thought to moderate the influence of informational value on retweeting will be introduced consecutively, chapter by chapter.

In *Chapter 2*, the notion of informational value will be introduced. It is based on news value theory, a theory that makes assumptions about which news will be selected for publication and consumption by journalists and recipients. I argue that in order to apply news value theory to retweeting decisions, news factors, (i.e., relevant characteristics of events and news that are ascribed to them by journalists and recipients) should be re-examined from a more psychological view. After this theoretical re-examination, two studies will be presented. In the first online-study, I tested whether news factors that should have high or low informational value differ in the suggested underlying concepts of first, affecting a large audience, and second, having the potential to impact it. Next, in the second laboratory study, I tested whether high informational value leads people to more retweeting than low informational value.

In *Chapter 3*, the exploration of possible influencing criteria will be extended by considering also audience awareness. To test whether and how different kinds of criteria interact in influencing retweeting decisions, a 2 x 2 x 2 mixed-design laboratory experiment was conducted. The varied criteria were the provided audience awareness information (guiding vs. non-guiding), the topic of the news (educational vs. non-educational), and the informational value of the message (high vs. low). It was hypothesized that participants who received guiding awareness information would show audience design (i.e., adapting communication behavior according to the audience) while disregarding informational value. In contrast, it was expected that participants who received non-guiding awareness

information would not show audience design, but would forward tweets according to the informational value.

*Chapter 4* will address another kind of awareness information that might influence retweeting decisions, namely, awareness information about agents, which should lead to social navigation. In order to test whether agent awareness moderates the influence of informational value on retweeting, a 2 x 2 within-subject design study was conducted. The varied criteria were agent awareness (present vs. absent) and informational value (high vs. low). It was expected that both independent variables interact with each other in such a way that, if no agent awareness is presented, informational value should be crucial for retweeting decisions. In contrast, it was expected that if agent awareness is provided, informational value should be less important for retweeting decisions, but the recommendation should be crucial for retweeting.

*Chapter 5* will deepen the insights into the principle of social navigation in the context of retweeting. Study 4 was extended by an additional factor, namely, in-group salience. Participants were told that the social cues refer either to a relevant in-group or to other users in general. Based on prior studies and on assumptions about social recommendation and social group norms, I expected that in-group salience will moderate the influence of informational value and the influence of awareness information on retweeting.

Finally, in *Chapter 6* all empirical findings will be concluded. In a general discussion, all main results will be summarized and discussed. Strengths and limitations of this dissertation will be discussed and implications for theory and for further research will be drawn.

## ***Chapter 2 | The Influence of Informational Value on Sharing News in Twitter***

This chapter is based on:

Rudat, A., Buder, J., Bodemer, D., & Hesse, F. W. *The influence of informational value on sharing news in Twitter*. Manuscript submitted for publication.

## Introduction

As news is supposed to have conversational value (Berelson, 1949), it is likely to be shared among people and talked about (e.g., Sommer, 2010; Sommer, Fretwurst, Sommer, & Gehrau, 2012). Reasons for sharing news are diverse. Among others, it may be that certain pieces of information can have social exchange value (Gantz & Trenholm, 1978; Homans, 1958) or generate reciprocity (Berger & Milkman, 2012; Fehr et al., 1998). Further, emotional experiences can make people share information (Ibrahim, Ye, & Hoffner, 2008; Kubey & Peluso, 1990) in that sharing might reduce cognitive dissonance (Berger & Milkman, 2012). Many of these reasons why people share information and spread it to others rely on psychological aspects. Therefore, in this chapter I will look at the topic of selecting and spreading news in a slightly different light. I aim to combine a topic of the communication field with psychological principles and methods.

Originally, selection and diffusion of news was only a journalistic profession and has been the subject of a whole research tradition of news selection (e.g., Gans, 2004; Kepplinger, 1989; Shoemaker & Reese, 1996). Among others, news value theory (Galtung & Ruge, 1965; Lippmann, 1922) described and explained selection decisions of journalists about which events to publish as news.

However, with the advent of Web 2.0, new challenges and conditions for journalistic daily life occurred (e.g., Lasorsa et al., 2012) as news can now be spread and edited in real time (e.g., Armstrong & Gao, 2010; Poell & Borra, 2012) in “[...] premediated situations where the story is changing so quickly that TV or print media do not have the time to develop a fully sourced story” (Papacharissi & de Fatima Oliveira, 2012, p. 267). Accordingly, Lee and Ma (2012) stated that “sharing news in social media has become a phenomenon of growing

social, economic, and political importance” (Lee & Ma, 2012, p. 331). A Web 2.0 application in which sharing of information can be done quite easily and quickly is microblogging. Microblogging applications, with Twitter being the most popular one, are networks for writing and sharing short pieces of information, namely, tweets. A specific feature of Twitter that I will focus on is called retweeting. Retweeting is a method of forwarding an existing Twitter message to an audience. As a quick and easy way to spread information in Web 2.0, retweeting has become an interesting topic for research (e.g., Boyd et al., 2010; Kwak et al., 2010; Liu et al., 2012; Pfitzner et al., 2012; Suh et al., 2010). Hansen et al. (2011) argued that retweeting “...is one of the important means of meme propagation and opinion formation in Twitter” (Hansen et al., 2011, p. 5), and Pfitzner et al. (2012) concluded that “retweets make up indeed a substantial fraction of all traffic in Twitter” (Pfitzner et al., 2012, p. 544). Moreover, Kwak et al. (2010) found that the majority of retweeted Twitter messages are news items.

One important change with Web 2.0 is the shift from publishing to participating, which means that now average people are also able to produce content and to share it (Hermans & Vergeer, 2009; O’Reilly, 2005). This means that not only journalists are able to spread news, but also nonprofessional internet users. As Hermida (2010) argued, “...it is undeniable that Twitter has emerged as a significant platform for people to report, comment and share news about major events, with individuals performing some of the institutionalized functions of the professional journalist” (Hermida, 2010, p. 4). Hence, by using such features as retweeting, non-journalists have the chance to act as multipliers.

As Twitter users are not journalists, they do not have professional journalistic education or organizational constraints on how and what news to spread; rather, they act as private



individuals. Therefore, one of my central research interests is how do non-journalistic Twitter users decide which news to share with others and how do their decisions differ from those of journalists? To examine this, journalistic selection criteria will be taken as starting point, namely, news factors identified in news value theory (Galtung & Ruge, 1965). However, I will argue that news factors need to be re-examined from a psychological viewpoint to address the particular motives that drive the spreading strategies of non-journalistic Twitter users. To do this, I would like to introduce the concept of informational value which I have adapted from news value theory and which I regard as being an appropriate explanatory concept for spreading news in microblogging systems such as Twitter.

## **The Influence of Informational Value**

News value theory is one of three approaches within the tradition of research on news selection (Kepplinger, 1989) along with gatekeeping (White, 1950) and news bias (Klein & Maccobby, 1954). Originally, news value theory focused on the relevant characteristics of events, namely, news factors that could influence selection decisions. From all the events taking place around the world every day, journalists can only pick up on a few, and from these few, they need to select an even smaller number of events for publishing. Research on news value has its origins in the early 1920s. Lippmann (1922) was the first researcher who asked about the value of news, attempting to explain why journalists publish some events as news while disregarding others. Later, in the 1960s and 1970s, two research traditions emerged, one in the US and one in Europe (Eilders, 2006; Staab, 1990b). In Europe, Galtung and Ruge (1965) identified and described criteria, the news factors, which make events become news. News factors are characteristics of news that journalists or recipients ascribe to events or information and thereby give them a certain value. Most of the following

European research on news value was built on or at least inspired by their work (e.g., Østgaard, 1965; Rosengren, 1974; Sande, 1971; Schulz, 1982; Staab, 1990a). Meanwhile, research has further developed news value theory and news factors and has extended its scope (e.g., Eilders, 2006; Eilders, Geißler, Hallermayer, Noghero, & Schnurr, 2010; Harcup & O'Neill, 2001; Papacharissi & de Fatima Oliveira, 2012; Ruhrmann, Woelke, Maier, & Diehlmann, 2003; Staab, 1990b). Among other things it has been reported that selection decisions by recipients on what news to read are also influenced by news factors (Eilders, 1997; Eilders & Wirth, 1999; Fretwurst, 2008). In the past, more than 20 news factors have been proposed and analyzed. For this dissertation, I concentrated on and adapted eight news factors (see Table 1, *Chapter 1*) that have been used in recent research and have turned out to be stable and meaningful (e.g., Ruhrmann & Göbbel, 2007).

Many studies have empirically confirmed the importance of most of these news factors for the selection decisions of journalists (e.g., Badii & Ward, 1980; Eilders, 1997; Ruhrmann et al. 2003; Shoemaker et al., 1987; Staab, 1990b). However, the results from journalists' selection criteria should not be generalized to Twitter users. To me, the most important difference between journalists and non-journalistic Twitter users regarding news sharing is the fact that Twitter users act as private individuals, and they do not have a journalistic mission. Further, they are not part of an institution, namely, a news medium. Instead, in terms of a psychological viewpoint, Twitter users are intrinsically motivated to share news with their followers. Thus, Twitter users should be especially interested in selecting with care what to retweet to their audience. They are focused and dependent on their followers for several reasons. First, as Boyd et al. (2010) stated that, “[s]preading tweets is not simply to get messages out to new audiences, but also to validate and engage with others” (Boyd et al., 2010, p. 1). This means that Twitter users should be interested in keeping contact and

maintaining involvement with their audience. Second, Twitter users should be interested in gaining a “preferential attachment” to their followers (Lasorsa et al., 2012, p. 22); that is, Twitter users achieve increased attention from existing and new followers if they have been deemed to be useful in the past. Finally, retweeting behavior has been considered to be an indication of influence, which requires effort (e.g., Cha et al., 2010). Moreover, with retweeting, distinct communities might be bridged as news can reach different network clusters and therefore, retweeting users might regard themselves as “information brokers” (Bruns & Burgess, 2012, p. 803). Taken together, this means that in order to preserve meaningfulness and the audience’s attention, Twitter users have to take care of their (imagined) audience (Boyd et al., 2010; Marwick & Boyd, 2011). I suggest that there are two reasonable ways to do this: First, Twitter users should retweet those news items that affect a large audience. The more people feel affected by what is retweeted, the higher the chance is of it remaining interesting for the audience. Second, Twitter users should retweet those news items that have a potential impact on the followers’ minds or their behavior. If news provokes some change in a recipient’s mind or evokes some behavioral change in recipients, their attention to what news is going to be spread next might increase.

Beside these motivations, it should be taken into account that Twitter users are also recipients themselves. This means that they scan the news also in the view of recipients (especially because Twitter users are non-professionals). For instance, in the research on selective exposure to news content and information seeking (e.g., Atkins, 1973; Knobloch-Westerwick, Carpentier, Blumhoff, & Nickel, 2005) it was found that recipients selected news according to its informational utility, which means that recipients chose those news items and spent more time with them that had a great magnitude, a high likelihood to affect the recipients, and were of high immediacy of consequences (Knobloch-Westerwick et al.,

2005). This would be in line with my assumptions regarding the motivated retweeting behavior that should result in affecting a large audience and in impacting it. In the following, I will discuss each of the eight news factors (see Table 1, *Chapter 1*) that are my focus according to this line of reasoning.

To start with, Aggression as a news factor relates to an event that does not concern a large audience per se. Further, news on aggression usually has to do with events that have already happened in the past and therefore do not imply taking immediate action (at least if they are not coupled with the news factor Negative Consequences). Hence, Aggression does not potentially impact the audience. Second, the news factor Controversy can present conflicting viewpoints or opposite attitudes. From a psychological perspective, controversies or conflicts can foster elaboration or stimulate critical thinking (e.g., Johnson & Johnson, 1993), and might lead to positioning oneself in a controversy. Consequently, existing mindsets might be varied or shaped, meaning that the news factor Controversy has the potential to impact the audience. Third, audience members are typically inclined to avoid negative consequences. Thus, the news factor Negative Consequences could potentially impact the audience as it might lead to thinking about how to escape from negative consequences and thereby restructuring prior thoughts (e.g., Kintsch, 1998). Negative consequences might even lead to a change in planned behavior to avoid those consequences. Fourth, Personalization as a presentation of individual persons neither affects a large audience nor does it call for a certain behavior or changes in an existing mental structure. Individuals used for Personalization messages are often unknown average persons, and thus, there are no available mental concepts that might be activated. Fifth, although the news factor Prominence concerns persons of whom people might have an available mental concept because these persons are well known, news about prominent persons usually does not affect

a large audience but instead concerns only this individual person or group of persons. Moreover, as the daily life of prominent persons differs so much from the daily life of average people, immediate actions are hardly called for. Sixth, the news factor Proximity by my definition should have an immediate impact for only a part of one's audience. As Twitter per se is not a local medium, I suppose that local news does not affect a large audience. In line with this, Armstrong and Gao (2010) found that especially local media very often publish tweets about lifestyle topics such as, for example, celebrities and entertainment. This goes along with my assumption that in Twitter neither Proximity, nor Personalization, nor Prominence plays a role for selecting news to share. Seventh, Relevance is by definition a news factor which characterizes events that might be or are meaningful to a large audience. The higher the relevance the more it is likely that a person might be directly affected (Eilders, 1997). And eighth, the news factor Unexpectedness potentially impacts the audience as the news factor might provoke changes in mind by presenting new information that has to be integrated into existing thoughts or schemata (e.g., Kintsch, 1998). Moreover, the audience might have to qualify expectations or integrate unplanned behavior.

To conclude, there are some news factors that have the potential to be important for Twitter users' selection decisions as they might concern a large audience and affect people's minds or their behavior. In contrast, other news factors do not have this potential and therefore should be less important for Twitter users' selection decisions. To address this as a concept for news sharing in Twitter, I would like to introduce the notion of informational value. I define informational value as a property that makes news relevant for a large audience and has the potential to impact others' thoughts or behavior. Accordingly, the news factors Controversy, Negative Consequences, Relevance, and Unexpectedness are regarded as

having high informational value. In contrast, the news factors Aggression, Personalization, Prominence, and Proximity are regarded as having low informational value.

## **Research Questions**

After having reflected on relevant aspects of news sharing behavior from a psychological point of view by introducing the concept of informational value, the current chapter aims to answer two general research questions: 1) Do the news factors differ in the suggested underlying concepts of informational value: a potentially affected large audience and the potential to impact it? 2) Does informational value influence retweeting? Regarding the first research question, it is expected that, if informational value is related to the suggested concepts of a potentially affected large audience and a potential impact on it, the news factors Controversy, Negative Consequences, Relevance, and Unexpectedness will be rated higher on these concepts than the news factors Aggression, Personalization, Prominence, and Proximity (Hypotheses 1a and 1b). Regarding the second research question, it is expected that informational value has an influence on retweeting decisions in a way that news factors with high informational value should be retweeted more often than news factors with low informational value (Hypothesis 2). To answer these two questions, two experiments (an online study and a lab study) were conducted, which will be presented in the following.

## **Study 1**

This online study investigated whether news factors differ in the suggested related concept of informational value. To do this, the following hypotheses were drawn:

*Hypothesis 1a:* News containing news factors with high informational value will be rated higher on the potential size of the affected audience than news containing news factors with low informational value.

*Hypothesis 1b:* News containing news factors with high informational value will be rated higher on the potential impact on the audience than news containing news factors with low informational value.

## **Method**

### ***Participants***

Data were collected from 47 German speaking participant volunteers (15 male, 32 female). All participants were recruited via a database of subscribed volunteers. They took part voluntarily and without any payment or rewards. Participants' age ranged from 18 to 63 years ( $M = 27$ ,  $SD = 9.21$ ). No data had to be excluded.

### ***Design***

This online study used a two group within-subject design to investigate whether the notion of informational value is related to the proposed concepts and leads to differences between the two groups of news factors. As within factor, the eight news factors were subsumed into two groups according to their assumed informational value: Controversy, Negative Consequences, Relevance, and Unexpectedness (*high informational value*), and Aggression, Personalization, Prominence, and Proximity (*low informational value*).

### ***Material***

Material consisted of 16 short pieces of fictive information which were created on the basis of real German tweets and about news topics (see Appendix A). For each of the eight news

factors two tweets were created so that each news factor occurred twice and each tweet contained one single news factor. Examples of the tweets are: “*Federal minister of education and research Annette Schavan meets international DAAD scholarship holders in Berlin*” and “*Swimmer Paul Biedermann is self-confident and well prepared for the next season*” as examples of news conveying the news factor Prominence.

To compare the two groups of news factors, all tweets were subsumed into two material sets. The first set of materials (*high value set*) contained all tweets that conveyed news factors with high informational value, whereas the second set of materials (*low value set*) contained all tweets that conveyed news factors with low informational value.

### ***Measures***

The concepts that are supposed to underlie informational value were measured by two items:

- 1) How many people are or could be affected by this event?
- 2) Is this news able to influence thoughts or behavior of others?

Each item was presented on a five point Likert-scale (Item1: 1 = *very few* to 5 = *many*; Item 2: 1 = *not at all* to 5 = *very likely*); that is, the higher the rating scores were, the larger the potential audience or the potential impact on the audience was, respectively.

### ***Procedure***

To take part in the online survey, participants were invited via an E-mail containing a link to the study. This meant that participants could take part in this study independent of time and location. After being instructed in the topic and task, all participants had the chance to test the task with an example tweet. Then, tweets were presented in a random order to avoid



sequence effects. All participants had the same task: They read and rated all tweets on the given two items. At the end, participants were thanked.

## Results

For the descriptive results of the ratings for the two items for each news factor see Table 2. For both items, news factors with high informational value were rated with the highest scores.

Table 2

*News Factors and Their Ratings on Size of Audience (Rating on a Scale 1 to 5, With 5 Meaning Largest Audience) and on Possible Impact on Audience (Rating on a Scale 1 to 5, With 5 Meaning Highest Possible Impact)*

News factor	Informational value	Rating on audience size		Rating on impact	
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Aggression	Low	2.53	0.74	2.78	0.94
Controversy	High	3.34	0.67	3.14	0.94
Negative Consequences	High	2.74	0.80	2.96	1.04
Personalization	Low	2.36	0.81	2.72	0.95
Prominence	Low	1.62	0.62	1.96	0.76
Proximity	Low	2.22	0.68	2.32	0.75
Relevance	High	4.21	0.56	3.46	0.90
Unexpectedness	High	2.53	0.84	2.48	0.83

For further analyses, the two groups of news factors were compared regarding their ratings for each of the two items. According to Hypothesis 1a, it was expected that news from the high value set would be rated higher on the potential size of the audience than news from the low value set. Pairwise comparison revealed a significant difference between the two groups of news factors,  $t(46) = 15.04$ ,  $p < .001$ ,  $r = .70$ . This means that on an aggregated level news

factors with high informational value were rated higher on audience size ( $M = 3.21$ ,  $SD = 0.53$ ) than news factors with low informational value ( $M = 2.18$ ,  $SD = 0.53$ ). Thus, Hypothesis 1a was corroborated. Regarding Hypothesis 1b, it was expected that the potential impact on the audience would be rated higher for news from the high value set than for news from the low value set. Again, pairwise comparisons revealed a significant difference between the two groups,  $t(46) = 9.38$ ,  $p < .001$ ,  $r = .36$ . This means that on an aggregated level news factors with high informational value were rated higher on the potential impact on the audience ( $M = 3.01$ ,  $SD = 0.77$ ) than news factors with low informational value ( $M = 2.44$ ,  $SD = 0.70$ ). Thus, Hypothesis 1b was corroborated, too.

## **Discussion**

By introducing the concept of informational value, I aimed to explore selection criteria of non-journalists who share news in Twitter on the basis of news factors. I compared two groups of news factors regarding the suggested underlying dimensions of informational value by assuming that, if those dimensions are related to informational value, the two groups of news factors should differ in the respective ratings. The results did indeed yield differences between the groups of news factors indicating that some news factors potentially concern more people than others and are more likely to affect existing mental concepts. In this study, however, the participants did not do any retweeting because the rating could have caused priming effects with regard to the subsequent retweeting decisions. For this reason, the actual influence of informational value on retweeting decisions is explored in a second study.

## Study 2

To investigate whether informational value influences retweeting decisions, I conducted a lab study. It was expected that news factors with high informational value would lead to more retweeting than news factors with low informational value. I therefore formulated the following hypothesis:

*Hypothesis 2:* Tweets containing news factors with high informational value will be retweeted more often than tweets containing news factors with low informational value.

## Method

### *Participants*

Data were collected from 31 participant volunteers (10 male, 21 female). All participants were German speaking students, recruited via a database of subscribed volunteers. For their participation in the experiment, which took 60 minutes, participants were paid 8€. Alternatively, the students could receive credit for their participation if needed for course requirements. Participants' age ranged from 19 to 49 years ( $M = 25.06$ ,  $SD = 5.28$ ). No data had to be excluded.

### *Design*

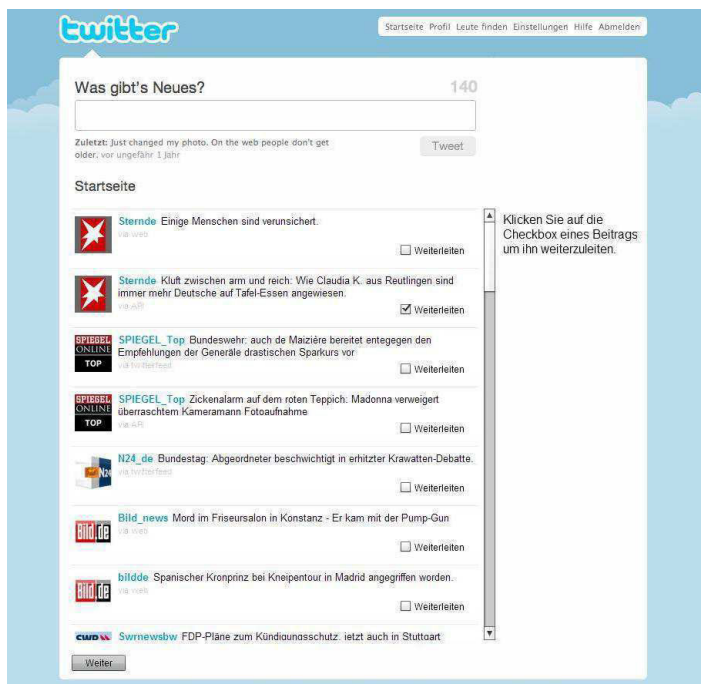
This lab study again used a two group within-subject design to explore the effect of informational value on retweeting of tweets. For informational value as within factor, eight news factors were used and were again subsumed into two groups: Controversy, Negative Consequences, Relevance, and Unexpectedness (*high informational value*), and Aggression, Personalization, Prominence, and Proximity (*low informational value*).

## Material

The material was created together with communication researchers who are familiar with news value theory. The material consisted of 43 fictive tweets about a wide range of news topics based on real existing tweets (see Appendix B). Each tweet conveyed a varying number of different news factors. The material was prepared in such a way that across the entire set, each news factor occurred the same number of times (13 times each). Further, occurrence of news factors was uncorrelated, which means that the number of each news factor was not related to the number of any other news factor. The tweets were not longer than 140 characters each and resembled real Twitter messages. They were presented in a simulated Twitter environment (see Figure 1).

Figure 1

### Screenshot of Presented Tweets, Study 2



To compare the two groups of news factors, all tweets were subsumed into two material sets. The first set of materials (*high value set*) contained all tweets that conveyed more news

factors with high informational value than news factors with low informational value, whereas the second set of materials (*low value set*) contained all tweets that conveyed more news factors with low informational value than news factors with high informational value.

### ***Measures***

*Retweeting*: For retweeting information, participants just had to click a button to indicate their decision to retweet the information. Thus, retweeting was measured dichotomously (*0 – not retweeted, 1 – retweeted*). Then, the mean retweeting scores of the high and the low value sets were calculated. Retweeting scores correspond to percentages. Higher scores mean that tweets from the respective set were retweeted more often, whereas lower scores indicated that tweets from the respective set were retweeted less often.

### ***Procedure***

Participants were recruited from a database of subscribed volunteers and were invited to take part in a “Twitter – Microblogging Study” in our laboratories in which they would have to read and select information presented to them. All instructions and materials were presented on a computer screen. After participants had read the instructions, they could ask about anything they did not understand. The tweets were presented for each participant, one below the other, in random order to avoid sequence effects. Retweeting was measured by the participants’ choice to retweet a tweet or not. To do this, they had to decide, after reading the tweets, which one they wanted to retweet to their followers. All participants received the same information about number and composition of their fictive audience. Then the participants made their decisions by marking the checkbox of those tweets that they wished to retweet. When they were finished, the participants were debriefed and thanked.

## Results

First, the descriptive results of the particular news factors regarding their influence on retweeting (see Table 3) will be presented. Following this, the results for the hypothesis will be presented. Participants selected mostly the information for retweeting that conveyed the news factors Relevance and Negative Consequences, both news factors belonging to the group of high informational value.

Table 3

*Percentage of Retweeted Tweets Regarding Each News Factor (Out of 13 Possible Ones) by Each Person (N = 31)*

News factor	Informational value	Retweeting	
		<i>M</i>	<i>SD</i>
Aggression	Low	.34	.19
Controversy	High	.35	.20
Negative Consequences	High	.45	.20
Personalization	Low	.27	.15
Prominence	Low	.22	.14
Proximity	Low	.33	.15
Relevance	High	.49	.26
Unexpectedness	High	.36	.16

### *Retweeting*

According to Hypothesis H2, tweets from the high value set should be retweeted more often than tweets from the low value set. I performed a pairwise comparison analysis that revealed that participants retweeted more tweets from the high value set ( $M = .43$ ,  $SD = .22$ ) than tweets from the low value set ( $M = .25$ ,  $SD = .13$ ). There was a significant difference of both

groups of news factors,  $t(30) = 3.69$ ,  $p = .001$ ,  $r = .43$ . Thus, Hypothesis H2 was corroborated.

## **Discussion**

This laboratory study explored whether informational value affects selection decisions of retweeting. The results show that participants retweeted tweets from the high value set more often than tweets from the low value set. It appears that only those tweets were retweeted that targeted a large audience or had the ability to restructure the minds of recipients. This lends support to the rationale that Twitter users consider their audience by selecting news that might be useful or meaningful to this audience. Looking at previous findings of news value research, I can conclude that there are similarities between the selection decisions made in a Twitter context and those selection decisions made in a journalistic context. For example, the news factors Relevance and Controversy have been found to be important for journalists also in previous research on news selection (Eilders, 1997; Schulz, 1982). However, in contrast to journalists who usually consider the news factor Prominence to be an important selection criterion (Harcup & O'Neill, 2001; Maier & Ruhrmann, 2008) this news factor does not seem to play an important role for retweeting.

## **General Discussion of Study 1 and Study 2**

The current chapter presented two studies to explore whether selection decisions for sharing news in a microblogging context follows similar mechanisms to journalistic publishing decisions and also how this selection criteria might differ. To do this, the two studies brought together research on Twitter and research on news selection, namely, news value theory. As retweeting decisions have similarities and differences with respect to journalistic selection decisions, I introduced the concept of informational value. This implicates that Twitter users,

as persons that act privately, are aware of having an audience and select information which might be meaningful or interesting to the audience in order to maintain their own meaningfulness. After having shown that news indeed differs in the concepts related to informational value (addressing a large audience and potentially impacting it), a second study could show that informational value actually does influence retweeting decisions: Tweets from the high value set were retweeted more often than tweets from the low value set.

This research took a first step in the direction of investigating news sharing in Twitter from a more psychological point of view by conceptualizing selection criteria for non-journalists on the basis of news factors. It provides evidence that it is important to consider principles and circumstances that come along with Web 2.0 as, for example, news can be produced and shared in real time, and not only journalists but also average users take part in the development and flow of news. Although news value theory in general might be an appropriate starting point to investigate news sharing in Web 2.0 contexts, more aspects in addition to journalistic criteria should be considered. To accomplish this, the psychological aspects of the non-journalistic individuals who use Twitter should be taken into account as I have attempted to do by introducing and testing the concept of informational value. Of course, a single study showing the influence of informational value on retweeting decisions is not sufficient to establish such a concept. More studies are needed to show whether this effect is a stable and generalizable one. Further, it should be shown whether and how other criteria interact with informational value regarding its influence on retweeting decisions. For instance, informational value could interact with properties of an audience (i.e., followers). To whom the information is spread, or even to whom the users think the information is spread, might influence the amount and content of the spread information, for reasons of



audience design (Dehler-Zufferey et al., 2011) or impression management (Krämer & Winter, 2008; Maireder, 2011). In addition, personality characteristics of the users might influence whether and how they retweet. Research already could show that personality traits influence whether Twitter is used for social or informational purposes (Hughes, Rowe, Batey, & Lee, 2012). Taking the results of this study into practical consideration, it could be argued that news media might tweet their news items strategically: News media should tweet those news items with high informational value because those are more likely to be spread. However, as such tweets will very likely be spread anyway; news media might also have an interest in tweeting more of that news that is not going to be spread easily.

Some limitations must be considered when interpreting the results of these studies. First of all, conducting experimental studies means that ecological validity will be decreased. However, I was interested in mechanisms that I would not have been able to obtain in the real Twitter: It would not have been possible to compare retweeted and not retweeted tweets out of a well-prepared set of tweets “in the wild”. For this reason, I decided to have a systematically controlled setting by conducting an experimental online study and an experimental lab study. Participants for these studies were mainly students and were recruited irrespective of their interest in and experiences with Twitter. In the real Twitter, among other things, participants would be in fact aware of the actual number and the makeup of their followers. Thus, it not only would be interesting to know whether the influence of informational value is stable in experimental settings but also whether the effect that was found could also be found in the real Twitter and with actual Twitter users.

Despite these limitations, however, it can be concluded that the results show that news factors are indeed applicable to the Web 2.0 context as news factors build a basis for

selection criteria for making decisions on whether to retweet or not. However, when considering the characteristics of news sharing in microblogs and the differences between journalists and average Twitter users, news factors in their traditional form are not sufficient. Therefore, the concept of informational value might be a promising response to the changed circumstances of news sharing in Web 2.0.

## Bridge

In the previous chapter I explained the concept of informational value and reported on a study that confirmed the influence of informational value on retweeting. It could be shown that news tweets conveying news factors with high informational value were retweeted more often than news tweets conveying news factors with low informational value. However, this finding has to be replicated in order to draw conclusions about its stability. Moreover, I argue that not only content characteristics influence retweeting decisions, but also contextual criteria, namely information about other users (Sassenberg, 2013). Therefore, in the following *Chapter 3*, a study will be presented that investigated the influence of informational value and the influence of audience awareness on retweeting.

In order to reduce redundancy that would occur due to the nature of independent manuscripts, the following chapters start with only a short introduction each but will not discuss the theoretical assumptions for informational value again. Instead, each of the following chapters will explain and discuss the potentially moderating factors that additionally might influence retweeting decisions.

## ***Chapter 3 | Audience Design in Twitter: Retweeting Behavior Between Informational Value and Followers' Interests***

This chapter is based on:

Rudat, A., Buder, J., & Hesse, F. W. (in press). Audience design in Twitter: Retweeting behavior between informational value and followers' interests. *Computers in Human Behavior*. doi: 10.1016/j.chb.2014.03.006.

## Introduction

Regarding selection decisions in the Twitter context, there are many potential influences. First of all, one might argue that the content of a tweet should be the most important criterion that impacts the decision whether to retweet it or not. However, I argue that not only characteristics inherent in the information, such as informational value, might influence selection decisions for retweeting, but also contextual criteria, such as properties of the task and the surrounding, or social information about others. Since I will investigate sharing of information in a social media context, social information about other users especially should have the potential to influence selection decisions. Regarding such social information, I refer to mechanisms of awareness and audience design (Clark & Murphy, 1982; Dehler-Zufferey et al., 2011): The notion of awareness means to make certain information (e.g., what do others think or prefer, who is interested in what) about other users salient; and the concept of audience design describes the fact that producers adjust contributions towards their recipients and thus adapt their communication behavior to their audience, for example, with regard to the audience's knowledge or interests (Clark & Murphy, 1982; Dehler-Zufferey et al., 2011). Of course, audience design is only possible if information about the audience is available. In Twitter, not much information about the audience is provided; and although most Twitter users might have a more or less valid image of their audience (Marwick & Boyd, 2011), they usually do not have any overall information about their audience to adapt their communication behavior to. Therefore, in this chapter, I will investigate whether and how people are influenced in their selection decisions for retweeting not only by content characteristics of information, namely informational value, but also by summarized information about their audience; and how both factors might interact with each other.

## The Influence of Awareness Information

After having shown that the retweet potential of news factors with high informational value is larger than the retweet potential of news factors with low informational value, the question arises whether there are other, interacting factors influencing the retweeting behavior of Twitter users. A promising contextual factor could be the audience, not only because in the context of social media other users are very likely to have an influence on the behavior of (re)tweeting users (Chen, 2011; Kim et al., 2012), but also because Twitter users take care about their audience: In order to preserve meaningfulness, Twitter users should be interested in addressing a large audience and in impacting it by potentially changing minds or behavior.

In Twitter, the followers constitute the audience: users who are subscribed to other users and read their tweets. Usually everyone could be someone's follower without the need of a reciprocal relationship. In real Twitter, users know the number of their followers, and, if they visit their personal profiles, they might get isolated, but no summarized information about the followers' interests. However, the more Twitter users know about their audience the more they can take care of it. A promising way to provide information about other users is the approach of awareness and awareness tools (e.g., Janssen & Bodemer, 2013). In the research on group awareness (e.g., Bodemer & Dehler, 2011), tools are used to make such information salient. While originally awareness tools were intended to substitute the richness of face-to-face settings (e.g., by providing information on users' presence or activities) (Gutwin & Greenberg, 2002), a shift towards tools that provide information about non-observable entities (e.g., users' preferences or opinions) has taken place (Buder, 2011; Dehler-Zufferey et al., 2011). Research has shown that such awareness information could be helpful for a better orientation in the information space or even for learning (e.g., Bodemer & Dehler, 2011; Buder, 2011; Buder & Bodemer, 2008; Sangin et al., 2011). Even without a

visualizing tool, aggregated and summarized awareness information about others can filter and personalize information and, therefore, can guide (re)tweeting users through their selection decisions. If these Twitter users are provided with such awareness information, they could tailor their messages. This is referred to as audience design: (Retweeting) users adapt their communication behavior according to perceived properties of the audience. Research has shown that increased awareness and audience design has positive effects on user behavior and efficient information exchange (e.g., Buder, 2011; Buder & Bodemer, 2008; Engelmann & Hesse, 2011). Moreover, audience design as a possible consequence of awareness should result in efficient communication behavior, which might help oneself and others orienting in an information space. Successful audience design also can make sure that recipients will understand or at least will read information as it matches their interests. Dehler-Zufferey et al. (2011) showed that audience design could even support learning.

However, although a large number of studies could already show that awareness information does have an effect on navigation behavior, communication behavior, and learning (e.g., Buder, 2011; Engelmann, Dehler, Bodemer, & Buder, 2009; Janssen & Bodemer, 2013; Janssen, Erkens, & Kirschner, 2011; Phielix, Prins, Kirschner, Erkens, & Jaspers, 2011; Schreiber & Engelmann, 2010), the question arises whether some types of awareness information are more effective than others. Buder (2011) argued that the “effectiveness of [awareness information] is positively correlated to the degree of behavioral adaption that it brings about” (Buder, 2011, p. 1116). Behavioral adaption, such as audience design, could be achieved by guidance. This means that the more awareness information leads to behavioral adaption or immediate action, the more guidance it has; hence, the more effective it is. Thus, in order to make awareness information leading to audience design, a criterion of varying the effectiveness could be the degree of explicit guidance of the provided

information. To me there seem to be two ways to increase the guidance of an awareness information: First, by relying on specific audience information (e.g., interests of others) rather than unspecific audience information (e.g., gender). Second, by providing information about audience percentages that are relatively high. To put it more concrete, the information that 53% of an audience is interested in educational topics (specific audience category, high percentage) should be much more guiding than the information that 53% of an audience is male (unspecific audience category, average percentage). Taken together, aggregated and summarized awareness information in Twitter might lead to audience design regarding the retweeting behavior. However, guiding awareness information should influence audience design that is, deciding which news topics to retweet, more than non-guiding awareness information.

### **Study 3**

In this study, I aim to answer the questions of whether and how awareness information about the audience interacts with the news topic of the tweet and with informational value regarding their influence on the selection decision on what items to retweet. As it could be shown in Study 2, without any awareness information high informational value news factors led to more retweeting than low informational value news factors. However, in the present study, the aim is to explore further factors that could influence selection decisions for retweeting. I consider awareness information about the audience as being one of them, but only if it has enough guidance. Guiding awareness information should lead to audience design and thus, lead to adapting the communication behavior towards the audience, while disregarding informational value.



I argue that if guiding awareness information is provided, people will adapt their communication behavior (Clark & Murphy, 1982; Dehler-Zufferey et al., 2011) in a way that they will consider the interests of their audience and accordingly select information that addresses the topics of interest. To be more precise, if Twitter users would be provided with the information that about the half of their followers is interested in news topics concerning education, Twitter users should show audience design by retweeting tweets containing educational news while disregarding the informational value of the tweets. In contrast, if Twitter users are provided only with the information that half of their followers are male or female, this should not lead to audience design. Thus, in this case, Twitter users should retweet the tweets only according to their informational value but not according to the topics. To investigate these hypotheses, I conducted an experimental study varying awareness information (guiding vs. non-guiding), topic of the tweets (educational vs. non-educational), and informational value (high vs. low). From these considerations I derived the following hypotheses:

*Hypothesis 1:* It is expected that participants who receive guiding awareness information will retweet more educational tweets than non-educational tweets. In contrast, participants who receive non-guiding awareness information will retweet educational and non-educational tweets in an equal number.

*Hypothesis 2:* It is expected that participants who receive guiding awareness information will retweet tweets containing news factors with high informational value and tweets containing news factors with low informational value in an equal number. In contrast, participants who receive non-guiding awareness information will retweet more tweets

containing news factors with high informational value than tweets containing news factors with low informational value.

## **Method**

### ***Participants***

Data were collected from 61 German speaking student participant volunteers. Data of one participant had to be excluded because of a failed manipulation check. Thus, data remained from 60 participants (15 male, 45 female). Their age ranged from 19 to 30 years ( $M = 23.45$ ,  $SD = 2.35$ ). Participants were asked about their average knowledge about Twitter and their average usage of Twitter. Both items were measured by a five-point scale ranging from 1 (*very small/rarely*) to 5 (*very good/very often*). Participants indicated their average knowledge about Twitter ( $M = 2.10$ ,  $SD = 1.04$ ) as well as their average usage of Twitter ( $M = 1.37$ ,  $SD = 0.69$ ) as rather small. For their participation in the experiment, which took 60 minutes, participants were paid 8€. Alternatively, the students could receive credit for their participation if needed for course requirements.

### ***Design***

The laboratory experiment used a 2 x 2 x 2 mixed design to explore the effect of awareness information, topic, and informational value on retweeting. For the between-subjects factor awareness information, two experimental conditions were set up. Participants in one condition (*guiding awareness condition*,  $n = 29$ ), were given guiding information about their followers (“53% of your followers are interested in education-related topics”). In this experimental setting information about the followers’ interests can be regarded as guiding because the interest directly refers to the content of the news, which was manipulated as within-subject factor. Participants in the other condition (*non-guiding awareness condition*,

$n = 31$ ) received non-guiding information about their followers (“53% of your followers are male/female”). I regard information about gender in this case as non-guiding because usually neither news about education nor average news about various topics is gender-sensitive. Moreover, the information that about the half of the followers belongs to one of two genders has less guidance than the information that about the half of the followers is interested in a certain topic out of many possible ones. The concrete information (“male” vs. “female”) was randomly assigned to avoid gender effects. For the within-subject factor topic, I created material in a way that half of it contained tweets related to education (*educational tweets*), which corresponded to the provided interest of the followers in the guiding awareness condition. In contrast, the other half of tweets covered a wide range of other news items except education (*non-educational tweets*). For the within-factor informational value, I used the eight news factors and subsumed them into two groups: Controversy, Negative Consequences, Relevance, and Unexpectedness (*high informational value*), and Aggression, Personalization, Prominence, and Proximity (*low informational value*).

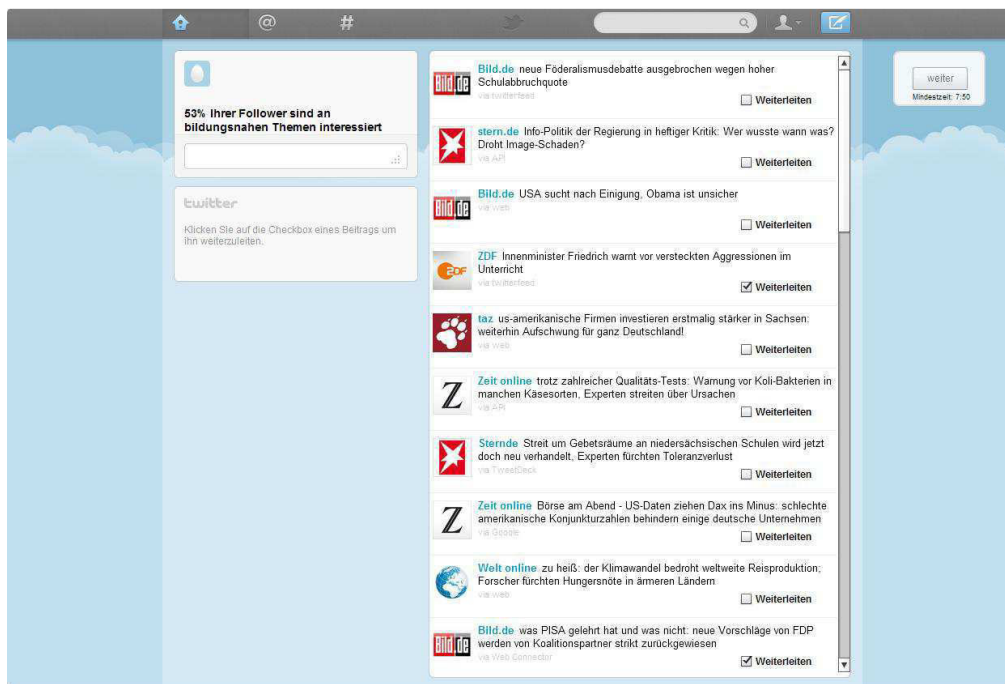
### ***Materials***

I created the material together with communication scientists who are familiar with news value theory. Material consisted of 36 fictive tweets about a wide range of news topics based on real German tweets (see Appendix C). Half of the material consisted of tweets about educational news, whereas the other half consisted of tweets about non-educational news. All tweets conveyed different news factors in a different number and in different combinations, but each tweet conveyed either news factors with high informational value or news factors with low informational value.

To compare the two groups of news factors, I subsumed all tweets into two sets of tweets. The first set (*high value set*) contained all tweets that conveyed news factors with high informational value, whereas the second set (*low value set*) contained all tweets that conveyed news factors with low informational value. Informational value was balanced for educational versus non-educational tweets. The material was prepared in a way that each news factor occurred in the same number (eight times per news factor) within all messages. Further, occurrence of news factors within one informational value set was uncorrelated, which means that the number of each news factor was not related to the number of any other news factor. The created tweets were not longer than 140 characters each and looked like real tweets. They were presented in a simulated Twitter environment (see Figure 2).

Figure 2

*Screenshot of Presented Tweets, Study 3 (Guiding Awareness Condition)*



Examples for tweets are: *“Chancellor Angela Merkel visits a primary school in Stuttgart”* (as example for an educational tweet containing the news factors Prominence and Proximity

and therefore belonging to the low value set), and “*Spanish crown prince was spotted during bar-hopping*” (as example for a non-educational tweet containing the news factor Prominence and therefore belonging to the low value set).

### ***Measures***

As the dependent variable, I measured retweeting of information.

*Retweeting*: For retweeting a particular tweet, participants had to click a button adjacent to the message to indicate their decision to retweet the information. This means, retweeting was measured dichotomously, with 0 indicating *not retweeted*, and 1 indicating *retweeted*.

### ***Procedure***

I recruited German speaking participants from a database of all local university students via mailing list asking them to take part in a “Twitter – Microblogging Study” in a laboratory where they would have to read and select information given to them. If they agreed to take part, they sat in front of a computer and the material was presented. All instructions were presented on the screen. Participants were told to read the instructions and to ask about anything they did not understand. Each participant was randomly assigned to one of two experimental conditions (guiding awareness or non-guiding awareness condition). The tweets were presented in a random order for each participant to avoid sequence effects. I measured retweeting by the participants’ choice of retweeting a tweet or not. To do this, they had to decide after reading the tweets, which tweet they wanted to retweet to their followers. Participants received different information about their fictive followers. Participants in the guiding awareness condition were told that 53% of their followers were interested in education-related topics. In contrast, participants in the non-guiding awareness condition were told that 53% of their followers were male or female, respectively. Gender was

assigned randomly to avoid gender effects. Participants decided by marking the checkbox of those tweets that they wished to retweet. For manipulation check, at the end of the experiment participants had to indicate via multiple choice which kind of information about the followers they were provided with. Finally, participants were thanked and debriefed.

## Results

First, the descriptive results of the particular news factors regarding their influence on retweeting will be presented (see Table 4). Participants selected mostly that information for retweeting that conveyed the news factors Relevance, Controversy, Negative Consequences, and Unexpectedness. These are all news factors with high informational value.

Table 4

*Percentage of Retweeted Tweets Regarding Each News Factor (Out of Eight Possible Ones) by Each Person (N = 60)*

News factor	Informational value	Retweeting	
		<i>M</i>	<i>SD</i>
Aggression	Low	.29	.21
Controversy	High	.44	.20
Negative Consequences	High	.41	.21
Personalization	Low	.20	.18
Prominence	Low	.22	.17
Proximity	Low	.25	.17
Relevance	High	.48	.21
Unexpectedness	High	.41	.23

Before analyzing treatment effects, the variables “average knowledge about Twitter”, and “average usage of Twitter” were checked, to ensure that differences were not due to pre-existing differences between the two conditions. Regarding both, the average knowledge

about Twitter and its average usage, independent *t*-tests yielded no differences between the two conditions (knowledge:  $t(58) = 0.97, p = .335, ns$ ; usage:  $t(58) = 0.99, p = .327, ns$ ). In the following, the results regarding the hypotheses will be presented.

### ***Retweeting***

All descriptive statistics regarding the hypotheses are summarized and presented in Table 5. To test the hypotheses, a mixed design analysis of variance (ANOVA), with awareness information (guiding vs. non-guiding), topic (educational vs. non-educational), and informational value (high vs. low) as independent variables and retweeting as dependent variable was performed. According to Hypothesis 1, participants in the guiding awareness condition should retweet more educational tweets than non-educational tweets. In contrast, participants in the non-guiding awareness condition should retweet educational and non-educational tweets in an equal number. First, the ANOVA revealed a significant main effect of topic,  $F(1, 123) = 10.46, p = .002$ , partial  $\eta^2 = .153$ , indicating that participants retweeted more educational tweets ( $M = .37, SD = .23$ ) than non-educational tweets ( $M = .28, SD = .20$ ). However, the ANOVA also revealed a significant interaction effect of Awareness Information x Topic,  $F(1, 58) = 12.54, p = .001$ , partial  $\eta^2 = .178$ . Pairwise comparisons of the retweeted topics using Bonferroni adjustment revealed that participants in the guiding awareness condition retweeted more educational tweets ( $M = .43, SD = .19$ ) than non-educational tweets ( $M = .23, SD = .16$ ),  $F(1, 58) = 22.21, p < .001$ , partial  $\eta^2 = .277$ . In contrast, participants in the non-guiding awareness condition retweeted educational ( $M = .32, SD = .21$ ) and non-educational ( $M = .32, SD = .17$ ) tweets in an equal number,  $F(1, 58) < 1, ns$ . Thus, the interaction effect explains the main effect, and therefore Hypothesis 1 can be confirmed: The influence of awareness information on retweeting is moderated by the topic of the tweet.

Table 5  
*Percentage of Retweeted Tweets*

		Awareness information		
		Guiding	Non-guiding	Total
Informational value	Topic			
High	Educational			
	<i>M</i>	.54	.41	.47
	<i>SD</i>	.21	.25	.24
	Non-educational			
	<i>M</i>	.31	.41	.36
	<i>SD</i>	.22	.23	.23
Low	Educational			
	<i>M</i>	.31	.23	.27
	<i>SD</i>	.22	.22	.22
	Non-educational			
	<i>M</i>	.15	.24	.19
	<i>SD</i>	.14	.19	.17

According to Hypothesis 2, participants in the guiding awareness condition should retweet tweets from the high value set and tweets from the low value set in an equal number. In contrast, participants in the non-guiding awareness condition should retweet more tweets from the high value set than tweets from the low value set. The ANOVA revealed that there was no difference between the conditions: Participants from both conditions showed the same retweeting behavior regarding informational value. This means, there was no interaction effect of Awareness Information x Informational Value,  $F(1, 58) < 1$ , *ns*, and Hypothesis 2 was not corroborated. Instead and against the expectations, I found only a significant main effect of informational value,  $F(1, 58) = 75.07$ ,  $p < .001$ , partial  $\eta^2 = .564$ , indicating that all participants retweeted tweets from the high value set ( $M = .42$ ,  $SD = .23$ )



more often than tweets from the low value set ( $M = .23$ ,  $SD = .20$ ). Further, and in line with the expectations, I neither found a main effect of awareness information,  $F(1, 123) < 1$ , *ns*, nor an interaction effect of Topic x Informational value,  $F(1, 58) = 1.22$ ,  $p = .274$ , *ns*, nor a three-way interaction effect,  $F(1, 58) < 1$ , *ns*.

## **Discussion**

This study aimed to explore criteria influencing selection decisions for retweeting in Twitter. After having investigated only one message-inherent criterion (i.e., informational value) in the previous Study 2, I now was interested in interaction effects of contextual factors and message-inherent criteria. Regarding characteristics inherent in the message, I again employed the news value theory, and more specifically, the adapted concept of informational value. Additionally, the topic of the tweets was manipulated. Regarding contextual factors, I focused on awareness information about the followers which should lead to audience design and thus influence the selection decision. I argued that people should adapt their communication behavior if they are provided with guiding awareness information about the followers' interests. Thus, I suggested that in this case, selection decisions should be driven more by the relevant topic rather than by informational value. In contrast, I expected that if non-guiding information about the followers' interests is provided, people select only by informational value while disregarding the topic.

First, I indeed found an interaction effect of awareness information and topic. The interaction effect means that the difference in retweeting of educational and non-educational tweets was larger in the guiding awareness condition than in the non-guiding awareness condition. Contrary to my expectation, however, I did not find an interaction effect of awareness information and informational value. Instead, I found a main effect of

informational value, indicating that high informational value news factors led to more retweeting than low informational value news factors. With this result, I replicated my former findings about informational value (see *Chapter 2*), indicating that the effect of informational value on retweeting might be strong and stable.

In the following, I will discuss the result patterns, starting with the interaction effect of awareness information and topic. This result means that users who are provided with guiding awareness information adapt their communication behavior regarding the topic of the retweeted messages. Thus, assumptions about audience design can be confirmed as users tend to adapt their communication behavior to their audience if they are provided with information about it. This might be due to such reasons for sharing information as reciprocity (Berger & Milkman, 2012; Fehr et al., 1998), or even altruism (Gantz & Trenholm, 1978). Nevertheless, users adapt to their audience only if the provided awareness information is actually guiding. However, the adaptation of retweeting behavior seemed to be limited because out of all of the available messages about a relevant topic, people still chose tweets with high informational value news factors over tweets containing news factors with low informational value. This means, although I found adaptation in the communication behavior, informational value still remains an important factor for deciding which of the news to actually retweet.

This study tested predictions under controlled and experimental laboratory conditions which entail both strengths and limitations. First, using systematically prepared material and conducting the study under lab conditions implicates a reduction of ecological validity. However, in the real Twitter it would not have been possible to compare retweeted and not retweeted tweets out of a carefully prepared set of tweets. Second, participants for the study

were mainly students and had rather low experiences with Twitter. From the participants only about 18% indicated to have an own Twitter account. Therefore, it would be helpful to additionally investigate whether this effect would also be replicable with participants with more Twitter experiences. Third, I analyzed only one possible contextual criterion, namely, awareness information about the audience. However, other contextual criteria, such as information about retweeting behavior of other users, might be influential and will be considered in future studies. Fourth, I argued that specificity of audience categories (interests vs. gender) and relative audience percentages (high vs. average) of an information lead to guidance and therefore to audience design. However, as I did not separate both aspects, I cannot draw a conclusion about which aspect might be the crucial one for varying the guidance of an awareness information. This might be addressed by future research.

Besides the limitations due to the experimental nature of the study, the findings contribute to answering the question of selection criteria for information in Web 2.0 settings in which typically a huge amount of information is available, and which therefore require selection decisions. In the context of an existing competition for users' attention, it should be meaningful to know which cues and criteria users comply with. As people in general tend to share information, the question arises, which kind of information, or in this particular case, which kind of news is more likely going to be retweeted. By introducing the concept of informational value I attempted to respond to changed circumstances that Web 2.0 brought along, such as the fact that now also non-journalistic Internet users are acting as news multipliers. Moreover, in the context of social media, in which issues of self-presentation and identity management are relevant (Krämer & Winter, 2008; Maireder, 2011) it might be meaningful which kind of information about oneself is fed back to other users. For instance, in learning contexts information about different opinions might provoke conflicts, which are

supposed to foster elaboration and therefore might lead to learning (Johnson & Johnson, 1993). Further, information about interests might evoke high audience design because of its guidance and therefore should result in efficient communication behavior and possibly in good identity management. In contrast, if only less guiding information is provided and made salient, other users hardly can adapt their communication behavior towards these users. In general, it can be argued that aggregated awareness information about other users can help to get better orientation in social media and Web 2.0 as they represent filtered and structured traces left by other users. This might be helpful for searching helpful information, for finding sources or additional cues, or getting personalized recommendations. Moreover, aggregated awareness information could be beneficial not only for oneself but also for other users as better orientation could result in better communication and interaction with others. Instead of only substituting the richness of face-to-face settings, awareness information should go beyond this. Moreover, awareness information should have guidance in order to achieve an adaption of the communication behavior. This then might lead to fruitful and sustainable interaction behavior. Therefore, insights into the usefulness and the influence of provided awareness information on the behavior of users should be interesting not only in the context of Twitter but also for other social media applications.

To conclude, the present study provides evidence that users adapt their communication behavior according to provided awareness information about their audience only if this awareness information has enough guidance. Moreover, although users do adapt their communication behavior to their audience, message-inherent criteria such as informational value still remain important for the actual selection decision which information to share with others.

## Bridge

In *Chapters 2 and 3* I reported on two studies that showed the strong influence of informational value on retweeting decisions. However, it could also be shown that not only content but also context should be considered when studying selection decisions for retweeting. Although the influence of audience awareness did not interact with informational value regarding its influence on retweeting, I still argue that, due to the nature of the social Web, social cues that are related to other users should have the potential to moderate the strong influence that informational value has. Therefore, in *Chapter 4*, I will present a study that again investigated whether and how the impact of informational value interacts with a contextual criterion. This time, the social cues will refer to other users' behavior.

***Chapter 4 | Making Retweeting Social: The  
Influence of Social Navigation and Informational  
Value on Sharing News in Twitter***

## Introduction

Selection decisions for retweeting might be based on different influencing factors. Among others, content characteristics, namely, informational value, strongly influences whether a tweet will be retweeted or not, as it could be shown in *Chapter 2* and *Chapter 3*. Informational value is defined as the property of news factors to affect a large audience and/or to have the potential to impact the audience's minds. However, since I investigate a phenomenon that occurs in the social Web, also social influence, namely influencing cues of other users should be taken into account when investigating retweeting behavior. Regarding such contextual criteria, I draw on approaches of awareness (e.g., Janssen & Bodemer, 2013). This research field investigates how communication and learning situations in computer-mediated communication (cmc) settings can be supported by providing additional information (such as information about attitudes or knowledge of communication partners, which was usually missing in cmc-settings) and making it salient.

Awareness information can be seen from two perspectives: On the one hand, information about the audience (i.e., recipients of the retweeted tweets) can be made salient. In *Study 3* (see *Chapter 3*), I investigated whether and how awareness information about characteristics of the audience, which was made salient, impacted retweeting decisions. I found that participants adapted their retweeting behavior according to the audience's interest. However, informational value still remained a meaningful criterion as high informational value had more influence on retweeting decisions than low informational value. A second type of awareness does not refer to the audience but rather provides information about other agents. In the context of this research, agents are Twitter users who also retweet and therefore act as multipliers themselves. In this case, information about other agents' retweeting behavior would be provided to every single Twitter user. In theoretical terms, awareness about an audience can be associated with audience design (Clark & Murphy, 1982), an adaptation of

one's communication behavior according to perceived properties of an audience. In contrast, awareness about other agents can be associated with social navigation (Dourish & Chalmers, 1994; Höök et al., 2003), an adaption of one's navigation and communication behavior according to aggregated traces of other users. The present study investigates whether awareness information about agents influences retweeting decisions and whether it moderates the influence of informational value on retweeting.

## **The Influence of Social Navigation**

After having established the concept of informational value as an influencing criterion inherent in information, I now would like to discuss other kind of potentially influencing criteria, namely, contextual criteria. For this, I draw on research on awareness (e.g., Janssen & Bodemer, 2013). Providing information in cmc-settings and making it salient means for communication partners to become aware of social or contextual characteristics. A large number of studies could already show that awareness information does have a positive effect on efficient communication behavior or learning (e.g., Buder, 2011; Buder & Bodemer, 2008; Engelmann et al., 2009; Janssen & Bodemer, 2013; Janssen et al., 2011; Phielix et al., 2011; Schreiber & Engelmann, 2010). As mentioned above, I differentiate between two kinds of awareness information: First, awareness information about the audience and second, awareness information about agents. Regarding the first kind of awareness, in Study 3 (see *Chapter 3*), I could show that information about characteristics of the user's audience leads to audience design as it influenced the participants' retweeting decisions according to the audience's interests.

Regarding the second kind of awareness, information about the retweeting behavior of agents could be collected and aggregated, and fed back to every single user. This should result in social navigation (Dourish & Chalmers, 1994; Höök et al., 2003). Social navigation



means that people leave “footprints in the snow” (Höök et al., 2003, p.1), which are social cues and recommendations that help other people to make their decisions about where to go and what to choose. The phenomenon of social navigation is widespread in daily Internet life: For instance, users receive recommendations based on the navigation patterns, the purchasing behaviors, or the evaluations of other users; online newspapers rank the most commented or most viewed articles; in online forums the best posts or answers are marked with a five star rating, indicating that many other people found a particular post relevant or helpful. It has become convention that symbols, such as little star icons, indicate quality, attractiveness, or popularity. Hence, the marked object has usually been judged positively by many other users. Referring to Twitter, if a tweet is marked with a little star icon this could mean that this tweet has been selected very often by other users. According to the concept of social navigation, this star icon should lead to behavioral adaption in a way that users follow the presented behavior of many agents.

Thus, in Study 4, I investigate the effect that such visualized traces of the behavior of (fictive) other users has on the selection decisions. Additionally, the present study investigates if and how a postulated social navigation effect interacts with informational value.

How social navigation affects selection decisions can be explained in different ways. According to the bandwagon effect (e.g., Sundar et al., 2008), a user should behave according to the behavior of many people before. This is based on the social heuristic that many other people probably were right (Axsom, Yates, & Chaiken, 1987; Sundar, Xu, & Oeldorf-Hirsch, 2009). Such a heuristic has the advantage of reduced cognitive effort that might be associated with selection decisions in the retweeting context (Fu, 2012; Shah &

Oppenheimer, 2008). Although the bandwagon effect has been often discussed in the context of (political) opinion formation (e.g., Nadeau, Cloutier, & Guay, 1993), research on social navigation mechanisms has also employed the bandwagon heuristic as a possible explanation for users' navigation behavior (Fu, 2012; Sundar et al., 2008).

However, visualized aggregated preferences of other members of a group or a community could also indicate some kind of group norm (e.g., Postmes, Spears, & Lea, 2000); and deciding to retweet certain information would be in line with the group norm whereas retweeting other information would not be. Although the discussion on the extent of social influence that might take place in cmc-settings has been controversial (Lee & Nass, 2002; Postmes et al., 2000), there is evidence that under certain circumstances (especially when one's group members are visually anonymous), group norms indeed do have an influence on, for example, conformity or decision making (e.g., Lee, 2004, 2006; Postmes, Spears, Sakhel, & de Groot, 2011; Walther, Liang, Ganster, Wohn, & Emington, 2012). Both explanations implicate that social cues might refer to something important, either to a large group of people who behaved similarly or to a norm of a relevant group. In the context of social navigation, items that are marked with a star icon should lead to higher importance ratings.

## **Study 4**

In Study 4, I combine both possible effects: that of criteria inherent in the information, namely, informational value, and that of contextual criteria, namely, awareness information about agents. As already argued and found in Studies 2 and 3, if no helpful contextual awareness information is provided, tweets that contain high informational value news factors should be retweeted more often than tweets that contain low informational value news factors. Analogous to this, in the present study, this should be the case for tweets that are not

marked with the star icon that indicates that this information already has been retweeted very often. In contrast, if tweets are marked with a star icon, then social navigation should lead to a retweeting behavior that is independent from informational value. That means that for tweets marked with a star icon, I expect them to be retweeted almost equally regarding their informational value. This should be the case because star icons are easily visible and noticed earlier than the content of a tweet. Therefore, such awareness information should qualify the direct influence of informational value on retweeting. Accordingly, I derived the following hypothesis:

*Hypothesis 1:* I expect an interaction effect of Awareness information x Informational value. It is expected that if tweets are not marked with awareness information, participants will retweet tweets containing news factors with high informational value more often than tweets containing news factors with low informational value. In contrast, it is expected that if tweets are marked with awareness information, the difference between retweeted tweets containing news factors with high informational value and tweets containing news factors with low informational value will be smaller.

## **Method**

### ***Participants***

Data were collected from 64 German speaking participant volunteers (11 male, 53 female). All participants were students, recruited via a database of subscribed volunteers. For their participation in the laboratory experiment, which took 60 minutes, participants were paid 8€. Alternatively, the students could receive credit for their participation if needed for course requirements. Participants' age ranged from 18 to 37 years ( $M = 23.70$ ,  $SD = 3.71$ ). Participants were asked about their knowledge about Twitter and their average usage of

Twitter. Both items were measured by a five-point scale ranging from 1 (*very little/rarely*) to 5 (*very good/very often*). Participants indicated their average knowledge about Twitter ( $M = 2.05$ ,  $SD = 0.98$ ) as well as their average usage of Twitter ( $M = 1.36$ ,  $SD = 0.76$ ) as rather low.

### ***Design***

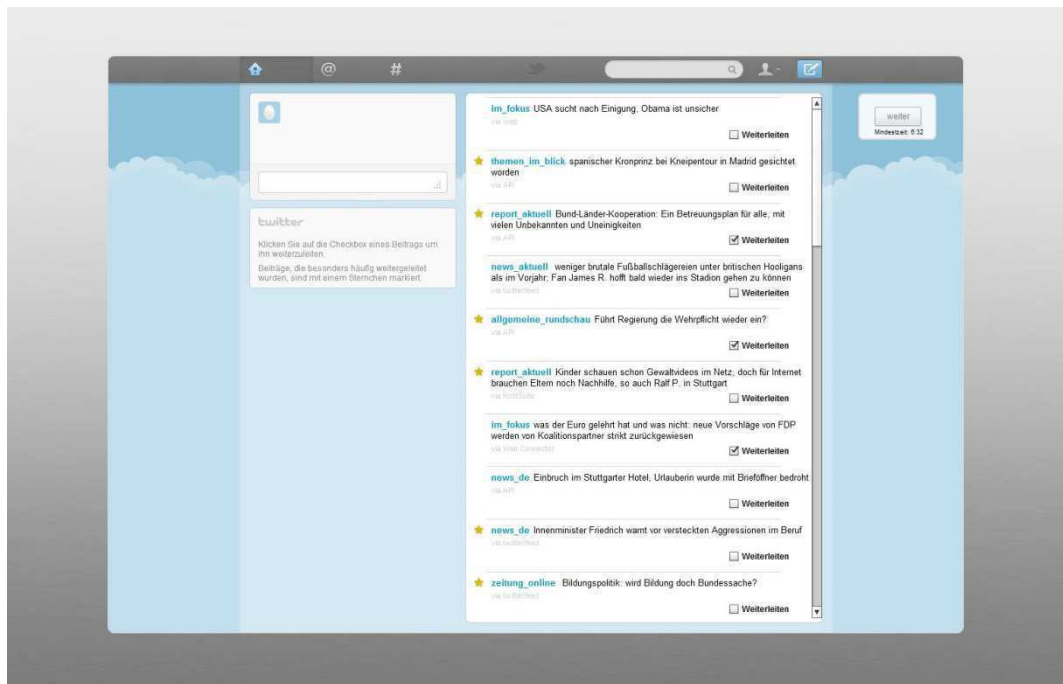
This laboratory study used a 2 x 2 within-subject design to explore the effect of informational value and awareness information on retweeting. For the factor informational value, I used the eight news factors and subsumed them into two categories: Controversy, Negative Consequences, Relevance, and Unexpectedness (*high value category*), and Aggression, Personalization, Prominence, and Proximity (*low value category*). For the factor awareness information, little star icons were assigned randomly to each half of the material. The other half of the tweets did not have any symbol. The subset of marked tweets varied randomly for each participant.

### ***Materials***

Material consisted of 36 tweets about a wide range of German news topics. All tweets conveyed different news factors in a different number and in different combinations (see Appendix D). To compare the two groups of news factors, I subsumed all tweets into two non-overlapping subsets. The first set (*high value set*) contained all tweets that conveyed news factors with high informational value, whereas the second set (*low value set*) contained all tweets that conveyed news factors with low informational value. This means that each tweet contained either news factors of only high informational value or news factors of only low informational value. I prepared the material in such a way that each news factor occurred in the same number (eight times per each news factor) within all messages. Further,

occurrence of news factors within one informational value group was uncorrelated, which means that the number of occurrences of each news factor was not related to the number of occurrences of any other news factor. The created fictive tweets were not longer than 140 characters each and looked like real tweets. For experimental reasons, I created names of fictive news sources but omitted source icons such as logos as they exist in real Twitter. All tweets were presented in a simulated Twitter environment (see Figure 3).

Figure 3  
*Screenshot of Presented Tweets, Study 4*



## Measures

As dependent variable, the retweeting behavior was measured and further also importance ratings were measured in order to receive insights into whether the assumption might be right that high informational value as well as a social cue is rated as highly important.

*Retweeting:* To measure retweeting information, participants had to click a button to indicate their decision to retweet the information. The decision was counted dichotomously (0 – *not retweeted*, 1 – *retweeted*).

*Importance ratings:* I measured the importance for each tweet by asking the participants to rate each tweet on a five point Likert-scale (1 – *unimportant* to 5 – *very important*).

### ***Procedure***

I recruited participants from a database of subscribed volunteers and invited them to take part in a “Twitter – Microblogging Study” in a laboratory in a German research institute where they would have to read and select information given to them. All instructions and materials were presented on a computer screen. The participants were told to read the instructions and, if necessary, to ask about anything they did not understand. As the experimental manipulations in this study lay solely in variations within the material, there were no different conditions for the participants, and thus, the procedure was the same for all participants. Participants were instructed about the meaning of the star icons: They were told that star icons beside the tweets mean that this respective tweet has already been retweeted very often by other Twitter users. The tweets then were presented in a random order for each participant to avoid sequence effects. I measured retweeting by the participants’ choice of retweeting a tweet or not. Participants decided by marking the checkbox of those tweets that they wished to retweet. After they had decided which tweets to retweet, all tweets were presented again. This time, participants had to rate each tweet on importance. At the end, participants were thanked and debriefed.

## Results

First, the descriptive results of the particular news factors regarding their influence on retweeting (see Table 6) will be presented. Participants selected mostly that information for retweeting that conveyed the news factors Relevance, Negative Consequences, Unexpectedness, and Controversy. These are all news factors with high informational value.

Table 6

*Percentage of Retweeted Tweets Regarding Each News Factor (Out of Eight Possible Ones) by Each Person (N = 64)*

News factor	Informational value	Retweeted	
		<i>M</i>	<i>SD</i>
Aggression	Low	.20	.17
Controversy	High	.38	.23
Negative Consequences	High	.44	.25
Personalization	Low	.13	.17
Prominence	Low	.18	.16
Proximity	Low	.17	.16
Relevance	High	.47	.27
Unexpectedness	High	.38	.23

### *Retweeting*

I calculated the mean retweeting scores for all tweets in all four combinations of the independent variables. Thus, I had mean retweeting scores for tweets from the high value set with star icons, tweets from the high value set without star icons, tweets from the low value set with star icons, and tweets from the low value set without star icons. All descriptive statistics regarding retweeting are presented in Table 7.

To test the hypothesis, I then performed a 2 x 2 repeated measures analysis of variance (ANOVA), with informational value (high vs. low) and awareness information (present vs. absent) as independent variables and retweeting as dependent variable. According to Hypothesis 1, participants should retweet more tweets from the high value set than tweets from the low value set if tweets are not marked with awareness information. In contrast, if tweets are marked with awareness information, the difference between retweeted tweets from the high value set and tweets from the low value set should be smaller.

Table 7

*Percentage of Retweeted Tweets*

		<i>M</i>	<i>SD</i>
Informational value	Awareness information		
High	Yes	.22	.14
	No	.18	.11
Low	Yes	.09	.07
	No	.07	.09

The ANOVA revealed no interaction effect of Awareness information x Informational value,  $F(1, 63) = 2.39, p = .127, ns$ . Thus, the hypothesis was not corroborated. Instead, it was found a significant main effect of informational value,  $F(1, 63) = 120.29, p < .001$ , partial  $\eta^2 = .656$ . This means that tweets from the high value set were retweeted more often than tweets from the low value set. Further, the ANOVA revealed also a main effect for awareness information,  $F(1, 63) = 9.74, p = .003$ , partial  $\eta^2 = .134$ . This means that tweets that were marked with awareness information were retweeted more often than tweets without awareness information.



***Additional Analysis: Importance Ratings***

Analogously to retweeting, I calculated mean importance rating scores for all combinations of the independent variables, which means that I had mean importance ratings for tweets from the high value set with star icons, tweets from the high value set without star icons, tweets from the low value set with star icons, and tweets from the low value set without star icons. All descriptive statistics regarding importance ratings are presented in Table 8.

Table 8

*Importance Ratings (1 – Unimportant, 5 – Very Important)*

		<i>M</i>	<i>SD</i>
Informational value	Awareness information		
High	Yes	3.63	0.56
	No	3.50	0.56
Low	Yes	2.33	0.46
	No	2.22	0.53

According to the assumption, participants should rate tweets from the high value set as well as tweets that were marked with awareness information as being more important than tweets from the low value set and as being more important than tweets without awareness information. I again performed a 2 x 2 repeated measures ANOVA with informational value (high vs. low) and awareness information (present vs. absent) as independent variables and importance ratings as dependent variable. The analysis revealed a significant main of effect informational value,  $F(1, 63) = 470.88, p < .001, \text{partial } \eta^2 = .882$ . This means that tweets from the high value set were rated as more important than tweets from the low value set. Further, the ANOVA also revealed a significant main effect of awareness information,  $F(1, 63) = 6.80, p = .011, \text{partial } \eta^2 = .097$ . This means that tweets that were marked with

awareness information were rated as more important than tweets without awareness information. There was no interaction effect of Informational value x Awareness,  $F(1, 63) < 1$ , *ns*.

I conducted additional analyses to investigate whether importance ratings mediate the relationship between the independent variables and retweeting behavior, using techniques suggested by Judd, Kenny, and McClelland (2001) for testing mediation in within-subject designs. The first mediation analysis examined the relationship between informational value and retweeting. As reported above, informational value affected importance ratings and informational value also affected retweeting. Hence, the basis for testing mediation is given. Importance rating difference scores (importance ratings of tweets from the high value set minus importance ratings of tweets from the low value set) were then created. Additionally, retweeting difference scores (retweeting of tweets from the high value set minus retweeting of tweets from the low value set) were created. This retweeting difference score was then regressed on two predictors: the sum of each participants' importance rating scores (high and low informational value) and the difference of each participants' importance rating scores (Judd et al., 2001). A significant regression coefficient for the importance rating difference predictor indicated mediation of the retweeting effect by importance ratings,  $\beta = .32$ ,  $p = .009$ . Furthermore, the estimated intercept was not found to differ from zero ( $B = -.242$ ,  $p = .125$ , *ns*), indicating complete mediation of retweeting differences by differences in importance ratings. Hence, the influence of informational value on retweeting is due to the importance that participants ascribe to informational value.

Analogously, I conducted the second mediation analysis which examined the relationship between awareness information and retweeting. The basis for testing mediation was also given as reported above: Awareness information influenced both importance ratings and

retweeting. The regression analysis then indicated that importance ratings also mediated the effect of awareness information on retweeting ( $\beta = .45, p < .001$ ). Finally, the estimated intercept was again not found to differ from zero ( $B = -.021, p = .76, ns.$ ), indicating complete mediation of retweeting differences by differences in importance ratings. Hence, the influence of awareness information on retweeting is also due to the importance that participants ascribe to the awareness information.

## **Discussion**

The present study was conducted to investigate criteria that influence selection of news to share with others in a Web 2.0 application such as Twitter. Two kinds of criteria were investigated: criteria inherent in the information and contextual criteria. As information inherent criteria, I used the concept of informational value adapted from and referring to news value theory; as contextual criteria, I used awareness information about agents, which is drawn from research on awareness and leads to social navigation. The agents' behavior was marked by a symbol next to the tweets, indicating that other agents have retweeted that respective tweet very often. I expected an interaction effect of awareness information and informational value in such a way that if tweets were marked with a star icon, participants should have retweeted them while disregarding the informational value of the tweets. In contrast, out of the tweets without a star icon, participants should have retweeted those tweets containing high informational value news factors more often than tweets containing low informational value news factors. However, there was no interaction effect of awareness information and informational value. Instead, the analysis revealed two main effects, showing that high informational value led to more retweeting than low informational value and that additionally, star icons that indicate selection decisions of others led to more retweeting compared to no star icons.

As in previous studies, I found the main effect of informational value to be very strong and stable; so far, awareness information as contextual criteria has not been influential enough to qualify that effect. Further, informational value also affected importance ratings, confirming that high informational value is understood to be important. Moreover, the effect of informational value on retweeting was due to the effect of informational value on importance ratings. This sheds further light on the process of how informational value affects selection decisions. However, taking the main effect of awareness information together with the rating results, it appears that cues of a group of other users are indeed noticed. Moreover, although awareness information did not qualify the effect of informational value on retweeting, it led to a higher rating score on the importance of the tweet. It could be shown that the ratings of importance also mediated the effect of awareness information on retweeting. Taken together, this provides evidence for the influence of social navigation on retweeting: Aggregated traces of agents' behavior provide orientation for other users and affect their selection decisions. Thus, for users of the Web 2.0, it might be relevant and helpful to see what other users find valuable or interesting in order to facilitate their own decision making. This finding is in line with studies that have reported on the effectiveness of awareness and social navigation cues in areas such as information seeking (Schwind & Buder, 2012) and collaborative learning (Engelmann et al., 2009).

Some limitations must be taken into consideration when interpreting the results of this study. As assumptions were tested under controlled laboratory conditions, I had to accept a rather low ecological validity. However, only under such conditions I was able to test the assumed effects by using systematically prepared material. Next, I recruited mainly students as participants, who had only low experience with Twitter. Of the participants, only about 11% indicated to have their own Twitter account. Therefore, further research might investigate

whether this effect would be replicable with more experienced participants. Then, it is not clear yet how exactly the effect of social navigation comes about. It might be possible that people just follow the majority. This would be in line with the bandwagon effect, which means that people just do what many other people did (e.g., Sundar et al., 2008), using their traces as a heuristic cue to avoid too much cognitive effort with decisions. However, social navigation might also depend on some kind of social influence and group norms (e.g., Postmes et al., 2000). This would be the case if the group of Twitter users would be salient and relevant for an individual and therefore the users behave according to the group's norm in order to belong to that group. In this concrete context, this would mean that the provided awareness information about the retweeting behavior stemmed from a relevant group, and thus, the single user would adapt his or her retweeting decisions according to the decisions of that group. However, as I did not manipulate any groups or identities, this question remains open. Future studies might show whether social navigation could depend on such social influences.

Despite of these limitations, the findings shed light on the question of how news in Web 2.0 is selected for sharing. Since in Web 2.0 settings typically a huge amount of information is available, selection decisions are required, and a competition for users' attention is going on. Thus, it is important to know which cues and criteria users comply with. This study showed that criteria inherent in information strongly influence selection decisions. However, aside from the content, also the social aspect of Web 2.0 plays an important role as the behavior of other users also impacts selection decisions. This is part of what makes social media social: interdependencies and influences on each other's behavior.

## Bridge

In *Chapter 4*, I presented a study that could show that agent awareness led to social navigation and thus, influenced retweeting decisions. However, and contrary to my expectation, agent awareness did not moderate the influence of informational value on retweeting. Therefore, in *Chapter 5*, a further study will be presented that investigated the potential moderating role of the source of awareness information. I argue that social navigation should be increased if the recommendation source refers to a relevant in-group while the influence of informational value should be decreased in this case.

***Chapter 5 | The Group Matters: The Moderating  
Effect of In-Group Salience on Sharing News in  
Twitter***

## Introduction

My prior studies have shown that informational value, which is defined as property to affect a large audience and/or to potentially impact the audience's mental structures or behavior, is not the only criterion that influences selection decision in Web 2.0 applications such as Twitter. Contextual criteria, namely, awareness information, also influences which tweets will be selected for retweeting and which ones not (see *Chapters 3 and 4*). Awareness in general refers to knowledge and information about, for example, other people, objects, feelings, or conditions (e.g., Carroll, Neale, Isenhour, Rosson, & McCrickard, 2003). Awareness information can be provided in computer-mediated communication (cmc) settings as these settings typically lack in contextual cues (e.g., information about the presence of communication partners, information about their attitudes, their knowledge, or their behavior). In the context of my research, awareness information can be regarded from two perspectives: First, information about the audience can be made salient. This could lead to audience design (Clark & Murphy, 1982), that is, adapting one's communication behavior to the audience's properties. Second, information about agents can be made salient. Agents are other Twitter users who also retweet and thus participate in the process of spreading news. This kind of awareness information should lead to social navigation (Dourish & Chalmers, 1994; Höök et al., 2003), that is, following the behavioral traces left by many other people. In the current chapter, I aim to further extend the insights into relevant criteria that influence such selection decisions. Based on the prior findings of Study 4 that awareness information about agents leads to social navigation and thus affects selection decisions (see *Chapter 4*), I will now investigate whether the salience of a relevant in-group increases the degree of social navigation. Moreover, I aim to find out whether and how this influence might interact with the influence of awareness information about agents and the influence of informational value.



## **The Influence of Social Navigation and In-Group Salience**

In Study 4, I could show that not only informational value influences selection decisions of Twitter users but also awareness information about agents. The approach of awareness information in general is often intended to counteract the lack of contextual cues in cmc-settings (e.g., Sproull & Kiesler, 1986) by making information about communication partners salient. Many studies could show that awareness information affects selection decisions, communication behavior, or learning (e.g., Buder, 2011; Buder & Bodemer, 2008; Engelmann et al., 2009; Janssen & Bodemer, 2013; Janssen et al., 2011; Phielix et al., 2011; Schreiber & Engelmann, 2010). Moreover, if such information relies on many collected and aggregated traces about other users' behavior, decisions, or attitudes, it should lead to social navigation (Dourish & Chalmers, 1994; Höök et al., 2003). The phenomenon of social navigation is probably well known to every Internet user: For instance, users receive recommendations about what to look at or what to purchase, based on their navigation patterns, their purchasing behaviors, or the evaluations of other users; online newspapers rank the most commented or most viewed articles; in online forums the best posts or answers are marked with a five star rating, indicating that many other people found a particular post relevant or helpful. Symbols such as little star icons may indicate quality, attractiveness, or popularity of an item and are therefore likely to influence users' selection decisions (Winter, Krämer, Appel, & Schielke, 2010). Hence, the marked object has usually been judged positively by many other users. With reference to Twitter, if a tweet is marked with a little star icon, this could mean that this tweet has been selected very often by other users. According to the concept of social navigation, this star icon should lead to behavioral adaption in a way that users follow the presented behavior of many agents.

In this way, such awareness information about agents functions as *social recommendation* of other users about what to read or to select (Huang, Cheng, Guo, Shen, & Yang, 2010). This principle could be explained from a psychological point of view: If people follow others or their recommendations, then social influence occurs (Cialdini & Goldstein, 2004; Lee & Nass, 2002; Postmes et al., 2001; Sassenberg, 2011; Spears & Lea, 1992; Turner, 1991). Following others' leads means to save time and cognitive effort and often provides an effective outcome (Cialdini & Trost, 1998; Shah & Oppenheimer, 2008). Moreover, such social recommendations might be regarded as social norms, which are "rules and standards that are understood by members of a group, and that guide and/or constrain social behavior" (Cialdini & Trost, 1998, p. 152). People follow social norms in order to, for example, behave effectively, build and maintain social relationships, or in order to manage one's self-concept (e.g., Cialdini & Trost, 1998; Postmes et al., 2000). However, such a social influence might be moderated by how a person's identity (e.g., Lee, 2006; Postmes et al., 1998) or self-categorization (e.g., Abrams et al., 1990) is shaped (e.g., Reicher et al., 1995). In a similar manner, I argue that, although there is good reason to believe that social navigation and social recommendations are effective, the effect of social recommendations might be moderated by the source of the recommendation. Contextual cues that refer to a relevant in-group should make the in-group membership salient and activate the corresponding norms (James & Greenberg, 1989). Therefore, recommendations that stem from members of a relevant in-group should increase social navigation. For instance, a student might not choose a restaurant recommended by a professor but would accept the recommendation of other students because then a particular in-group membership becomes salient.

Taken together, by providing persons with cues to an existing and relevant in-group, this group becomes salient. Then, group norms such as common behavior, or social

recommendations should influence persons to behave accordingly. Thus, the principle of social navigation (i.e., the effects of awareness information about agents) should be moderated by the salience of a relevant in-group.

## Study 5

In Study 5, my aim was to investigate whether and how the salience of an in-group interacts with informational value of tweets and awareness information about agents regarding its influence on retweeting behavior. To do this, I conducted an experimental laboratory study, using systematically prepared material and invited students as participants.

I expected that student participants for whom no in-group was made salient would show less social navigation than student participants for whom a relevant in-group was made salient. Participants without in-group salience should instead be more influenced by informational value compared to participants with in-group salience. Taken together, I expected that the influences of informational value and awareness information on retweeting behavior each will be moderated by whether a relevant in-group is made salient or not. I derived the following two hypotheses:

*Hypothesis 1:* The difference between the number of retweeted tweets from the high value set minus the number from the low value set will be larger for participants in the non-salient condition compared to participants in the salient condition.

*Hypothesis 2:* The difference between the number of retweeted tweets with a star icon minus those without a star icon will be larger for participants in the salient condition compared to participants in the non-salient condition.

## Method

### *Participants*

Data were collected from 65 participant volunteers (22 male, 43 female). All participants were German speaking students, recruited via a database of subscribed volunteers. For their participation in the laboratory experiment, which took 60 minutes, participants were paid 8 €. Alternatively, the students could receive credit for their participation if needed for course requirements. Participants' age ranged from 18 to 28 years ( $M = 21.51$ ,  $SD = 2.60$ ). Participants were asked about their average knowledge about Twitter and their average usage of Twitter. Both items were measured by a five-point Likert scale ranging from 1 (*very small/rarely*) to 5 (*very good/very often*). Participants indicated their average knowledge about Twitter ( $M = 2.18$ ,  $SD = 1.04$ ) as well as their average usage of Twitter ( $M = 1.28$ ,  $SD = 0.63$ ) as rather small. Further, participants indicated how much they identified with being students, which was also measured by a five-point Likert scale ranging from 1 (*very little*) to 5 (*very strongly*), as rather high ( $M = 4.00$ ,  $SD = 0.94$ ).

### *Design*

This laboratory study used a 2 x 2 x 2 mixed design to explore the effects of informational value, awareness information, and in-group salience on retweeting. For the within-factor informational value, I used eight news factors and subsumed them into two categories: Controversy, Negative Consequences, Relevance, and Unexpectedness (*high value category*) versus Aggression, Personalization, Prominence, and Proximity (*low value category*). For the within-factor awareness information, little star icons were randomly assigned to each half of the material. The other half of tweets was not marked with a symbol. The subset of marked tweets varied randomly for each participant. For the between-factor, in-group salience, I created two experimental conditions, differing in the information about which

group the star icons referred to: In one group, the star icons referred to Twitter users in general (*non-salient condition*,  $n = 32$ ), whereas in the other group, the star icons referred to other students (*salient condition*,  $n = 33$ ).

### ***Materials***

The material consisted of 36 tweets about a wide range of news topics (see Appendix E). All tweets conveyed different news factors in a different number and in different combinations. To compare the two groups of news factors, I subsumed all tweets into two non-overlapping subsets. The first set (*high value set*) contained all tweets that conveyed news factors with high informational value, whereas the second set (*low value set*) contained all tweets that conveyed news factors with low informational value. This means that each tweet contained either news factors of only high informational value or news factors of only low informational value. I prepared the material in such a way that each news factor occurred in the same number (eight times per each news factor) within all messages. Further, occurrence of news factors within one informational value group was uncorrelated, which means that the number of each news factor was not related to the number of any other news factor. The tweets were not longer than 140 characters each and looked like real tweets. However in contrast to Twitter, I omitted source icons and listed fictive news sources from which the items purportedly stemmed. All tweets were presented in a simulated Twitter environment.

Examples for tweets are: “*Will the government bring the general conscription back into use?*” (as an example for a tweet containing the high informational news factors Unexpectedness and Relevance), and “*Chancellor Angela Merkel will visit a museum in Stuttgart*” (as example for a tweet containing news factors of low informational value, Prominence and Proximity).

### ***Procedure and Measurement***

I recruited participants from a database of subscribed volunteers and invited them to take part in a “Twitter – Microblogging Study” in our laboratory where they would have to read and select information given to them. All instructions and materials were presented on a computer screen. The participants were told to read the instructions and, if necessary, to ask about anything they did not understand. In one condition (non-salient condition), participants were told that the star icon refers to other Twitter users who retweeted the respective tweets very often. In contrast, in the other condition (salient condition), participants were told that the star icon refers to other students who retweeted the respective tweets very often. Otherwise the procedure was the same for all participants. The tweets were presented in a random order for each participant to avoid sequence effects. I measured retweeting by the participants’ choice of retweeting a tweet or not. To do this, they had to decide, after reading the tweets, which tweet they wanted to retweet. Participants decided by marking a checkbox adjacent to those tweets that they wished to retweet. The decision was counted dichotomously (0 – *not retweeted*, 1 – *retweeted*). At the end, participants were thanked and debriefed.

### **Results**

Before analyzing treatment effects, I checked the variables “average knowledge about Twitter”, “average usage of Twitter”, and “identification with students” to ensure that differences were not due to pre-existing differences between the two conditions. Regarding all three items, the average knowledge about Twitter, its average usage, and identification with students, independent *t*-tests yielded no differences between the two conditions (knowledge:  $t(63) = -0.93$ ,  $p = .357$ , *ns*; usage:  $t(63) = -0.74$ ,  $p = .464$ , *ns*; identification:  $t(63) = 1.61$ ,  $p = .112$ , *ns*).

Table 9

*Percentage of Retweeted Tweets Regarding Each News Factor (Out of Eight Possible Ones) by Each Person (N = 65)*

News factor	Informational value	Retweeting	
		<i>M</i>	<i>SD</i>
Aggression	Low	.25	.20
Controversy	High	.36	.20
Negative Consequences	High	.43	.23
Personalization	Low	.15	.17
Prominence	Low	.19	.18
Proximity	Low	.22	.16
Relevance	High	.44	.25
Unexpectedness	High	.37	.21

For the descriptive results of the particular news factors regarding their influence on retweeting see Table 9. Participants selected mostly that information for retweeting that conveyed the news factors Relevance, Negative Consequences, Unexpectedness, and Controversy. These are all news factors with high informational value. In the following, I will present the results regarding the hypotheses.

### ***Retweeting***

All descriptive statistics regarding retweeting and the hypotheses are presented in Table 10. To test the hypotheses, I performed a mixed design analysis of variance (ANOVA), with informational value (high vs. low), awareness information (present vs. absent), and in-group salience (non-salient vs. salient) as independent variables and retweeting as the dependent variable. According to Hypothesis 1, participants in both the non-salient and in the salient condition should retweet tweets from the high value set more often than tweets from the low value set. However, the difference between retweeted tweets from the high and the low value

set should be larger for participants in the non-salient condition. According to Hypothesis 2, both participants in the non-salient and in the salient condition should retweet tweets with a star icon more often than tweets without a star icon. However, the difference between retweeted tweets with and those without a star icon should be larger for participants in the salient condition.

Table 10

*Percentage of Retweeted Tweets*

		In-group salience		
		Non-salient	Salient	Total
Informational value	Awareness information			
	High			
	Present			
	<i>M</i>	.19	.22	.20
	<i>SD</i>	.14	.11	.12
	Absent			
	<i>M</i>	.18	.17	.18
	<i>SD</i>	.11	.12	.11
Low	Present			
	<i>M</i>	.06	.14	.10
	<i>SD</i>	.06	.11	.10
	Absent			
	<i>M</i>	.07	.11	.09
	<i>SD</i>	.06	.08	.08

The ANOVA revealed three significant main effects: First, I found a main effect of informational value,  $F(1, 63) = 80.02, p < .001, \text{partial } \eta^2 = .559$ . This means that tweets of the high value set ( $M = .19, SD = .12$ ) were retweeted more often than tweets from the low value set ( $M = .10, SD = .09$ ). Second, there was a main effect of awareness information,



$F(1, 63) = 4.16, p = .046, \text{partial } \eta^2 = .062$ , indicating that tweets with a star icon ( $M = .15, SD = .11$ ) were retweeted more often than tweets without a star icon ( $M = .13, SD = .09$ ). Finally, there also was a main effect of in-group salience,  $F(1, 63) = 4.18, p = .045, \text{partial } \eta^2 = .062$ , meaning that participants of the salient condition ( $M = .16, SD = .10$ ) retweeted more tweets than participants in the non-salient condition ( $M = .12, SD = .09$ ).

However, the ANOVA also revealed two significant interaction effects that qualify the main effects. First, I found a significant interaction effect of informational value and in-group salience,  $F(1, 63) = 4.26, p = .043, \text{partial } \eta^2 = .063$ . This interaction effect is in line with Hypothesis 1 and can be explained by pairwise comparisons using Bonferroni adjustment: The difference of retweeted tweets from the high and the low value set was larger for participants from the non-salient condition ( $F(1, 63) = 59.69, p < .001, \text{partial } \eta^2 = .487$ ) than for participants from the salient condition ( $F(1, 63) = 24.04, p < .001, \text{partial } \eta^2 = .276$ ). This indicates that participants from the salient condition retweeted tweets from the high value set ( $M = .20, SE = .02$ ) more often than tweets from the low value set ( $M = .12, SE = .01$ ). However, the difference was larger for participants from the non-salient condition (high value set:  $M = .18, SE = .02$ ; low value set:  $M = .07, SE = .01$ ).

Second, and partially in line with my expectations, the ANOVA revealed a marginally significant interaction effect of awareness information and in-group salience,  $F(1, 63) = 3.80, p = .056, \text{partial } \eta^2 = .057$ . Pairwise comparisons using Bonferroni adjustment indicated that participants in the non-salient condition retweeted tweets with ( $M = .13, SE = .02$ ) and without star icons ( $M = .12, SE = .01$ ) in an equal number ( $F(1, 63) < 1, ns$ ), whereas participants in the salient condition retweeted tweets with a star icon ( $M = .18, SE = .02$ ) more often than tweets without a star icon ( $M = .14, SE = .01$ ) ( $F(1, 63) = 8.08, p =$

.006, partial  $\eta^2 = .114$ ). Thus, although the result is only marginally significant, it still shows a tendency in the direction of Hypothesis 2. I neither found an interaction effect of informational value and awareness information,  $F(1, 63) < 1$ , *ns*, nor a three-way interaction of informational value, awareness information, and in-group salience,  $F(1, 63) < 1$ , *ns*.

## **Discussion**

The present study investigated the moderating role of in-group salience for the influence of informational value on retweeting and for the influence of agent awareness on retweeting. My prior studies have shown that high informational value leads to more retweeting compared to low informational value. Moreover, I found that awareness information about agents leads to social navigation (see Study 4 in *Chapter 4*). In the current study, it was expected that both influences should be moderated by in-group salience. Thus, two interaction effects were hypothesized: an interaction between informational value and in-group salience (Hypothesis 1), and an interaction between awareness information and in-group salience (Hypothesis 2). Results confirmed Hypothesis 1, and to some degree Hypothesis 2. Student participants who were told that awareness information originated from other Twitter users were more strongly influenced by informational value than student participants who were told that awareness information originated from other students. In line with former findings, the study shows that informational value appears to be a powerful indicator of retweeting decisions, but the extent of this impact can be weakened by activating in-group salience. Further, student participants who were told that awareness information originated from other Twitter users were less affected by agent awareness than student participants who were told that the awareness information originated from other students. In fact, results revealed that participants in the non-salient condition were not influenced by awareness information at all. This is interesting because I assumed that social

recommendation cues should have an influence per se and that their influence should only increase if they refer to a relevant social group. This finding is also in contrast to Study 4, which showed that social recommendations lead to social navigation even without cues to an in-group (see *Chapter 4*). The main difference between both studies is that in the current study all participants were asked at the beginning about their identification with being students. It might be the case that this identification item created a stronger subjective contrast between oneself and a community, effectively rendering this community as an out-group in the non-salient condition.

If social navigation depends on whose traces the recommendations stem from, this would be in line with findings from social psychology indicating that social influence depends strongly on how valued and important the group from which the norms come is perceived (e.g., Turner, 1991). In the current case, I argue that students should perceive other students as valued and important as they belong to their own social group; and it should be counterproductive for the self-esteem not to perceive one's own group as meaningful.

There are some limitations that are due to the experimental nature of the study and that have to be taken into account. First, I used carefully and systematically prepared material and conducted a lab study. This entails a decreased ecological validity. However, I would not have been able to compare retweeted and not retweeted tweets out of a well-prepared set of tweets in the real Twitter. Second, participants for the study had rather low experience with Twitter. Only about 17% of them indicated to have their own Twitter account. Therefore, future studies might investigate whether participants with more Twitter experience would retweet in a similar manner or whether they would show different retweeting patterns. Third, only one particular group was used to manipulate in-group salience, namely, students.

Moreover, I did not explicitly measure the perceived importance or closeness to the group of students; I only measured the degree of identification. However, the results indicated that, at least in this case, the manipulation was successful as the group of students was recognized and had an impact on retweeting decisions. Nevertheless, future studies might extend measurements and investigate whether these findings are generalizable to other groups.

Despite these limitations, this study gave further insights into selection decisions in the Twitter context. Whether news is shared with others or not is dependent on both content criteria (informational value) and context criteria (awareness information). However, both influences are moderated by the salience of the group from which awareness information originated, thus emphasizing the importance of the *social* in the social Web.

## Bridge

The study presented in *Chapter 5* indicated that the influence of informational value as well as the influence of agent awareness can be moderated by in-group salience. If the recommendation source refers to a relevant in-group and thus, makes the group salient, social navigation increases and the effect of informational value decreases. Although this result pattern is somewhat contradictory to findings reported in *Chapter 4*, it sheds further light on principle and nature of social Web.

The empirical part of this dissertation concluded with *Chapter 5*. In *Chapter 6*, all main results will be summarized and general considerations and implications of this dissertation will be discussed.

## ***Chapter 6 | General Discussion***

## Overview and Beyond

The current dissertation investigated which criteria influence retweeting decisions in Twitter. To do this, one online study and four laboratory studies were conducted. The results yielded two categories of factors that influence retweeting behavior: First, characteristics of the tweets' content affect whether people share them or not. By drawing on news value theory, I conceptualized the notion of informational value, which turned out to strongly impact retweeting: High informational value leads to more retweeting than low informational value. News factors with high informational value are Controversy, Negative Consequences, Relevance, and Unexpectedness as they all potentially affect a large audience and/or have the potential to impact others' mind or behavior. In contrast, the news factors Aggression, Personalization, Prominence, and Proximity turned out to be less influencing for retweeting decisions as they have only low informational value, hence, neither the potential to affect a large audience nor to impact the audience's minds. Across four studies (see *Chapters 2 - 5*), I could show and replicate this finding, indicating that informational value seems to be a stable and strong criterion for deciding whether to retweet news items or not. Only the last study (see *Chapter 5*) revealed a moderated influence of informational value in such a way that in-group salience regarding the awareness source could weaken the effect of informational value on retweeting.

A further analysis of Study 4 shed light on why informational value influences retweeting. It was found that informational value was mediated by importance ratings. This means that news with high informational value news factors was rated as more important than news with low informational value news factors and, therefore, high informational value led to more retweeting than low informational value. Hence, this pattern seems to further confirm

my assumption about the nature of high informational value: News that reach many people and that potentially affect them should be recognized as meaningful.

Considering that I have chosen only eight news factors out of a possible number of more than 20 news factors that have been discussed in research in the past years (Ruhmann et al., 2003; Ruhmann & Göbbel, 2007), one might ask whether other news factors might not have been applicable as well. Among the established news factors, Continuity is one that often was found to be influential for selection decisions of journalists as well as for selection decisions of recipients (e.g., Eilders, 1997; Sande, 1971). In contrast to the news factor Unexpectedness, Continuity comes into play for events or developments that already have been covered by news media earlier. Thus, people already know them and are potentially interested in how the story proceeds. At first sight, it might seem to be contrary to the function and effect of Unexpectedness. However, in a perfect news value world, the news factors Continuity and Unexpectedness actually would enter the stage together: Issues that are already known and therefore expected by recipients take an unexpected turn. What would it have meant to include Continuity into the concept of informational value? I would argue that Continuity should have high informational value because recipients have already integrated a mental schema for this certain event. Moreover, events that are covered over a long period usually are of high relevance for many people. However, in the research for the present dissertation, I decided to exclude Continuity from the set of news factors for experimental reasons: As I created fictive news based on real existing news tweets, it was hardly possible to uncouple Continuity from Unexpectedness or from Relevance while holding the entire material systematically balanced at the same time. Other news factors that might be included in future research are Humor or Novelty. In the context of Twitter, where private acting people disseminate news in their leisure time, it might be reasonable to expect



that fun plays an important role. Especially as the “Internet community” (whoever that is) is supposed to have a special sense for humor. In addition, Novelty could be taken into account because Twitter as real-time news medium should be highly responsive to any novelty.

Further, not only news factors as content criteria might affect retweeting decisions but also other characteristics of the content. As already mentioned in the introduction (see *Chapter 1*), there are contradictory findings about whether positive or negative news is spread more often (e.g., Berger & Milkman, 2012; Hansen et al., 2010; Pfitzner et al., 2012). To me, the argument of negativity as a retweeting predictor is actually more convincing. Galtung and Ruge (1965) already formulated negativity as a news factor that influences whether an event will be published as news or not. In contrast, they did not name any news factor positivity or happiness. Accordingly, Kepplinger and Weissbecker (1991) argued that the amount of negative news coverage increased regardless of the actual incidence of negative events. It may be the case that negative emotions lead more to communicative action than positive emotions do as, for example, Chmiel et al. (2011) found this for online forum participation. Further, Koch, Peter, and Obermaier (2013) recently showed that negatively framed news was perceived as more credible by recipients than positively framed news, thus leading to a negativity-credibility-bias. Hence, there seem to be more indications for negative valence as being supportive for retweeting compared to positive valence. However, I would agree with Berger and Milkman (2012) that not only valence alone but also arousal, that is, the concrete facet of a valence, such as anxiety or anger, might influence how much news is going to be spread. In addition, also gender could influence preference of valence as, for example, Grabe and Kamhawi (2006) found that men were more aroused by negative news whereas women rated their arousal by positive news as being higher. Future studies could try to shed more light on this issue.

Beyond valence, also other content characteristics might play a role in retweeting decisions, such as, for example, topic or style of the news tweet. It might be the case that stories around political elections always have a greater potential to become retweeted than car accidents. Similarly, especially in Twitter, it could be that news or comments written in an ironic style will be preferred to purely serious news. However, with respect to topics, again news value theory could be employed because political elections and their results usually affect many people, whereas car accidents usually affect only few people.

The second category of influencing criteria that I investigated in the present dissertation contains context information, namely, information and cues about other Twitter users and their interests or behavior. To accomplish this, I drew on the awareness approach, which means to make information that is usually lacking in cmc-settings visible and salient. In the Twitter context, two perspectives of awareness information could be differentiated: First, audience awareness could be provided (see *Chapter 3*) by making characteristics about the audience (i.e., the followers) salient, such as, for example, their interests. Second, agent awareness could be provided (see *Chapters 4 and 5*), which means to make salient how other users who also share news in Twitter behaved. Whereas audience awareness should lead to audience design, agent awareness should result in social navigation. Both kinds of awareness information were found to affect retweeting decisions.

Regarding the first perspective, audience awareness made people adapt their retweeting behavior according to the followers' interests. However, this was true only for audience awareness that was guiding. Guiding in this case means that information was unlikely and specific enough that it actually implicates a reaction, namely, audience design. It was not possible from my data to disentangle what actually made the awareness information guiding. I supposed that the combination of low likelihood, which enhances attention (analogously to

the news factor Unexpectedness), and of specificity, which could be understood as fit to the context or the task, leads to reaction. However, it remains unanswered whether only one of these two characteristics would also make awareness information guiding. I would doubt that only low likelihood, without any context fit, provokes audience design. Dourish and Bellotti (1992) pointed out that potential problems with awareness information are due to the fact that awareness information might be not specific enough or does not relate to the particular activity. Conversely, if awareness information would fit to the context, but would be very likely, it might not cause any attention and thus no action. Hence, I assume that both elements, low likelihood and specificity, are needed in order to make awareness information guiding. However, this might be a subject for further studies.

Regarding the second perspective, agent awareness made users following the “footprints in the snow” (Höök et al., 2003, p. 1), meaning that they adapted their retweeting behavior according to how other Twitter users retweeted before. In Study 4, a further analysis gave insight into why agent awareness influenced retweeting. It was found that agent awareness was mediated by importance ratings. This means that tweets with agent awareness were rated higher on importance than tweets without agent awareness, and therefore, they were retweeted more often than tweets without agent awareness. This result indicates that the presence of other users in the social Web indeed is recognized and valued. Thus, it should not be surprising that the social Web might provoke social influence which in turn could result in social navigation.

However, both audience awareness and agent awareness did not moderate the influence of informational value, showing that, in spite of audience design and social navigation, high informational value was preferred to low informational value. Only in Study 5 was a factor ascertained that indeed moderated the influence of informational value, namely, in-group

salience (see *Chapter 5*). The results revealed that if students were told that the recommendations stem from other students, the influence of informational value was smaller than if students were told that recommendations stem from other Twitter users in general. This indicates that although content is a strong influence on retweeting, selection decisions also depend on what makes the social Web social: other people. Future studies could investigate whether this finding is generalizable to other social groups other than students: for broader groups such as gender or nationality and for tighter ones such as fans of a local sports club. According to the self-categorization theory (e.g., Abrams et al., 1990), a social identity becomes salient when a person compares his or her own group to a psychologically relevant out-group (Onorato & Turner, 2004). As every person naturally belongs to several groups, given by the structure of society, it is context-dependent which group identity is salient at which time. Thus, as long as there exists a group membership that can be made salient, the findings should be generalizable to other social groups, regardless of whether these are broader or tighter. Further, Onorato and Turner (2004) compared two theories of the self: a stable one, namely, self-schema theory and the more fluid self-categorization theory. They concluded that context-dependent self-categorization was more dominant even if it was contradictory to the personal self-schema (Onorato & Turner, 2004). This finding indicates that in future studies a manipulated identity-salience might have larger effects than prior existent stable schema of the self.

Next, regarding social navigation, Study 4 and Study 5 yielded contradictory results. In Study 4, agent awareness resulted in social navigation without any cue to an in-group having been provided. In contrast, in Study 5, student participants who were told that recommendations stem from other Twitter users in general (meaning that there was also no in-group salience) did not show social navigation at all. This result might have been caused

by a prior identification task which in turn might have activated the relevant group, and therefore, a stronger comparison to all other communities might have occurred. A design with an additional control group without any information about the recommendation source could disentangle this result pattern: If in this case no information about the recommendation source leads to social navigation, whereas given information but without a cue to an in-group (as in Study 4 and like the non-salient condition in Study 5) hinders social navigation, the aforementioned explanation might be true that group comparisons and distinction cause the effects. Or in other words, if participants notice that recommendations stem from a group that is explicitly not their relevant in-group, they might tend to show reactance to these recommendations. Alternatively, one could leave out the prior identification task in order not to activate an existent group. However, in this case, there would be no control about the participants' identification, and the differences between groups might be due to different degrees of prior identification.

In regard to context variables, it would have also been possible to investigate other criteria. To start with, it is feasible that news sources have an influence on whether news will be selected for retweeting or not. Whereas in my first studies, real existing news media were used as sources, I omitted them in the last studies for experimental reasons. However, result patterns regarding the influence of informational value remained almost the same. It would be interesting, especially from my viewpoint as communication researcher, whether and how systematically varied news media sources influence retweeting decisions with respect to, for example, political tendencies of the news media, or potential differences between “yellow press” and “serious” news media, or private news media and news media under public law. According to some research about convergence in the German dual broadcast system (Donsbach & Büttner, 2005; Wutz, Brosius, & Fahr, 2004), differences should not be too

huge. However, it still might be the case that if not retweeting, other variables, such as credibility, are affected by news sources and their images.

Further, personality factors are assumed to be related to social media use (Hughes et al., 2012). Thus, characteristics such as extraversion or openness to experience might additionally influence whether and how a person retweets. Also motivational aspects such as social comparison orientation might moderate the various influences on retweeting in a given situation (Sassenberg, 2013). For example, Twitter users that strive for social comparison outcomes, such as being better informed than others, might tend to retweet less in order to keep their potential advantage (see Ray, Neugebauer, Sassenberg, Buder, & Hesse, 2013 for an application of social comparison in a knowledge awareness context).

As Hughes et al. (2012) found differences between the relationship of personality and Twitter, on the one hand, and Facebook usage, on the other hand, the question arises whether and how my results might be applicable also to other Web 2.0 applications. Analogous to retweeting, Facebook allows its users to share information with their friends by a simple mouse click. Thus, an easy and wide spreading of news might be possible. Also all aspects of awareness should be transferrable especially because Facebook is supposed to be more a social network than Twitter is. However, this is also a reason why my research might not have worked with Facebook: Whereas Twitter's focus is on information sharing and real-time news spreading, Facebook highlights the social connections and relationships. Different from Twitter, Facebook is much more about daily chatter, private events, and covers one's whole personal life, which also includes aspects such as impression management (e.g., Goffman, 1959; Krämer & Winter, 2008; Rosenberg & Egbert, 2011). Twitter, in contrast, highlights information sharing from a purer perspective.

Further, in this dissertation, selection decisions have been investigated as a snapshot without considering prior or subsequent retweeting behavior. Taking into account that Twitter usage can lead to viral dynamics, it might be worth it to take issues such as agenda setting or rumor as a starting point for further research: How do topics develop over time and who actually sets the agenda? Do news media determine the hot topics by publishing them, do only influential Twitter personalities decide which news will be discussed everywhere, or is there still a kind of hidden dynamic in which all Twitter users participate? Is there any relationship between news spreading and rumor contagion in Twitter, and if so, what kind of relationship would it be? Which personal characteristics might influence whether one is affected by rumor or not? And how would awareness information affect the path that rumors go?

To conclude, besides some remaining open questions, all criteria that were investigated and that were assumed to influence retweeting decisions did so. Informational value as content criterion turned out to be the most powerful factor with a stable influence over all studies. However, also contextual criteria, namely, social cues and information about other users, their interests, their behavior, or group membership have an effect on how people select which news to share with others and which news not.

To deepen the insights into this area of research, it might be promising to combine quantitative and qualitative methods. In order to find out more about retweeting motivations, approaches of interviews or case studies (e.g., Boyd et al., 2010) could enrich the findings that are gained with controlled experiments. For example, in a case study, frequent Twitter users and less frequent Twitter users could be interviewed about their tweeting and retweeting habits including preferences of topics and styles, routines, or recommended do's and don'ts. Presumably two different retweeting patterns would result that then could be contrasted with each other.

## **“Informational Value” of This Dissertation**

By bringing together news value theory and Web 2.0, this dissertation could contribute to the development of news value theory. Whereas news values were originally only applied to mass media such as TV or print news, recent research shifted the focus also onto different and newer forms of news communication such as, for example, press photography (Rössler, Bomhoff, Haschke, Kersten, & Müller, 2001) or weblogs (Eilders et al., 2010). Since news found its way into the Web 2.0, phenomena such as alternative journalism (Poell & Borra, 2012) or ambient journalism (Hermida, 2010) came up. These phenomena describe how journalism has changed and adapted to Web 2.0 and social media. Especially Twitter is often regarded as a news medium in which awareness about ongoing discussions can be provided (Hermida, 2010). Moreover, Twitter users might also act as gatewatchers who shape the news process by accentuating, selecting, and sharing news (Bruns & Burgess, 2012). Hence, it should be quite obvious to bring also news value theory into Web 2.0. Of course, from a theoretical point of view, news value theory could have been extended much further. For instance, I did not take into account any discussion about the suggested additivity (e.g., Galtung & Ruge, 1965) that means that the more news factors occur, the higher the news value is, nor did I mention the two components theory by Kepplinger and Ehmig (2006) that assumes that different news media interpret and value news factors differently and therefore differ in their news coverage. I also disregarded research about news factors and memory performance (e.g., Eilders, 1997; Eilders & Wirth, 1999), and I did not engage in the discussion about the news media’s role in the construction of reality (e.g., Schulz, 1976). However, I preferred working in an interdisciplinary way and accepted therefore not to extend news value theory on its very theoretical level. Instead, I went a way that integrated psychological theory into news value theory. By re-examining news factors from a psychological view, this research could, in the end, still contribute somewhat to a theoretical



extension. In general, this dissertation was interdisciplinary as I started to investigate retweeting selection from the viewpoint of my communication background and then piece by piece shifted the focus and added phenomena from psychological research. If not on a pure theoretical level, I instead enriched news value research by experimental methodology. Although psychology and psychological methods have been incorporated in the field of communication, experimental methods are still only “almost accepted” (Lang, 2013, p. 23; for a recent exception see the experimental studies about news factors as attributions of relevance conducted by Weber & Wirth, 2013). The survey method and content analysis as the most commonly used methods in communication science often lack in internal validity and/or causal inferences. The same seems to be true for the majority of Twitter research. Most studies investigating mechanisms and aspects of Twitter, such as retweeting, virality in general, user motivations, or sentiments, use bottom up approaches, case studies, or large scale field studies (e.g., Boyd et al., 2010; Hansen et al., 2011; Java et al., 2007; Kim et al., 2012; Thelwall et al., 2011). Only few studies have used an experimental approach which allows for drawing causal conclusions under controlled conditions (e.g., Chen et al., 2010; Lee & Shin, 2012; Morris et al., 2012; Westerman et al., 2012). To my knowledge, no experimental research has been done in order to investigate retweeting. By conducting laboratory studies with using a carefully designed fictive Twitter environment, possible confounders could be eliminated, and thus a high internal validity could be reached. Moreover, systematically prepared material was used which allowed for drawing exact conclusions about the effect the tweets’ content, and thus informational value, had on retweeting. Moreover, all studies followed a top down approach which means that hypotheses were derived from theoretical considerations. Taken together, the main advantage of conducting experiments is to be able to draw causal inferences, that is, to actually get an indication why and how something happens. Of course, this aspiration for

“exact science” entails some constraints with respect to generalizability. Almost all experimental research finds itself in this area of tension. In my lab studies, I invited mainly students who unfortunately were not very experienced in using Twitter. Moreover, I did not use real tweets. In order to have systematically prepared and balanced material, I used self-created fictive tweets, although they often were based on real existing tweets. Because of the fictive character of the tweets, I had to use news that was credible enough without it actually having taken place. If I would have used real stories, the news factor Unexpectedness would not have worked, for example. Perhaps some tweets seemed to be too unrealistic to provoke real world decisions. Moreover, due to the fictionalization of the tweets, parts of the material changed from study to study. Reasons for this lay, on the one hand, in the character of the experimental manipulation: For Study 3, other than for the other studies, educational tweets were needed. On the other hand, topics and news had to change because of real world developments. For instance, after some politicians resigned, names could not be used again. However, material for all studies was created in such a way that news factors were balanced and uncorrelated in order to reach comparability between the studies. Another aspect that field study advocates might point out is that I did not use any URLs or hashtags in my tweets. Although there are findings that suggest that hashtags lead to retweeting (Suh et al., 2010), I decided to disregard such elements because I had focused on content characteristics that were inherent in the news. Supplementary elements might have caused distraction.

Taken together, the findings of the current dissertation might affect a large audience because (although not in Germany, but almost everywhere else) many people use Twitter and many news media are interested in having their news spread. Moreover, the findings of this dissertation might affect readers’, researchers’, and Twitter users’ minds when they discuss,

extend, or apply them. Given this, the current dissertation should have high informational value.

## **Please RT**

Finally, one must consider that this is only a single dissertation about a topic that has not yet been investigated very often from the viewpoints that I based my research on. In order to deepen the insights into why and how people retweet what, much more research needs to be done. Furthermore, I suggest that the interdisciplinary approach should be extended. In this way, findings from different research areas could be integrated. This might be helpful for all concerned with respect to being understood.

Lang (2013) noticed that there exists “a growing group of scholars, primarily young scholars, who have interdisciplinary training and who approach questions of mass communication in a fundamentally different way from those still working in the dominant paradigm” (Lang, 2013, p. 18). This sounds promising and is hopefully the case in many research fields. As there is growing need for interdisciplinary approaches (Lang, 2013), we should proceed.

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## *Appendix*

*A Material Study 1*

Nr.	News factors Tweets	High Informational Value				Low Informational Value			
		Controversy	Negative Consequences	Relevance	Unexpectedness	Aggression	Personalization	Prominence	Proximity
1	Nach und vor PISA: neue Vorschläge von Experten zum Lehrplan werden von Regierungen strikt zurückgewiesen	x							
2	Zahl der Empfehlungen fürs Gymnasium in Bremen auf unerwartet hohem Niveau				x				
3	Bund-Länder-Kooperation: Ein Bildungsplan für alle ist im Gespräch			x					
4	Schulschwänzer und ihre Probleme: neue Diskussion über Gründe und Lösungsmöglichkeiten, negative Langzeitfolgen noch ungeklärt		x						
5	Christoph Matschie: Weichen für Gemeinsamen Unterricht sind in Thüringen richtig gestellt.						x		
6	Bundesministerin Schavan trifft internationale DAAD-Stipendiaten in Berlin							x	
7	Freie Schulen sind in Baden-Württemberg ausreichend finanziert.								x
8	Vorwürfe zur geplatzten Schulreform in Hamburg werden schärfer und beleidigend					x			
9	Streit unter Sportfunktionären: Professionalisierung contra Persönlichkeit. Was dürfen Sportler fühlen?	x							



Nr.	News factors Tweets	High Informational Value				Low Informational Value			
		Controversy	Negative Consequences	Relevance	Unexpectedness	Aggression	Personalization	Prominence	Proximity
10	US-amerikanische Sportartikelhersteller investieren erstmalig verstärkt in Sachsen!				x				
11	Privatfernsehen plant, Fußballübertragungen auszuweiten			x					
12	Affäre um weitere Schiedsrichter-Korruption nimmt ihren Lauf. Negative Folgen sind gewiss.		x						
13	Doris und Peter L. sammeln und spenden gemeinsam mit vielen auf Benefiz-Volleyball-Turnier: sportlich engagierte Bürgerschaft!						x		
14	Schwimmer Paul Biedermann glaubt an sich und ist für 2013 gut gerüstet.							x	
15	Baden-Württembergische Landesmeisterschaft im Fechten findet guten Zuspruch								x
16	Weniger brutale Fußballschlägereien unter britischen Hooligans als im Vorjahr					x			

**B Material Study 2**

Nr.	News factors Tweets	High Informational Value				Low Informational Value			
		Controversy	Negative Consequences	Relevance	Unexpectedness	Aggression	Personalization	Prominence	Proximity
1	Unfassbare Pest: Ökologen untersuchen die ölverseuchte Küste von Louisiana – ihre Warnung vor hektischer Reinigung ruft Kritik hervor	x	x	x					
2	Streit über Schuldenabbau: Merkel und Westerwelle sparen sich die Harmonie, stattdessen aggressive Stimmung	x				x	x	x	
3	Westerwelle weiter unter Druck: Leuthusser-Schnarrenberger fordert überraschend Rücktritt vom Rücktritt	x			x		x	x	
4	Merkels Info-Politik in Kritik: Wer wusste wann was?	x					x	x	
5	Einige Menschen sind verunsichert								
6	Tübingen: Radfahrer rastet nach Unfall gestern Abend plötzlich aus und verprügelt Autofahrer				x	x			x
7	Erneute Brandstiftung in Hamburg: Unbekannte zünden acht Autos an, auch das vom zurückgetretenen von Beust.		x			x	x		
8	hunderttausende Menschen weltweit von Naturkatastrophen betroffen, "Nahrungskämpfe" häufen sich			x		x			
9	USA sucht nach Einigung, Obama ist unsicher						x	x	
10	FDP-Pläne zum Kündigungsschutz, jetzt auch in Stuttgart heftiger Widerstand: Gewerkschaften laufen Sturm, Unterstützung aus Frankreich	x		x					x
11	Freie Schulen sind in Thüringen ausreichend finanziert.								

Nr.	News factors Tweets	High Informational Value				Low Informational Value			
		Controversy	Negative Consequences	Relevance	Unexpectedness	Aggression	Personalization	Prominence	Proximity
12	In Berlin wird wichtiger Schritt für 30 Beschäftigte in der Umgebung entschieden								
13	Weniger brutale Fußballschlägereien unter britischen Hooligans als im Vorjahr; Fan James R. hofft bald wieder ins Stadion gehen zu können					x	x		
14	Spanischer Kronprinz bei Kneipentour in Madrid angegriffen worden					x		x	
15	Preisexlosion bei Lebensmitteln: Asien fürchtet Hungersnot und beschuldigt auch Europa	x	x						
16	Täter auf der Flucht: Mehrere Tote bei Amoklauf in England		x		x	x			
17	Warnung vor Koli-Bakterien in vielen Käsesorten: Verbraucherschützer warnen vor Infektionen		x	x	x				
18	Bundeswehr: auch de Maizière bereitet entgegen den Empfehlungen der Generäle drastischen Sparkurs vor	x		x	x		x	x	
19	Börse am Abend - US-Daten ziehen Dax ins Minus: Unerwartet schlechte amerikanische Konjunkturzahlen stoppen Schwäbische Unternehmen		x		x				x
20	Zickenalarm auf dem roten Teppich: Madonna verweigert überraschten Kameramann Fotoaufnahme				x			x	
21	Bundestag - Abgeordneter beschwichtigt in erhitzter Krawatten-Debatte:	x							
22	Straßenschlacht in Italien, 40 Männer gingen mit Baseballschlägern aufeinander los					x			
23	Im Regierungslager flammt Streit über Personalfragen auf.	x							

Nr.	Tweets	News factors	High Informational Value				Low Informational Value			
			Controversy	Negative Consequences	Relevance	Unexpectedness	Aggression	Personalization	Prominence	Proximity
24	Setzt Regierung die Wehrpflicht jetzt doch nicht aus?			x	x					
25	Doris und Peter L. sammeln und spenden gemeinsam mit vielen auf Benefiz-Konzert in Heidelberg: engagierte Bürgerschaft!						x		x	
26	US-amerikanische Firmen investieren erstmalig stärker in Sachsen: gut für ganz Deutschland!			x	x					
27	Paris Hilton von der Treppe gestürzt: gebrochenes Bein		x					x		
28	Fußballfans schon jetzt voller Vorfreude auf EM 2012: auch Raúl L. aus Stuttgart hat sein Wohnzimmer schon dekoriert, in spanischen Farben!						x		x	
29	Obama auf Durchreise am Stuttgarter Flughafen. Fans und Demonstranten reagieren spontan				x		x	x	x	
30	Brutale Messerstecherei nach Kneipentour: vier Schwerverletzte in Reutlingen		x			x			x	
31	Zu heiß: der Klimawandel bedroht weltweite Reisproduktion; Forscher fürchten Hungersnöte in ärmeren Ländern		x	x						
32	Italien: Opposition will "Volksmobilisierung" gegen Regierung, Vorwürfe werden nicht weniger	x								
33	Ballack wird erneut zum DFB-Rücktritt geraten							x		
34	Sonja M. (23) gehört zu denen, die jetzt riesigen Umweg nehmen müssen: wegen unbekannter Giftraupe ist Wäldchen in Region Stuttgart gesperrt		x		x		x		x	

Nr.	News factors Tweets	High Informational Value				Low Informational Value			
		Controversy	Negative Consequences	Relevance	Unexpectedness	Aggression	Personalization	Prominence	Proximity
35	Kluft zwischen arm und reich: Wie Claudia K. aus Reutlingen sind immer mehr Deutsche auf Tafel-Essen angewiesen.			x			x		x
36	Arbeitslosigkeit geht in Deutschland zurück; Frank-Jürgen Weise warnt vor Euphorie			x			x		
37	Heidis neue TV-Show belastet ihre Ehe. Sollte Heidi Klum nen Gang zurückschalten? Amerikaner haben eindeutig andere Meinung als wir	x						x	
38	Mord im Friseursalon in Konstanz - Er kam mit der Pump-Gun		x		x	x			x
39	Umweltkatastrophe ohne Ende: Ölpest vor USA und Folgen dauern noch sehr lange an		x	x					
40	Eine hohe Last für sozial Schwache: Palmers Vorschlag stößt in der Region Tübingen auf Zorn, unfriedliche Stimmung bei Bürgern	x	x	x		x		x	x
41	weltonline: Sylvie van der Vaart: Einbruch im Stuttgarter Hotel, sie wurde mit Brieföffner bedroht					x		x	x
42	Deutschland: Streit um Gebetsräume an Schulen wird neu verhandelt, Anfeindungen und neue Drohungen liefern Zündstoff	x		x		x			
43	Manager-Umfrage: Deutschland steigt trotz Krisenerholung nicht zum Spitzenstandort auf, aber Süddeutschland beliebt.				x				x

**C Material Study 3**

Nr.	News factors Tweets	High Informational Value				Low Informational Value			
		Controversy	Negative Consequences	Relevance	Unexpectedness	Aggression	Personalization	Prominence	Proximity
1	Streit um Gebetsräume an mecklenburgischen Schulen wird jetzt doch neu verhandelt, Experten fürchten Toleranzverlust	x	x		x				
2	Vorwürfe zur geplatzten Schulreform in Hamburg werden schärfer und beleidigend					x			
3	Freie Schulen sind in Baden-Württemberg ausreichend finanziert.								x
4	Zahl der Empfehlungen fürs Gymnasium in Sachsen auf unerwartet hohem Niveau				x				
5	Bund-Länder-Kooperation: Ein Bildungsplan für alle, mit vielen Unbekannten und Uneinigkeiten	x		x					
6	Grundschüler schauen schon Gewaltvideos im Netz, doch für Internet-Unterricht brauchen Lehrer noch Nachhilfe, so auch Ralf P. in Stuttgart					x	x		x
7	Krise in Brandenburgs Bildungspolitik: auch Sekretär Brauer beschimpft Vorgesetzten					x	x		
8	Pubertierende Jungs scheitern am G8-Lehrplan, wie Expertenansichten und Politik aufeinanderprallen	x	x						
9	Bildungspolitik: wird Bildung doch Bundessache?			x	x				
10	Anke Engelke plant offenbar gemeinsam mit Ministerium Lese-Offensive für Kleinkinder						x	x	

Nr.	News factors Tweets	High Informational Value				Low Informational Value			
		Controversy	Negative Consequences	Relevance	Unexpectedness	Aggression	Personalization	Prominence	Proximity
11	Bundesministerin Schavan trifft internationale DAAD-Stipendiaten in Ulm							x	x
12	Nach UN Konvention: Behinderte Kinder an Regelschulen: Gemeinsamer Unterricht kostet doch einige Millionen mehr als erwartet			x	x				
13	Christoph Matschie: Weichen für Gemeinsamen Unterricht sind in Thüringen richtig gestellt.						x		
14	Angela Merkel besucht Grundschule in Stuttgart							x	x
15	Neue Föderalismusdebatte ausgebrochen wegen hoher Schulabbruchquote		x	x					
16	was PISA gelehrt hat und was nicht: neue Vorschläge von FDP werden von Koalitionspartner strikt zurückgewiesen	x							
17	Schulschwänzer und ihre Probleme: neue Diskussion über Gründe und Lösungsmöglichkeiten, negative Langzeitfolgen noch ungeklärt		x						
18	Innenminister Friedrich warnt vor versteckten Aggressionen im Unterricht					x		x	

Nr.	Tweets	News factors	High Informational Value				Low Informational Value			
			Controversy	Negative Consequences	Relevance	Unexpectedness	Aggression	Personalization	Prominence	Proximity
19	Non-educational Tweets	Tübingen: Autofahrer rastet nach Unfall gestern Abend aus und verprügelt Radfahrer					x			x
20		Info-Politik der Regierung in heftiger Kritik: Wer wusste wann was? Droht Image-Schaden?	x	x						
21		Weniger brutale Fußballschlägereien unter britischen Hooligans als im Vorjahr; Fan James R. hofft bald wieder ins Stadion gehen zu können					x	x		
22		Preisexplosion bei Lebensmitteln betrifft ganz Asien. Europa wird die Schuld gegeben	x		x					
23		Trotz zahlreicher Qualitäts-Tests: Warnung vor Koli-Bakterien in manchen Käsesorten, Experten streiten über Ursachen	x			x				
24		Börse am Abend - US-Daten ziehen Dax ins Minus: schlechte amerikanische Konjunkturzahlen behindern einige deutsche Unternehmen		x						
25		Bundestag - Praktikant kann in erhitzter Krawatten-Debatte beschwichtigen	x			x				
26		Straßenschlacht in Italien, 50 Männer gingen mit Baseballschlägern aufeinander los, Papst Benedikt verurteilte dies scharf.					x		x	



Nr.	News factors Tweets	High Informational Value				Low Informational Value			
		Controversy	Negative Consequences	Relevance	Unexpectedness	Aggression	Personalization	Prominence	Proximity
27	Doris und Peter L. sammeln und spenden gemeinsam mit vielen auf Benefiz-Konzert in Heidelberg: engagierte Bürgerschaft!						x		x
28	US-amerikanische Firmen investieren erstmalig stärker in Sachsen: weiterhin Aufschwung für ganz Deutschland!			x	x				
29	Fußballfreude in Baden-Württemberg: Alex K. und sein Team neue Hoffnung der Jugend						x		x
30	Zu heiß: der Klimawandel bedroht weltweite Reisproduktion; Forscher fürchten Hungersnöte in ärmeren Ländern		x	x					
31	Wie gut wäre Michael Ballack als Experte im TV?							x	
32	Spanischer Kronprinz bei Kneipentour in Madrid gesichtet worden							x	
33	Umweltkatastrophe ohne Ende: Ölpest vor USA und Folgen dauern noch sehr lange an		x	x					
34	USA sucht nach Einigung, Obama ist unsicher						x	x	
35	Einbruch im Stuttgarter Hotel, Urlauberin wurde mit Brieföffner bedroht					x			x
36	Manager-Umfrage: Deutschland steigt trotz Krisenerholung nicht zum Spitzenstandort auf				x				

**D Material Study 4**

Nr.	News factors Tweets	High Informational Value				Low Informational Value			
		Controversy	Negative Consequences	Relevance	Unexpectedness	Aggression	Personalization	Prominence	Proximity
1	Streit um Gebetsräume wird jetzt doch neu verhandelt, Experten fürchten Toleranzverlust	x	x		x				
2	Erneut versuchte Brandstiftung in Hamburg					x			
3	Freie Schulen sind in Baden-Württemberg ausreichend finanziert.								x
4	Zahl der Arbeitslosen in NRW auf unerwartet niedrigem Niveau				x				
5	Bund-Länder-Kooperation: Ein Betreuungsplan für alle, mit vielen Unbekannten und Uneinigkeiten	x		x					
6	Kinder schauen schon Gewaltvideos im Netz, doch für Internet brauchen Eltern noch Nachhilfe, so auch Ralf P. in Stuttgart					x	x		x
7	Krise in Brandenburgs Verkehrspolitik: auch Sekretär Brauer beschimpft Vorgesetzten					x	x		
8	Pubertierende Jungs scheitern am G8-Lehrplan, wie Expertenansichten und Politik aufeinanderprallen	x	x						
9	Bildungspolitik: Wird Bildung doch Bundessache?			x	x				
10	Magdalena Neuner plant offenbar gemeinsam mit Ministerium Bewegungsoffensive für Kinder						x	x	
11	Bundesministerin Schavan trifft internationale DAAD-Stipendiaten in Ulm							x	x
12	Führt Regierung die Wehrpflicht wieder ein?			x	x				
13	Christoph Matschie: Weichen für Integration sind in Thüringen richtig gestellt.						x		

Nr.	Tweets	News factors	High Informational Value				Low Informational Value			
			Controversy	Negative Consequences	Relevance	Unexpectedness	Aggression	Personalization	Prominence	Proximity
14	Angela Merkel besucht Museum in Stuttgart							x	x	
15	Neue Föderalismusdebatte ausgebrochen wegen hoher Schulabbruchquote		x	x						
16	Was der Euro gelehrt hat und was nicht: neue Vorschläge von FDP werden von Koalitionspartner strikt zurückgewiesen	x								
17	Stressbelastung: neue Diskussion über Gründe und Lösungsmöglichkeiten, negative Langzeitfolgen!		x							
18	Innenminister Friedrich warnt vor versteckten Aggressionen im Beruf					x		x		
19	Tübingen: Autofahrer rastet nach Unfall gestern Abend aus und verprügelt Radfahrer					x			x	
20	Info-Politik der Regierung in heftiger Kritik: Wer wusste wann was? Droht Image-Schaden?	x	x							
21	Weniger brutale Fußballschlägereien unter britischen Hooligans als im Vorjahr; Fan James R. hofft bald wieder ins Stadion gehen zu können					x	x			
22	Preisexplosion bei Lebensmitteln betrifft ganz Asien. Europa wird die Schuld gegeben	x		x						
23	Trotz zahlreicher Qualitäts-Tests: Warnung vor Koli-Bakterien in manchen Käsesorten, Experten streiten über Ursachen	x			x					
24	Börse am Abend - US-Daten ziehen Dax ins Minus: schlechte amerikanische Konjunkturzahlen behindern einige deutsche Unternehmen		x							

Nr.	Tweets	News factors	High Informational Value				Low Informational Value			
			Controversy	Negative Consequences	Relevance	Unexpectedness	Aggression	Personalization	Prominence	Proximity
25	Bundestag - Praktikant kann in erhitzter Krawatten-Debatte beschwichtigen		x			x				
26	Straßenschlacht in Italien, 50 Männer gingen mit Baseballschlägern aufeinander los, Papst Benedikt verurteilte dies scharf.					x		x		
27	Doris und Peter L. sammeln und spenden gemeinsam mit vielen auf Benefiz-Konzert in Heidelberg: engagierte Bürgerschaft!						x		x	
28	US-amerikanische Firmen investieren erstmalig stärker in Sachsen: weiterhin Aufschwung für ganz Deutschland!			x	x					
29	Fußballfreude in Baden-Württemberg: Alex K. und sein Team neue Hoffnung der Jugend						x		x	
30	Zu heiß: der Klimawandel bedroht weltweite Reisproduktion; Forscher fürchten Hungersnöte in ärmeren Ländern		x	x						
31	Wie gut ist Michael Ballack als Experte im TV?							x		
32	spanischer Kronprinz bei Kneipentour in Madrid gesichtet worden							x		
33	Umweltkatastrophe ohne Ende: Ölpest vor USA und Folgen dauern noch sehr lange an		x	x						
34	USA sucht nach Einigung, Obama ist unsicher						x	x		
35	Einbruch im Stuttgarter Hotel, Urlauberin wurde mit Brieföffner bedroht					x			x	
36	Manager-Umfrage: Deutschland steigt trotz Krisenerholung nicht zum Spitzenstandort auf				x					

*E Material Study 5*

Nr.	News factors Tweets	High Informational Value				Low Informational Value			
		Controversy	Negative Consequences	Relevance	Unexpectedness	Aggression	Personalization	Prominence	Proximity
1	Streit um Gebetsräume wird jetzt doch neu verhandelt, Experten fürchten Toleranzverlust	x	x		x				
2	Erneut versuchte Brandstiftung in Hamburg					x			
3	Freie Schulen sind in Baden-Württemberg ausreichend finanziert.								x
4	Zahl der Arbeitslosen in NRW auf unerwartet niedrigem Niveau				x				
5	Bund-Länder-Kooperation: Ein Betreuungsplan für alle, mit vielen Unbekannten und Uneinigkeiten	x		x					
6	Kinder schauen schon Gewaltvideos im Netz, doch für Internet brauchen Eltern noch Nachhilfe, so auch Ralf P. in Stuttgart					x	x		x
7	Krise in Brandenburgs Arbeitspolitik: auch Sekretär Müller beschimpft Vorgesetzten					x	x		
8	Pubertierende Jungs scheitern am G8-Lehrplan, wie Expertenansichten und Politik aufeinanderprallen	x	x						
9	Bildungspolitik: wird Bildung doch Bundessache?			x	x				
10	Magdalena Neuner plant offenbar gemeinsam mit Ministerium Bewegungsoffensive für Kinder						x	x	
11	Bundesministerin Schavan trifft internationale DAAD-Stipendiaten in Ulm							x	x
12	Führt Regierung die Wehrpflicht wieder ein?			x	x				
13	Christoph Matschie: Weichen für Integration sind in Thüringen richtig gestellt.						x		

Nr.	News factors Tweets	High Informational Value				Low Informational Value			
		Controversy	Negative Consequences	Relevance	Unexpectedness	Aggression	Personalization	Prominence	Proximity
14	Angela Merkel besucht Museum in Stuttgart							x	x
15	Neue Föderalismusdebatte ausgebrochen wegen hoher Schulabbruchquote		x	x					
16	Was der Euro gelehrt hat und was nicht: neue Vorschläge von FDP werden von Koalitionspartner strikt zurückgewiesen	x							
17	Stressbelastung: neue Diskussion über Gründe und Lösungsmöglichkeiten, negative Langzeitfolgen!		x						
18	Innenminister Friedrich warnt vor versteckten Aggressionen im Beruf					x		x	
19	Tübingen: Autofahrer rastet nach Unfall gestern Abend aus und verprügelt Radfahrer					x			x
20	Info-Politik der Regierung in heftiger Kritik: Wer wusste wann was? Droht Image-Schaden?	x	x						
21	Weniger brutale Fußballschlägereien unter britischen Hooligans als im Vorjahr; Fan James R. hofft bald wieder ins Stadion gehen zu können					x	x		
22	Preisexplosion bei Lebensmitteln betrifft ganz Asien. Europa wird die Schuld gegeben	x		x					
23	Trotz zahlreicher Qualitäts-Tests: Warnung vor Koli-Bakterien in manchen Käsesorten, Experten streiten über Ursachen	x			x				
24	Börse am Abend - US-Daten ziehen Dax ins Minus: schlechte amerikanische Konjunkturzahlen behindern einige deutsche Unternehmen		x						
25	Bundestag - Praktikant kann in erhitzter Krawatten-Debatte beschwichtigen	x			x				

Nr.	Tweets	News factors	High Informational Value				Low Informational Value			
			Controversy	Negative Consequences	Relevance	Unexpectedness	Aggression	Personalization	Prominence	Proximity
26	Straßenschlacht in Italien, 50 Männer gingen mit Baseballschlägern aufeinander los, Papst Benedikt verurteilte dies scharf.					x		x		
27	Doris und Peter L. sammeln und spenden gemeinsam mit vielen auf Benefiz-Konzert in Heidelberg: engagierte Bürgerschaft!						x		x	
28	US-amerikanische Firmen investieren erstmalig stärker in Sachsen: weiterhin Aufschwung für ganz Deutschland!			x	x					
29	Fußballfreude in Baden-Württemberg: Alex K. und sein Team neue Hoffnung der Jugend						x		x	
30	Zu heiß: der Klimawandel bedroht weltweite Reisproduktion; Forscher fürchten Hungersnöte in ärmeren Ländern		x	x						
31	Wie gut ist Michael Ballack als Experte im TV?							x		
32	Spanischer Kronprinz bei Kneipentour in Madrid gesichtet worden							x		
33	Umweltkatastrophe ohne Ende: Ölpest vor USA und Folgen dauern noch sehr lange an		x	x						
34	USA sucht nach Einigung, Obama ist unsicher						x	x		
35	Einbruch im Stuttgarter Hotel, Urlauberin wurde mit Brieföffner bedroht					x			x	
36	Manager-Umfrage: Deutschland steigt trotz Krisenerholung nicht zum Spitzenstandort auf				x					

## *Summary*

In today's society, whenever breaking news is subject of discussion, one can be quite sure that Twitter played a role in the dissemination process of the news. Twitter is a Web 2.0-application for writing and sharing short information, and makes it easy to spread news. As news is an integral part of our lives, mechanisms of spreading news become crucial. With Twitter, and its easy sharing feature of retweeting, not only journalists are able to disseminate news but also average Internet users. However, against the background of an uncountable amount of existing news, the question arises which news is going to be shared and which one is not. The present dissertation aims to answer this question by considering two categories of characteristics: first, characteristics of the tweets' content, and second, characteristics of the particular context.

Regarding content criteria, the dissertation draws on news value theory, a theory that makes assumptions about which news is selected by journalists and recipients from the perspective of communication research. Since also average Internet users take part in the dissemination process of news, the so-called news factors are re-examined from a psychological perspective. As a result, the notion of informational value is introduced. Informational value is defined as the property of news to affect a large audience and/or to have the potential to impact the audience's minds.

Regarding contextual criteria the dissertation draws on research on awareness and social navigation. As in computer-mediated communication settings usually certain information is missing (e.g., information about others' preferences or interests), it can be provided and made salient, hence users can get aware of it. Therefore, such provided additional information is called awareness information. Awareness information in the Twitter context can be seen from two perspectives: First, awareness information about the audience can be



provided. Such audience awareness should lead to audience design, that is, adaption of the communication behavior according to the audience's properties. Second, awareness information about agents, that is, other Twitter users who also share news, can be provided. This agent awareness should result in social navigation, that is, following the behavior of many others. Agent awareness could be also seen as recommendations about what to retweet.

In order to test the potential influence of these criteria of content and context, five experimental studies (one online study and four laboratory studies) were conducted. The results confirm the assumptions about informational value and show that high informational value has a strong and stable influence on retweeting across all studies. Further, audience awareness indeed leads to audience design, meaning that retweeting behavior is adapted according to the audience's interests. Next, also agent awareness influences retweeting behavior in a way that retweeting decisions are adapted according to what others have already often retweeted. However, neither audience awareness nor agent awareness moderates the influence of informational value on retweeting decisions. Only information about who the agents actually are does so. This means, if it is known of whose traces the recommendation stem from, the influence of informational value on retweeting is moderated. Taken together, this dissertation provides insights into mechanisms of news selection in the Web 2.0 context. Indeed, content of news has a meaningful impact on whether news is going to be shared or not. However, also another aspect, which is a central characteristic of the social Web, affects retweeting decisions: other people. Research for this dissertation was done in an interdisciplinary fashion and encourages further research on this topic combining methods and approaches of different disciplines.

## *Deutsche Zusammenfassung*

Wenn Schlagzeilen die Runde machen und in aller Munde sind, kann man heutzutage davon ausgehen, dass Twitter im Verbreitungsprozess dieser Nachricht eine Rolle spielte. Twitter ist eine Web 2.0-Anwendung, mit der kurze Informationen geschrieben und geteilt werden können und die es ermöglicht, Nachrichten einfach zu verbreiten. Da Nachrichten einen wichtigen Teil unseres Lebens ausmachen, kommt den Verbreitungsmechanismen eine besondere Bedeutung zu. Mithilfe von Twitter und seiner leicht zu bedienenden Verbreitungsfunktion des *Retweeting* ist es nun nicht mehr nur Journalisten möglich, Nachrichten zu verbreiten, sondern auch durchschnittlichen Internetnutzern. Angesichts der immer größer werdenden Menge an verfügbaren Nachrichten stellt sich allerdings die Frage, welche Nachricht verbreitet wird und welche nicht. Die vorliegende Dissertation will diese Frage beantworten. Dafür werden Charakteristiken des Inhalts einer tweet-Nachricht ebenso betrachtet wie Charakteristiken des Kontexts.

Hinsichtlich der Inhaltskriterien wird auf die Nachrichtenwerttheorie zurückgegriffen, eine kommunikationswissenschaftliche Theorie, die Annahmen darüber aufstellt, welche Nachrichten von Journalisten und Rezipienten ausgewählt werden. Weil nun auch durchschnittliche Internetnutzer am Verbreitungsprozess von Nachrichten teilhaben, werden die sogenannten Nachrichtenfaktoren aus psychologischer Sicht betrachtet und, daraus folgend, das Konzept *informational value* eingeführt. *Informational value* meint die Eigenschaft von Nachrichten, ein großes Publikum zu betreffen und/oder das Potenzial zu haben, Verhalten oder Gedanken des Publikums zu beeinflussen.

Hinsichtlich der Kontextkriterien wird auf Forschung zu *awareness* und *sozialer Navigation* zurückgegriffen. Da in Computer-vermittelten Kommunikationsszenarien bestimmte Informationen üblicherweise fehlen (z.B. Informationen über Präferenzen oder Interessen

anderer Personen), können sie verfügbar und salient gemacht werden. Entsprechend werden Nutzer dann solcher Informationen gewahr, weswegen diese Informationen auch *awareness Informationen* heißen. Im Twitter-Kontext können solche *Awareness* Informationen aus zwei Perspektiven betrachtet werden: Erstens können Informationen über das Publikum bereitgestellt werden (*audience awareness*), die dann zu *audience design* führen sollten. *Audience design* bedeutet, dass das Kommunikationsverhalten bestimmten Eigenschaften des Publikums angepasst wird. Zweitens können Informationen über Agenten bereitgestellt werden (*agent awareness*). Agenten sind andere Twitter-Nutzer, die ebenfalls Nachrichten verbreiten. Diese Informationen sollten in *sozialer Navigation* resultieren, das bedeutet, dass das Verhalten dem gezeigten Verhalten anderer Nutzer angepasst wird.

Um den Einfluss dieser möglichen Kriterien zu überprüfen, wurden fünf experimentelle Studien (eine Onlinestudie und vier Laborstudien) durchgeführt. Die Ergebnisse bestätigen die Annahmen über *informational value* und zeigen über alle Studien hinweg, dass hoher *informational value* einen stabilen Einfluss darauf hat, dass Nachrichten zur Verbreitung in Twitter ausgewählt werden. Zusätzlich führt *audience awareness* tatsächlich zu *audience design*, was bedeutet, dass Nutzer ihr Retweeting-Verhalten den Interessen des Publikums anpassen. Außerdem konnte gezeigt werden, dass auch *agent awareness* das Retweeting-Verhalten dahingehend beeinflusst, dass dem bereits gezeigten Verhalten anderer Nutzer gefolgt wird. Allerdings moderieren weder *audience awareness* noch *agent awareness* den Einfluss von *informational value* auf die Retweeting-Entscheidungen. Lediglich die zusätzliche Information, wer genau die Agenten sind, hat einen moderierenden Effekt auf die Wirkung von *informational value* auf das Retweeting.

Die vorliegende Dissertation gibt Einblicke in die Mechanismen der Nachrichtenverbreitung im Web 2.0. Obwohl der Inhalt von Nachrichten einen starken Einfluss auf die Selektionsentscheidungen ausübt, darf ein anderer Aspekt nicht vernachlässigt werden, der

gleichzeitig ein zentrales Merkmal des sozialen Webs ist: andere Nutzer. Die Forschung für diese Dissertation wurde in interdisziplinärer Art und Weise durchgeführt und soll dazu ermutigen, auch bei weiterer Forschung zu diesem Thema Methoden und Ansätze verschiedener Disziplinen miteinander zu verbinden.

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Danke in jeweils maximal 140 Zeichen.

