

Freie Universität Berlin

Fachbereich für Erziehungswissenschaften und Psychologie

**Facebook Status Updates:
Psychological Correlates and Consequences**

Dissertation

zur Erlangung des akademischen Grades

Doktor der Philosophie (Dr. phil.) in Psychologie

vorgelegt von

Dipl. Psych. Fenne große Deters

Berlin, September 2015

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Disputation: 27. November 2015

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Acknowledgments

First of all, I would like to thank my advisors Dr. Michael Eid and Dr. Matthias Mehl for their trust, support, and advice, and for being an essential source of knowledge and motivation to me!

I am grateful to my colleagues for all the entertaining lunch breaks as well as to my collaborators, conference buddies, and (most of) my students, without whom my time as a PhD student would certainly not have been such a good experience. Special thanks go to Megan Robbins and Jana Mahlke for always making me feel welcome and at home and for constantly offering me advice and support.

Thank you, Melanie Brucks, Liz Necka, and Anke Heyder for proof-reading my dissertation and providing insightful feedback!

I very much appreciate the patience of and invaluable support provided by my family and my boyfriend Ingo Heidbüchel throughout these years. And I would also like to thank my friends, in particular Julia Hegmans, who I can always count on.

Last but not least, I would like to acknowledge my participants and research assistants (in particular: Dorothy Huynh, Julia Jones, Diana Strässle, and Louisa Hohmann) whose contribution to this work was crucial!

Abstract

About one seventh of the world's population spends time on Facebook and several millions of status updates are posted and read every day (Fowler, 2012; O'Neill, 2010). Facebook status updates constitute a novel and intriguing form of communication which differs with respect to important aspects like length, audience, and affordances for social feedback not only from face-to-face interaction but also from other more established forms of online communication. In light of the immense popularity of status updates, these differences prompt questions about the psychological correlates and consequences of status updating. While Facebook has sparked the interest of many psychologists (Wilson, Graham, & Gosling, 2012), studies focusing on specific features instead of measuring general Facebook use are scarce even though aggregating across different activities likely obscures important effects (Smock, Ellison, Lampe, & Wohn, 2011). However, in addition to the dearth of empirical evidence on status updates, shortcomings of the previous literature called for more research. Firstly, a lack of experimental research in the assessment of consequences of status updating rendered findings of previous research causally ambiguous (Shadish, Cook, & Campbell, 2002). And secondly, despite the unique opportunities Facebook offers for observational data collection (Wilson et al., 2012), the majority of studies relied exclusively on self-reports which is problematic, for instance, because effects might be inflated due to shared method variance (Back & Egloff, 2009; Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). The present dissertation aimed to address the dearth of empirical evidence on Facebook status updates as well as shortcomings of the literature, and is composed of three separate studies which assess independent research questions about important aspects of status updating.

Study 1 assessed the effects of posting status updates on posters' social well-being pioneering the implementation of a field-experiment by directly manipulating status updating behavior in

participants' natural social ecology. Based on the reasoning that status updates—due to defining characteristics like their shortness and their broad audience—afford users to easily keep their friends up-to-date, it was proposed that posting status updates makes users feel closer and more connected to their friends and hence, reduces feelings of loneliness (Köbler, Riedl, Vetter, Leimeister, & Krcmar, 2010). For one week, participants in the experimental condition were asked to post more than they usually do, whereas participants in the control condition received no instructions. Participants added a “Research Profile” as a Facebook friend allowing for the objective documentation of protocol compliance, participants' status updates, and direct social feedback by friends. Results showed (1) that the experimentally-induced increase in status updating activity reduced loneliness, (2) that the decrease in loneliness was due to participants feeling more connected to, and in touch with their friends on a daily basis, and (3) that the effect of status updating on loneliness was independent of direct social feedback by friends.

Study 2 addressed the concerns raised by researchers (e.g., Bergman, Fearington, Davenport, & Bergman, 2011; Carpenter, 2012) as well as some journalists (e.g., Jayson, 2009; Rosen, 2007) that narcissists use status updating excessively, and hence that narcissistic posts dominate the experience on Facebook. Firstly, the study assessed whether this belief is shared by Facebook users and secondly, it examined the actual relationship between narcissism and status updating activity in a US American and a German sample. Capitalizing on the advantages of a multimethod approach, the frequency of status updates was directly observed on participants' profile pages, and in the German sample, self-reports of narcissism were complemented with informant reports by friends and family of the participants. Results confirmed that users of social networking sites believe that narcissism strongly predicts status updating activity. However, in contrast to this, both in the German and the US American

sample, analyses of the actual relationship yielded null-findings. Because non-significant findings are difficult to interpret but might nevertheless provide useful information, the equivalence testing approach was applied (Hoenig & Heisey, 2001), which allowed for the conclusion that the effect of narcissism on actual status updating activity is not substantial.

Based on two hypotheses prominent in research on online communication, the social enhancement and the social compensation hypothesis (Kraut et al., 2001; Valkenburg & Peter, 2007), **Study 3** assessed the role of extraversion and social anxiety in predicting social responses to status updates in a US American and a German sample. Moreover, because valence is a fundamental dimension to describe status updates (Utz, 2015) the study also explored the interplay between personality, valence of status updates, and direct social responses. To capitalize on the assets of combining several methods, personality was assessed with self-report questionnaires, and valence of status updates was evaluated by independent raters. Social responses to status updates were captured in two ways, firstly, direct social feedback (i.e., likes and commenters) was observed on participants' profile pages, and secondly, in the German sample, informant reports on the interpersonal appraisal of participants' status updates by their Facebook friends were collected. In both samples, for direct social feedback neither extraversion nor social anxiety emerged as significant predictors. However, analyses of the informant reports showed that status updates of individuals higher in social anxiety were appreciated more by their friends. Furthermore, results pointed to the importance of valence in this context; revealing associations between valence and direct social feedback, valence and extraversion, and a moderation effect of personality on the association between valence and likes in the US sample.

Taken together, the present dissertation provides much needed empirical evidence on status updates, and addresses important shortcomings in the literature by capitalizing on the unique opportunities for data collection Facebook offers. Technological change often creates fears and prompts many questions about potential merits and perils (Boase & Wellman, 2006). Even though results of individual studies need to be interpreted with caution (Maxwell, Lau, & Howard, 2015), the findings of the present dissertation might help to allay concerns with respect to status updating and even point to potential benefits. Directions for future research as well as specific opportunities and challenges for research on Online Social Networking Sites will be discussed.

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Chapter 1

Introduction

Introduction

In October 2012, Facebook, the most popular Online Social Networking Site (Mander, 2014), reported to have one billion users who log in at least once a month (Fowler, 2012). Hence, within less than ten years since its foundation in 2004, roughly one seventh of all living humans regularly engaged with Facebook, and Facebook's user base is still growing today, albeit at a slower rate (Facebook Newsroom, 2015). Apart from Facebook, many other similar sites exist such as Google+, MySpace, or Friendster. Some of these Online Social Networking Sites are predominantly popular in a specific geographical region like Sina Weibo in China or VKontakte in Russia, while others are focused on a particular life domain (e.g., business: Xing, LinkedIn; dating: Plentyof Fish, Badoo; traveling: CouchSurfing, WAYN), or target a specific group of individuals like mothers (e.g., CafeMom) or researchers (e.g., ResearchGate, academia.edu). Online Social Networking Sites can be defined as online platforms which enable individuals to create a profile to present themselves, to display their connection with other users, to share user-generated content like, for example, photos, and to communicate with their social network on the site (Boyd & Ellison, 2007; Ellison, Steinfield, & Lampe, 2007; Gangadharbatla, 2008). Facebook is primarily used to connect and communicate with already existing offline ties (Ellison, Steinfield, & Lampe, 2011) and is hence tied to users' real-life identities (Utz, 2015).

1.1 Research on Online Social Networking Sites

Online Social Networking Sites are ingrained in the daily life of many individuals worldwide and unsurprisingly, such a huge social phenomenon soon sparked the interest of psychologists (Wilson, Gosling, & Graham, 2012). However, just as in early research on internet use, Facebook use was mostly defined very broadly even though the site combines features as diverse as, for example, private messages, event hosting, online games, commercial content,

or photo uploading (Burke, Kraut, & Marlow, 2011). On that account, Smock, Ellison, Lampe, and Wohn (2011) suggested that instead of assessing general Facebook use, Facebook should be conceptualized as a “collection of features” or a “toolkit”. Indeed, they showed that the associations between users’ motivations and the use of different features like, for example, status updates, comments, or private messages varied across those features. For instance, participants who indicated that they post status updates more often also reported to a higher extent that they used Facebook for “expressive information sharing”. Commenting, on the other hand, was positively predicted by a motivation to turn to Facebook for “social interaction” and “relaxing entertainment”, and negatively by a motivation for “companionship”. Several studies by Bazarova and colleagues confirmed that a more granular analysis of Facebook’s communication features furthers our understanding on how and why they are used. These studies showed that status updates, wall posts, and private messages differ in respect to the intensity and valence of emotions expressed (Bazarova, Choi, Schwanda Sosik, Cosley, & Whitlock, 2015) as well as in how language style reflects self-presentational concerns (Bazarova, Taft, Choi, & Cosley, 2012). Moreover, participants reported different strategic goals for status updates, wall posts, and private messages (Bazarova & Choi, 2014). While participants self-disclosed in status updates primarily to achieve social validation, the main reason for self-disclosure in private messages and wall posts was relational development. Similarly, early studies on personality and Facebook use showed that it is worthwhile to distinguish between the use of different features instead of aggregating across them. These studies discovered patterns that would not have been captured by a measure of general Facebook use. For example, while individuals high in neuroticism refrained from posting photos (Ross, Orr, Sisic, Arseneault, Simmering, & Orr, 2009; Ryan & Xenos, 2011), they indicated to eagerly use the wall posting feature (Ross et al., 2009). In a study with 180,000 participants, Bachrach, Kosinski, Graepel, Kohli, and Stillwell (2012)

confirmed that different features of Facebook like posting photos, status updating, or joining groups attract individuals who differ with respect to their personality. Furthermore, with a focus on the impact of Facebook use on social well-being, Burke, Marlow, and Lento (2010) also demonstrated that measuring only general Facebook use might obscure important effects. While directed communication (e.g., wall posts, private messages, likes, comments, etc.) was associated with increases in bonding social capital and decreases in loneliness, consumption of content not specifically directed to the user (e.g., status updates, photo posts, conversations between friends) predicted decreases in both bonding and bridging social capital as well as increases in loneliness.

Based on the reasoning that a more granular analysis of Facebook is worthwhile, this dissertation focused on one specific feature: Facebook status updates. Assessing Facebook status updates appeared warranted for three reasons: Firstly, despite the fact that at the time of the first data collection in 2011 status updates had been implemented for about three years (Hall, Pennington, & Lueders, 2013), and Facebook users posted about 60 million status updates each day (O'Neill, 2010), there was a dearth of empirical research investigating this topic. Secondly, status updates constitute a new form of communication whereas many of the other features on Facebook correspond to already – comparatively – established tools for communication or self-expression outside of Online Social Networking Sites such as private messages (e-mails) or profile pages (personal homepages) (Heiberger & Harper, 2008). Last but not least, status updates are by default archived in a semi-public form, enabling researchers to relatively easily obtain access for observational data collection as well as the implementation of field experiments (Wilson et al., 2012). In the following, a short introduction to the Facebook status updating feature will be provided.

1.2 Facebook Status Updates

Facebook status updates are short textual messages Facebook users can post. They are permanently displayed on the user's own profile page and might appear in the automatically curated and personalized social awareness streams – the so-called News Feeds – of all of the user's Facebook friends unless the user has voluntarily limited the audience of his or her posts. Facebook friends can provide social feedback in form of “likes” or comments. Similar broadcasting features (Ellison, Gray, Vitak, Lampe & Fiore, 2013) referred to as “micro-blogs” (Köbler, Riedl, Vetter, Leimeister, & Krcmar, 2010) or “social posts” (“Beyond email”, n.d.) are integrated into many Online Social Networking Sites like Google+, MySpace, LinkedIn, and Meetup, or, in some cases, are their main function like on Twitter. As indicated by their name, status updates were initially intended to inform one's Facebook friends about what one was currently up to and hence, were by default preceded by the name of the poster and the word “is” (Kramer, 2010; Lee, 2011; van Grove, 2009). However, this rather restricted feature – adapted from instant messaging services where users signal to their network whether or not they are available for online chatting – quickly evolved to a more open format (van Grove, 2009). Facebook removed the “is”, and the prompt “What are you doing right now? ” was later replaced by the more general question “What is on your mind? ” (Egan & Moreno, 2011). Accordingly, Lee (2011) identified several types of posts only remotely related to an update on one's current “status” like posts expressing opinions or judgments, or questions aiming to elicit responses by friends (also see Ellison et al., 2013). This flexibility in use is also reflected in the temporal orientation of status updates which cover content in past, present, and future tense (große Deters, 2014)¹. In the following, important characteristics of status updates will be described in detail.

¹ To avoid potential confusion—the cited work is a text-linguistic analysis of status updates by *Nele* große Deters based on the corpus of status updates collected as part of the present dissertation.

1.2.1 Length of Status Updates

Originally, Facebook status updates were limited to 160 characters (similar to text messages) but even though the maximum length has been increased in several steps to more than 60,000 characters in 2011 (Lin & Qui, 2014; Pieter, 2011), most status updates are still close to the original length with a little over 10 words on average (Kramer & Chung, 2011; Lin & Qui, 2014; Mickes et al., 2013; Schöndienst & Dang-Xuan, 2011; große Deters, 2014).

1.2.2 Audience of Status Updates

By default status updates are visible to all of the Facebook friends of a poster. However, while Facebook friends could visit the profile page of the poster to read the status update, most friends will only see a status update if it appears in their News Feed (Bernstein, Bakshy, Burke & Karrer, 2013). Due to the huge amount of content that is posted everyday on Facebook, Facebook's curation algorithm pushes status updates into the News Feeds of only a selected subgroup of all of one's Facebook friends (Eslami et al., 2015). However, once a friend interacts with the status update by liking or commenting on it, this activity together with the original status update might also appear in the News Feed of the friend's friends (Bazarova & Choi, 2014). Moreover, friends can explicitly share a status update of another user with their own friends through the status update feature or repost it in a private message, on a friend's profile, or in a group. Hence, the potential audience, i.e., all users who could potentially read a status update (Utz, 2015), usually consists of all of the user's friends as well as friends of his or her friends. Facebook users have on average around 250 friends on the site (e.g., Hampton, Goulet, Marlow, & Rainie, 2012; Winter et al., 2014) but because posts might also be shown to friends of those friends, a post of a median Facebook user could reach more than 31,000 people (Hampton et al., 2012). Thus, in contrast to the default for tweets, status

updates are normally not accessible to everybody and hence not “public” but they can reasonably be described at least as “semi-public” (Winter et al., 2014).

The actual or empirical audience consisting of all users who do indeed read a status update (Utz, 2015; Bernstein et al., 2013) is normally much smaller than the potential audience. Because Facebook does not provide more specific information, to infer the size of the actual audience, users have to rely on visible cues like the number of their friends as well as the amount of likes and comments from different friends a status updates receives (Bernstein et al., 2013). However, as Bernstein et al. (2013) showed, these cues are no reliable indicators and users dramatically underestimate their actual audience. On average, the actual audience for an individual post is by a factor of four larger than the users’ estimate: The median actual audience for a post is 78 friends while users expect that only 20 friends will see it (Bernstein et al., 2013). But even if one only takes into account the size of the perceived audience, i.e., around 20 friends, by posting a status update Facebook users address a much larger audience than with most other forms of communication used by many individuals in their daily life.

Not only the size of the audience and the discrepancy between perceived and actual audience, but also the composition of the audience make status updates stand out in comparison to other forms of personal communication. Social relationships are formed in different contexts, for example, at school, at work, at a leisure activity, or at home, and different social norms in each of these social circles suggest which information we reveal and how we share it (Goffman, 1959; Hull, Lipford, & Latulipe, 2011; Nissenbaum, 2004). Apart from special situations like giving a speech at one’s wedding or birthday party, or writing an obituary, we hardly ever communicate simultaneously with a bigger group of people who belong to different social circles. However, the default audience for status updates is diverse and

includes ties from many different social spheres (Bazarova & Choi, 2014; Kivran-Swaine, & Naaman, 2011; Vitak, 2013; Utz, 2015). As mentioned before, users usually do not join Facebook to form new relationships or to communicate with strangers but rather take their offline social network online by friending individuals with whom they share an offline connection (Ellison et al., 2011). As evident from the fact that users have on average around 250 Facebook friends (Hampton et al., 2012), only a minority of all Facebook friends are strong ties like close friends or family members (Manago, Taylor, & Greenfield, 2012). Most Facebook friends are weak ties from different social contexts like neighbors, coworkers, high school friends, or people met during traveling (Manago et al., 2012). Moreover, friend networks on Facebook are also sparsely interconnected, i.e., most of one's Facebook friends have no direct connection to each other (Hampton et al., 2012). Hence, the composition of the audience not only demands that users navigate different expectations but it might also be challenging to find common ground for such a diverse audience. As a result, the content of status updates can be expected to be more author-centric than in other forms of communication which are directed at smaller and less diverse groups of people (Kramer & Chung, 2011).

1.2.3 Masspersonal Communication

The combination of big audiences but personal content blurs the boundaries between classical interpersonal and mass communication (Bazarova et al., 2012) and hence, status updates can be described as a new form of so-called "masspersonal communication" (O'Sullivan, 2005). Being able to reach a huge part of one's social network almost effortlessly allows for extremely efficient communication (Matook, Cummings, & Bala, 2015). While broadcasting one's thoughts and opinions to a larger group of people has long required many resources or special status, like being a journalist, author, politician, or celebrity, status updates now easily

grant almost anybody access to a bigger audience. Whether sharing political statements and consumer experiences, news about important life changes, mundane details about one's daily life or requests for support, status updates can help individuals to exert influence (Anderson, Fagan, Woodnutt, & Chamorro-Premuzic, 2012), keep their friends and acquaintances up-to-date, maintain a shared reality with many of their ties (French, Zech, Quinten & Kerschreiter, in preparation), enjoy feeling like a celebrity (Pempek, Yermolayeva, & Calvert, 2009), or tap into the resources of their network (Ellison et al., 2013; Lampe, Gray, Fiore, & Ellison, 2014; Morris, Teevan, & Panovich, 2010).

1.2.4 Social Feedback to Status Updates

Despite their one-to-many communication style (Pempek et al., 2009), status updates also invite the audience to interact with the content. Facebook friends can indicate that they “like” a status update by clicking the corresponding button or can post a comment. Both comments as well as who has “liked” the status update are displayed together with the original status update. Authors of status updates can also add a like or comments to their own post and all comments to status updates can again get likes or, since recently, can also be commented on. Hence, while status updates start as a monologue they can—and often do—result in conversations (Lee, 2011). Schöndienst and Dang-Xuang (2011) found that about 80% of all status updates in their study received at least one like or comment but participants varied substantially in how many comments respectively likes they received on average per status update. Overall, the median number of friends who liked (1.13) or commented on (1.86) a status updates was quite low. Even if taking into consideration that the median actual audience of a post in 2011 might have been lower than the 78 friends reported by Bernstein et al. (2013) two years later, it is still obvious that only a fraction of all friends who read a status update also provide direct social feedback. The characteristics of the audience of status

updates, as described in section 1.2.2, likely help to explain why only a few friends comment on and like status updates. Due to the diversity of the recipients and the inclusion of many weak ties (Manago et al., 2012), several friends might not be interested in the topic of a status update or even fail to understand it (Kramer & Chung, 2011). Feeling uncomfortable with posting a comment that will be shown to an unknown audience might also keep friends from commenting. Moreover, status updates do not indicate an investment of time and effort in a specific relationship to the same extent as directed communication such as private messages, e-mails, or letters, which might discourage many friends from taking the time to respond (Burke & Kraut, 2014). Also because a poster cannot possibly know for sure who has actually seen a message, friends who might otherwise feel obligated to provide social feedback can take advantage of this so-called "plausible deniability" pretending that they have never read the status update (Aoki & Woodruff, 2005; Bernstein et al., 2013).

1.2.5 Asynchronous Communication

Communication via status updates is usually asynchronous (Köbler et al., 2010), even though sometimes friends might comment on a status update immediately after it has been posted and the author of the status update can decide to engage in a synchronous interaction by replying to those comments right away (große Deters, 2014). Similar to other forms of asynchronous communication like text messages or letters, there is no time pressure when writing a status update. As Das and Kramer (2013) showed, many users take advantage of this and edit their status updates heavily before posting or even self-censor them. Unsurprisingly in light of the big, diverse, and poorly defined audience of status updates (Bazarova & Choi, 2014), users' main motivation for editing and self-censoring is to reduce the risk of offending some of their friends (Das & Kramer, 2013; Sleeper et al., 2013).

1.2.6 Summary

Status updates constitute a new and intriguing form of computer-mediated communication integrated into Facebook, the most popular Online Social Networking Site. Defining characteristics of status updates that distinguish them from other forms of communication are their length, the size and composition of and uncertainty about their (actual) audience, the opportunities for direct social feedback and the fact that they are asynchronous.

1.3 The Present Dissertation

Every day several million Facebook users communicate with their friends and express themselves by posting status updates (O’Neill). As outlined above, this novel and unique form of communication differs with respect to important aspects like length, audience, and affordances for social feedback not only from face-to-face interaction but also from other more established forms of online communication. Naturally, in light of the immense popularity of status updates, these differences prompt questions about the psychological correlates and consequences of status updates. While a growing body of research on Facebook might help to gain some general understanding of the social setting in which status updating takes place, general measures of Facebook use will likely obscure interesting and important associations with, and effects of status updates (Smock et al., 2011). Empirical research which specifically assesses status updates is scarce and at the time when this research project was developed only a few studies existed. Apart from providing descriptive data (Kramer & Chung, 2011; Lee, 2011; Morris et al. 2010; Pempek et al., 2009), these early studies explored the consequences of status updating on social well-being (Köbler et al., 2010; Yoder & Stutzman, 2011), examined how personality and motivations predict status updating activity (Bergman, Fearington, Davenport, & Bergman, 2011; Ong et al, 2011; Ross et al., 2009; Ryan & Xenos, 2011; Smock et al. 2010), and content of status updates (Mehdizadeh, 2010),

and assessed the association between posting frequency, friend count and direct social feedback (Schöndienst & Dang-Xuan, 2011). While these studies took up some issues often assessed in the broader context of research on Online Social Networking Sites, Internet usage and online communication, namely, effects on (social) well-being (see e.g., Burke et al., 2010; Ellison, Steinfield, & Lampe, 2007; Gross, Juvonen, & Gable, 2002; Kraut et al., 1998), and associations of usage with personality and motivations (see e.g., Buffardi, & Campbell, 2008; Hamburger, & Ben-Artzi, 2000; Kim, Sohn, & Choi, 2011; Landers, & Lounsbury, 2006), other research questions frequently addressed in related areas of research have not gained any attention at all. For instance, despite their importance in research on online communication (see e.g. Kraut et al., 2001; Sheeks & Birchmeyer, 2007; Valkenburg & Peter, 2007; van Zalk, Branje, Denissen, van Aken & Meeus, 2011), no study so far examined the questions whether this new feature for communication might offer opportunities particularly for less socially skilled individuals to reap social benefits of communication (social compensation hypothesis, Valkenburg & Peter, 2007), or whether status updates cater mostly to the needs of individuals who are generally sociable and socially competent (social enhancement hypothesis, Kraut et al., 2001). In addition to the apparent dearth of empirical evidence on status updates, several shortcomings in the literature on status updates called for more research.

1.3.1 Shortcomings of the Previous Literature

All studies assessing effects of status updating used cross-sectional, correlational and no experimental designs (Köbler et al., 2010; Yoder & Stutzman, 2011), which renders findings causally ambiguous (Shadish, Cook, & Campbell, 2002). Because status updating takes place in an online environment that is easily accessible and observable for researchers, studying the effects of status updates actually offers the rare opportunity to directly manipulate the behavior of interest and measure compliance with the experimental instructions, while

preserving participants' social ecology. However, not only in research specifically on status updates but even in the fast growing body of literature on Online Social Networking Sites in general, experimental studies are rare and the opportunity to conduct virtual field experiments has been largely neglected so far.

The majority of previous studies on status updates relied exclusively on participants' self-reports (for an exception see Mehdizadeh, 2010), even though Online Social Networking Sites allow for the direct collection of observational data (Kosinski, Matz, Gosling, Popov, & Stillwell, 2015; Wilson, et al., 2012). This is problematic because self-report data might not be a valid measure of actual behavior on Facebook (see Hampton et al., 2012) and is potentially biased (Fleeson, 2009; Paulhus & Vazire, 2007). Furthermore, the combination of several methods such as self- and informant reports, observational data, or evaluations by independent raters, might be crucial to capture different aspects of a psychological phenomenon (Eid & Diener, 2006; Vazire, 2006), and avoids the risk of inflated effects due to shared method variance (Back & Egloff, 2009; Podsakoff, MacKenzie, Lee, & Podsakoff, 2003).

1.3.2 Goal and Composition of the Present Dissertation

The goal of the present dissertation was twofold: Firstly, it aimed to contribute to building a base of empirical evidence on the psychological correlates and consequences of Facebook status updates. Secondly, it intended to address shortcomings of the literature by pioneering the implementation of a field-experiment directly manipulating behavior on Facebook, and by using a multimethod approach which included exploiting the unique opportunities for observational data collection on Facebook. The present dissertation is composed of three separate studies: Study 1 assessed the effect of status updating on loneliness of the posters

using an experimental design. Study 2 examined the association between narcissism and status updating activity, and Study 3 explored the role of extraversion and social anxiety in predicting social responses to status updates. Data was collected in a sample of $N = 153$ students at the University of Arizona (Study 1, 2, and 3), a sample of $N = 270$ students from universities all over Germany (Study 2 and 3), and a sample of $N = 301$ German speaking social media users recruited on Facebook using snowball sampling (Study 2). In the following, the specific aims and methods of each study will be presented.

1.3.3 Study 1: The Effect of Status Updating on Loneliness

The goal of Study 1 was to examine the psychological effects of posting status updates on Facebook. Based on the reasoning that status updates—due to defining characteristics like their shortness and their broad audience—afford users to easily keep their friends up-to-date, it was proposed that posting status updates makes users feel closer and more connected to their friends and hence, reduces feelings of loneliness (Köbler et al., 2010). Moreover, the study aimed to explore to which extent direct social feedback affects this hypothesized effect of status updating on loneliness.

In order to determine causality while preserving participants' social ecology, an experiment with a pretest/posttest control group design was implemented directly on Facebook. Participants' status updating behavior was experimentally manipulated over the course of one week. Their daily feelings of connectedness with their friends as well as changes in feelings of loneliness from pre to post intervention were measured with self-reports. The study capitalized on the fact that status updates as well as likes and comments are permanently archived on users' profile pages which are accessible to all of their Facebook friends. Participants were asked to friend a specifically created "Research Profile" on Facebook and

hence, participants' natural status updating activity before entering the study, their posting behavior during the study as well as comments and likes by their friends could be directly observed. Firstly, this afforded the opportunity to provide all participants with information on how many status updates they usually post and instruct participants in the experimental condition to increase the frequency of their status updating, relative to their baseline. Secondly, it could be controlled whether experimental participants followed this instruction and whether control participants maintained their normal posting behavior. And last but not least, it was possible to directly observe how much social feedback, i.e., likes and comments, status updates received.

1.3.4 Study 2: The Relationship between Narcissism and Status Updating Frequency

The aims of study 2 were to empirically assess whether Facebook users assume that individuals high in narcissism post more status updates, and to examine the actual association between narcissism and status updating frequency. These research questions were motivated by countless press articles, blog posts, and the like suggesting that the general public holds the belief that status updates are the perfect outlet for narcissists and that narcissistic posts outnumber other content, and hence dominate the experience on Facebook (e.g., Jayson, 2009; O'Dell, 2010; Rosen, 2007). Moreover, some researchers shared this concern based on the reasoning that many characteristics of status updates render them attractive for narcissists (e.g., Bergman, et al., 2011; Carpenter, 2012; Rosen, Whaling, Rab, Carrier, & Cheever, 2013). However, it can be argued that status updates also cater to a non-narcissistic population and have drawbacks for narcissists. On the one hand, being able to reach a big audience mostly comprised of superficial ties (Buffardi & Campbell, 2008), having high control over self-presentation (Mehdizadeh, 2010), and the author-centric nature of status updates (Kramer & Chung, 2011) might attract narcissists. But on the other hand, status updates are also used

for non-self-presentational purposes like asking for support or maintaining social bonds (McKinney, Kelly, & Duran, 2012; Morris, Teevan & Panovic, 2010). Moreover, just as in real-life long-term relationships more exposure to content produced by narcissists often leads to rejection by friends, which potentially renders status updating less appealing to narcissists (Back, Schmukle, & Egloff, 2010).

Firstly, in order to empirically assess lay assumptions on this topic, an online questionnaire was administered to a sample of Facebook users. Secondly, the actual association between narcissism and status updating frequency was examined in two samples (US American and German) allowing assessments of generalizability across cultures. In the German sample, the same procedure to collect observational data was followed as in the US American sample (see Study 1). Hence, the study could rely on actual counts of status updates instead of potentially biased self-reports of behavior and avoid the risk of inflated effects due to shared method variance between predictor and outcome (Back & Egloff, 2009; Carpenter, 2012; Ong et al., 2011). Moreover, in the German sample self-reports of narcissism were complemented with informant reports by family and friends of the participants. This additional perspective is particularly valuable in research on narcissism because narcissism is characterized by biased self-perceptions and often becomes manifest in interpersonal problems (Oltmanns & Lawton, 2011; South, Oltmanns, & Turkheimer, 2003). To increase precision by controlling for measurement error in the predictor variable, structural equation models with narcissism as a latent predictor were specified. Negative binomial regression models were applied because the outcome—the number of status updates—was a count variable with a low mean and hence, could not be adequately analyzed with ordinary least square regression (Coxe, West, & Aiken, 2009).

1.3.5 Study 3: Social Responses to Status Updates and the Role of Personality

The aim of Study 3 was to explore the role of extraversion and social anxiety in predicting social responses to status updates. Extraversion and social anxiety are two core personality traits associated with social competence and sociability offline (John & Srivastava, 1999; Schlenker & Leary, 1982). However, differences between face-to-face and online communication like the absence of nonverbal cues called for empirical research that assesses whether these personality traits similarly influence social interactions online (Valkenburg & Peter, 2009). In respect to this question, two hypotheses have dominated research on online communication. On the one hand, the rich-get-richer or social enhancement hypothesis argues that socially competent individuals will be able to simply take their offline social skills online to benefit from this additional opportunity for communication (Kraut et al., 2001; Moore & McElroy, 2012). On the other hand, the poor-get-richer or social compensation hypothesis suggests that, due to its distinct characteristics, online communication particularly serves less socially skilled individuals (Moore & McElroy, 2012; Valkenburg & Peter, 2007). In addition to testing these hypotheses in respect to status updates, this study also aimed to explore the interplay between personality and valence of status updates in predicting social responses. Valence is a fundamental dimension to describe status updates and empirical evidence suggests that it is associated both with social responses to status updates (Barash, Ducheneaut, Isaacs, & Bellotti, 2010; Zhang, 2010) as well as to extraversion and social anxiety (Kashdan, 2007; Schwartz et al., 2013).

To avoid biases introduced by the (exclusive) usage of self-report measures (e.g., Back & Egloff, 2009; Podsakoff et al., 2003) and aiming to capture information not accessible to participants (e.g., Vazire, 2006), this study combined data from four different sources. Firstly, personality was assessed with self-report questionnaires. Secondly, social responses to status

updates were measured by accessing participants' profile pages and counting the amount of direct social feedback, i.e., the number of likes a status update received as well as the number of friends who commented on it. Thirdly, in the German sample, social responses to status updates were captured more broadly by collecting informant reports on the interpersonal appraisal of the participants' status updates by their Facebook friends. And fourthly, the valence of status updates was evaluated by independent raters. Two characteristics of the data, namely its nested structure (direct social feedback and valence nested in status updates; informant reports nested in participants) and the fact that the outcome variables capturing direct social feedback (number of likes and commenters) were count variables with a low mean, needed to be accounted for when choosing appropriate statistical models for data analyses. Hence, data was analyzed applying Generalized Linear Mixed Models for count outcomes (Aiken, Mistler, Coxe, & West, 2015) and Linear Mixed Models for continuous outcomes (West, Welch, & Galecki, 2014).

1.3.6 Organization of this Dissertation

In the following three chapters the independent studies will be presented in detail. The last chapter of this dissertation – the general discussion – will shortly summarize and discuss the main findings of these studies, outline how the present dissertation contributes to the literature, point to future directions for research, and close with a discussion of opportunities and challenges for research on Online Social Networking Sites.

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Chapter 2

Does Posting Facebook Status Updates Increase or Decrease

Loneliness?

An Online Social Networking Experiment

große Deters, F. & Mehl, M. R. (2013). Does posting Facebook status updates increase or decrease loneliness? An online social networking experiment. *Social Psychology and Personality Science*, 4, 579–586. doi:10.1177/1948550612469233

<http://dx.doi.org/10.1177/1948550612469233>

Abstract

Online social networking is a pervasive but empirically understudied phenomenon. Strong public opinions on its consequences exist but are backed up by little empirical evidence and almost no causally-conclusive, experimental research. The current study tested the psychological effects of posting status updates on Facebook using an experimental design. For one week, participants in the experimental condition were asked to post more than they usually do, whereas participants in the control condition received no instructions. Participants added a lab “Research Profile” as a Facebook friend allowing for the objective documentation of protocol compliance, participants’ status updates, and friends’ responses. Results revealed (1) that the experimentally-induced increase in status updating activity reduced loneliness, (2) that the decrease in loneliness was due to participants feeling more connected to their friends on a daily basis and (3) that the effect of posting on loneliness was independent of direct social feedback (i.e. responses) by friends.

Keywords: Facebook, Loneliness, Social Integration, Well-being, Internet Methodologies

Does Posting Facebook Status Updates Increase or Decrease Loneliness?

An Online Social Networking Experiment

“We live in an accelerating contradiction: the more connected we become, the lonelier we are. We were promised a global village; instead we inhabit the drab cul-de-sacs and endless freeways of a vast suburb of information. (...) The question of the future is this: Is Facebook part of the separating or part of the congregating; is it a huddling-together for warmth or a shuffling-away in pain?”

Stephen Marche, *Is Facebook Making Us Lonely?* The Atlantic, May 2012

About 30% of the world’s population uses the internet (“internetworldstats”). And Facebook, the most popular online social networking site, has 800 million active users of whom more than 50% visit the site every day (“Facebook Statistics”, 2011). The internet has changed our daily lives, our ways of communication and our ways of interacting with our social networks (Weiser, 2001). But despite its popularity, the public opinion around the internet is rather critical. Prompted largely by Kraut et al’s (1998) first and highly influential study claiming that internet use can cause loneliness and depression, the public has been concerned about the detrimental interpersonal and psychological effects of spending time online (McKenna & Bargh, 2000; Shaw & Gant, 2002; Weiser, 2001). Since then, however, the empirical evidence regarding the risks and benefits of internet use has been mixed and Kraut and colleagues’ study has been subject to substantial criticism (Gross, Juvonen, & Gable, 2002; LaRose, Eastin, & Gregg, 2001). While some researchers have cautioned against internet use (Nie, 2001; Nie & Erbring, 2000) on the base of it creating “a ‘lonely crowd’ in cyberspace” (LaRose et al., 2001, The Paradoxical Internet Paradox Section, para. 4), others have identified its beneficial effects on social capital (Ellison, Steinfield, & Lampe, 2007; Steinfield, Ellison, & Lampe, 2008), social support (LaRose et al., 2001), well-being (Valkenburg & Peter, 2007a), and loneliness (Fokkema & Knipscher, 2007).

These contradicting results might, in part, be due to the fact that early studies defined “internet use” very broadly, subsuming online activities as diverse as reading the news, chatting with friends, buying clothes, and downloading music (LaRose, et al., 2001, McKenna & Seidman, 2006). Although researchers have begun to focus on specific online activities such as chatting (Shaw & Gant, 2000), in the field of online social networking research, most studies still do not differentiate among the various activities members of these sites can engage in (e.g., scrolling through a friend’s profile, uploading photos, status updating) (Smock, Ellison, Lampe, & Wohn, 2011). Burke, Marlow, and Lento (2010) recently demonstrated how problematic “aggregating over” these activities can be. Using objective server data to measure participants’ online activities, they found that active (e.g., writing private messages, status updating) and passive (e.g., viewing photos, reading friends’ conversations) Facebook use showed opposing effects on loneliness and social capital; whereas active use emerged as beneficial, passive use tended to be detrimental.

2.1 An Online Social Networking Experiment

Building on this idea, the present study assessed the psychological effects of the specific activity of posting status updates on Facebook. Furthermore, the study capitalized on the unique scientific opportunities online social networking research offers (Back, Stopfer, Vazire, Gaddis, Schmukle, Egloff, & Gosling, 2010; Gosling, Augustine, Vazire, Holtzman, & Gaddis, 2011; Wilson, Gosling, & Graham, 2012). Firstly, online social networking research allows for virtual experimental field research; in other words, it enables researchers to conduct experiments within participants’ natural online environments. Thus, while preserving participants’ social ecology, the direct, experimental manipulation of real-world behavior allows for strong causal conclusions (e.g., Bond et al., 2012). However, the vast majority of studies in the field have used correlational designs which render findings on the

psychological effects of virtual social engagement causally ambiguous (e.g., Ahn, 2011; Burke et al., 2010; LaRose et al., 2001). In the present study, we experimentally manipulated participants' online behavior by instructing them to temporarily post more status updates on Facebook.

Secondly, online social networking sites allow for the efficient collection of direct observational data to supplement the default and often exclusive use of self-reports. Observational data can avoid memory biases and alleviate social desirability effects (Furr & Funder, 2007). As described in detail in the method section, we accessed participants' Facebook profiles during the study to collect relevant observational data.

2.2 Status Updates

Status updates are short messages that are posted to the personalized welcome page (the so-called News Feed) of all Facebook friends of the user as well as on the user's own profile page. Status updates are especially interesting as they represent a new and increasingly popular form of communication (Java, Song, Finin, & Tseng, 2007). Most social networking sites, like Facebook, Google+ and MySpace utilize some form of status updates, and in some cases, like on Twitter, they serve as the main function. These posts are restricted in length (e.g., 420 characters on Facebook, 140 characters on Twitter) and recipients can comment on them or indicate that they "like" them. Status updates enable effortless and fast one-to-many communication. They can be directed to a large unknown audience (e.g., everybody on the internet, often on Twitter) or, in the case of Facebook, to a large known audience (all friends on Facebook). On average, Facebook currently counts 60 million status updates per day (O'Neill, 2010). The popularity and novelty of status updates make it a topic worth being studied empirically.

2.3 What Psychological Effects Can Be Expected from Status Updating?

As a form of computer-mediated communication, status updates could be criticized for possibly undermining face-to-face communication, which is considered richer, more natural and thus more beneficial to our social well-being (e.g., Kraut et al., 1998; Moody, 2001; Nie & Erbring, 2000). On the other hand, some studies support the notion that computer-mediated communication can help maintain and solidify existing friendships, especially if regular face-to-face communication is hampered by physical distance (e.g., Ellison et al., 2007; Valkenburg & Peter, 2007b). In a study by Cummings, Lee, and Kraut (2006) on communication types and relationship closeness during the transition to college, computer-mediated communication emerged as more important than phone calls for sustaining friendships. The authors concluded that communication frequency rather than quality is critical for maintaining closeness. Even more so than email, status updates appear ideal for sharing what is happening in one's life because their shortness facilitates frequent posts (Köbler, Riedl, Vetter, Leimeister, & Krömer, 2010). Is it effective to share the ups and downs of daily life with friends in such short written messages? And does keeping friends up-to-date make one feel more connected to them and thereby protected against feeling lonely? The present study aims to test empirically whether an experimentally induced increase in status updating affects feelings of loneliness. Furthermore, if posting status updates reduces feelings of loneliness, we expect that the effect is, at least in part, due to—or, in statistical terminology, mediated by—how connected and in touch one feels to friends on a daily basis.

2.4 Is It Important for Status Updates to Receive Responses?

Status updates can be commented on by friends. What role does this social feedback play for the expected psychological effects of posting status updates? If posting is understood as an attempt to initiate social interaction, a lack of feedback might result in increased feelings of

loneliness. Akin to a failed attempt to start a conversation at a party (e.g., with the “target” paying no attention), an unanswered status update could be perceived as social rejection (Williams, Cheung, & Choi, 2000). Thereby, it would prime the discrepancy between desired and actual social interaction, which is at the heart of feelings of loneliness (Mellor, Stokes, Firth, Hayashi, & Cummins, 2008; Perlman & Peplau, 1984). Alternatively, Facebook users might implicitly assume that their status updates reach and are (sooner or later) read by the recipients even if there is no direct response. It is conceivable that the mere feeling of having shared something with friends might promote feelings of closeness and social inclusion. The present study empirically tested the extent to which social feedback affects the hypothesized social effects of status updating.

2.5 Methods

2.5.1 Participants and Design

One hundred and two undergraduate students at the University of Arizona with a Facebook profile participated in the study for partial course credit. The study was an internet-based field experiment with a pre-test/ post-test control group design. Participants were randomly assigned to the experimental (instructions to post more status updates) or the control (no instructions) condition.² Nine students failed to complete the post-assessment questionnaires. Seven students in the experimental condition did not follow the instructions and were excluded from the analyses (four showed no change from baseline in the number of status updates, three posted fewer status updates). Drop-outs did not differ systematically from the

² A second control group that was instructed to reduce their status updating activity was excluded from the analysis. Surprisingly, about one third of all participants posted no status update during the baseline period and therefore, could not comply with the instructions to post fewer status updates. Instead of excluding participants with no status updating activity from all three groups to assure randomization, we dropped this second control group from the analyses based on the rationale that participants with little status updating experiences can be expected to be particularly impacted by the manipulation (to post more status updates). Dropping this sub-group (to maintain randomization) could thus have critically biased the effect estimation in the experimental (i.e., increase) condition.

remaining participants in their posting activity or loneliness at baseline. Therefore, the final sample consisted of $N = 86$ participants (experimental condition: $n = 37$, control condition: $n = 49$). Fifty-three (61%) of the participants were female and 77 (90%) were between 18 and 22 years old.

2.5.2 Procedures and Measures

The experiment was conducted entirely online using (a) participants' own Facebook profiles for delivering the intervention and (b) the web-based survey software DatStat Illume for the assessment. First, participants received an email with a link to an online session where they were asked to provide informed consent. Next participants completed a set of questionnaires which included a commonly used 10-item version of the UCLA Loneliness Scale (Russell, Peplau, & Ferguson, 1978) using a scale ranging from 1 (I never feel this way) to 4 (I often feel this way). The UCLA Loneliness Scale measures subjective feelings of loneliness and social isolation (sample items: "How often do you feel completely alone?", "How often do you feel shut out and excluded by others?", Cronbach's $\alpha = .90$, $M = 2.16$, $SD = 0.63$). Participants also filled out the 4-item Subjective Happiness Scale (Lyubomirsky, & Lepper, 1999; Cronbach's $\alpha = .87$, on a seven-point Likert scale: $M = 5.31$, $SD = 1.10$) and the short version of the Center for Epidemiologic Studies Depression Scale (CES-D-10; Andresen, Malmgren, Carter, & Patrick, 1994; Cronbach's $\alpha = .75$, on a four-point Likert scale $M = 1.83$, $SD = 0.49$). As the last step in this questionnaire session, participants logged on to Facebook and sent a friend request to our "Research Profile". In doing so, they granted the investigators access to their profile including their wall, which contained a chronological history of their Facebook activity since they joined the social networking site. Next, we counted the status updates participants had posted during the designated "baseline period", the two months prior to study entry. Then, participants in both conditions received email-

feedback about their average number of status updates posted per week. Participants in the experimental condition were asked to post more status updates than “they usually post per week” during the following week. Participants in the control condition only received the feedback about their usual status updating activity but no instruction to change their behavior.

Over the next seven days, daily emails were sent out to direct participants to a short online questionnaire which they were asked to complete at the end of the day. In addition to questions about their mood (e.g., “Right now I feel happy”), participants indicated their level of social connection using a five-point Likert scale ranging from “very slightly” to “extremely” (“Right now I feel connected to and in touch with my friends”, Cronbach’s α for the seven assessments = .89, $M = 3.46$, $SD = 0.90$). For participants in the experimental condition, the daily emails included a reminder to post more. After seven days, participants completed another set of questionnaires which again contained the UCLA Loneliness Scale (Cronbach’s $\alpha = .94$, $M = 2.08$, $SD = 0.69$, $r_{time\ 1 \times\ time\ 2} = .69$), the Subjective Happiness Scale (Cronbach’s $\alpha = .87$, $M = 5.36$, $SD = 1.07$, $r_{time\ 1 \times\ time\ 2} = .83$), and the CES-D (Cronbach’s $\alpha = .81$, $M = 1.88$, $SD = 0.52$, $r_{time\ 1 \times\ time\ 2} = .53$). In the days thereafter, we accessed participants’ Facebook profile from the “Research Profile” and saved the profile pages. Data collected from the saved profile pages included number of friends, number of status updates during the intervention period, and number of responses received per status update during baseline as well as during the intervention period. Afterwards participants were invited via email to come to the lab for the debriefing upon which their profile was deleted from the friends list of the “Research Profile”.

2.6 Results

2.6.1 Descriptive Statistics: Participants' Level of Online Connectivity and Activity

Participants had on average $M = 495.3$ Facebook friends ($SD = 355.0$, Range: 13–1886). All participants indicated that their “Facebook friends” included real-world friends, 94.2 % were friends with family members, 66.3% with their parents, 44.2% had added co-workers as a friend, and 19.8% their work supervisor or professor.

During the baseline period, participants posted on average $M = 2.2$ status updates per week ($SD = 2.6$, Range: 0.0-10.8). During the seven days of the intervention, participants in the experimental condition posted on average $M_{diff} = 8.71$ status updates more than during the baseline ($SD_{diff} = 8.84$, $t[36] = -6.00$, $p < .001$), whereas control participants showed, on average, only a minimal increase in their number of status updates ($M_{diff} = 0.69$, $SD_{diff} = 2.36$, $t[48] = -2.06$, $p = .05$). Participants in the experimental condition increased significantly more than participants in the control condition ($M_{diff} = 8.02$, $t[84] = 6.08$, $p < .001$).

2.6.2 Effect of the Intervention: Did Higher Status Updating Activity Affect Loneliness?

To test the hypothesis that posting more status updates affects loneliness, we predicted time 2 loneliness from time 1 loneliness and condition (contrast coded). Time 1 loneliness ($\beta = 0.66$, $t[83] = 8.46$, $p < .001$) and condition ($\beta = -0.18$, $t[83] = -2.33$, $p = .02$) significantly predicted loneliness at time 2. Participants in the experimental condition reported, on average, a decrease in loneliness ($M_{change} = -0.19$, $t[36] = 2.15$, $p = .04$, $d = -0.31$) after having posted more status updates over the past week. Loneliness did not change among participants in the control condition ($M_{change} = -0.004$, $t[48] = -0.06$, $p = .96$) (see Figure 2.1). Importantly, the intervention did not affect participants' subjective happiness ($\beta = 0.08$, $t[83] = 1.26$, $p = .21$)

or levels of depression ($\beta = -0.05$, $t[83] = -0.57$, $p = .57$) suggesting that the effect is specific to experienced loneliness.

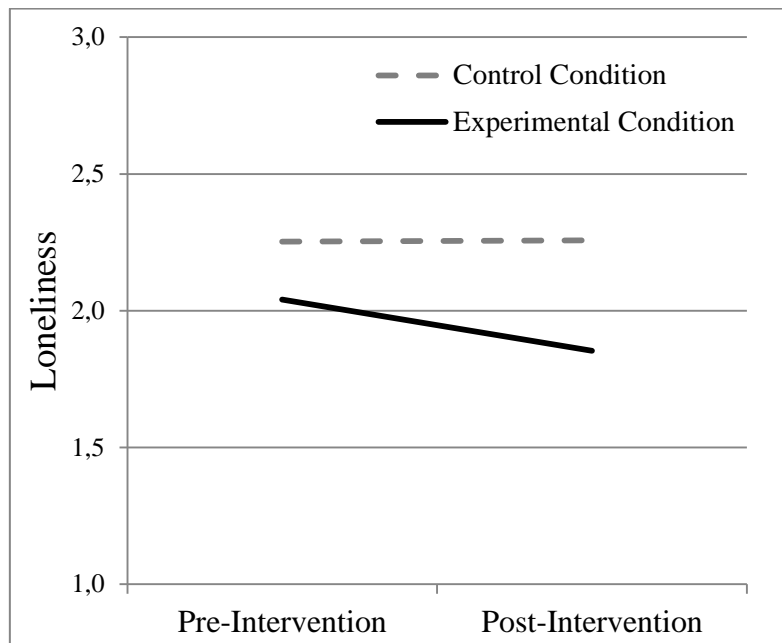


Figure 2.1: Mean change in loneliness in the control and experimental condition. The difference in loneliness at time 1 between control ($n = 37$) and experimental condition ($n = 49$) was not significant ($M_{diff} = 0.21$, $p = .67$)

To complement the between-group analyses, we then tested, among participants in the experimental condition, the extent to which increases in status updating during the experiment (i.e. the difference between the number of status updates during experiment and the average number of weekly status updates during baseline) were associated with decreases in loneliness. The existence of such a dose-related effect can help alleviate concerns about expectancy effects as an alternative explanation and provide further evidence for the robustness of the effect. The correlation between increased status updating activity and decrease in loneliness was $r = -.29$ ($p = .09$) indicating a statistical trend that, based on the relative small sample of $n = 37$ experimental participants and a standard two-tailed test, just

failed to meet the traditional threshold of statistical significance.³

2.6.3 Test for Mediation: Does Status Updating Reduce Loneliness Via Increasing Daily Feelings of Social Connectedness?

Next, we tested the degree to which increased feelings of social connectedness—measured daily during the intervention period and averaged over time—served as a statistical mediator for the relationship between the experimental request to post more and changes in loneliness. As recommended by Preacher and Hayes (2004), especially for small samples, we tested for mediation using bootstrapping analyses. Based on 5,000 bootstrap resamples, the indirect effect of experimental condition on residualized changes in loneliness (standardized) via daily feelings of connectedness (standardized) was statistically significant ($b = -0.08$; 95% CI = -0.17, -0.01). Thus, the experimentally induced changes in feelings of loneliness were statistically explained by the degree to which participants felt connected to and in touch with their friends during the intervention period (see Figure 2.2).

³ We found a similar descriptive pattern among participants in the control condition ($r = -.11$; $p = .46$). Further, across all participants, changes in status updating were significantly correlated with changes in loneliness ($r = -.27$; $p = .01$). This is important because, conceptually, participants who posted more status updates—without being (experimentally) prompted to do so—should still experience the psychological consequences. Reasons for the lower correlation among control participants likely lie in the smaller effect “input” (i.e. lower spontaneous relative to prompted increase) and the reduced effect “signal” (whereas experimental participants all increased synchronized on day 1, control participants may have increased their status updating activity on any day during the intervention).

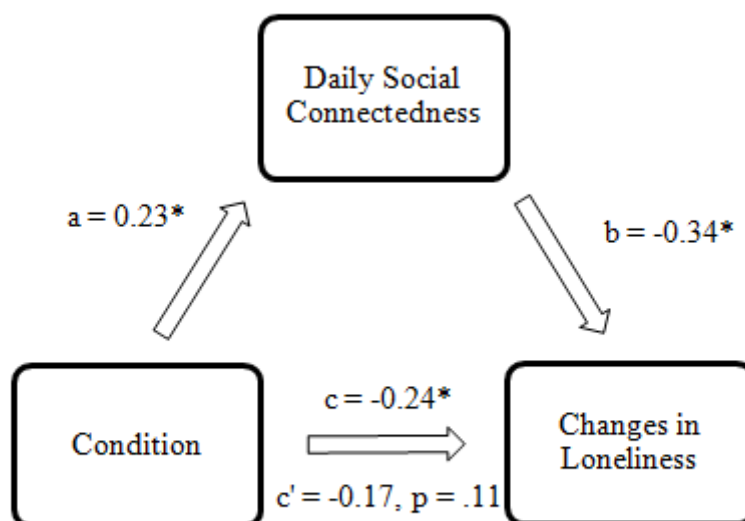


Figure 2.2. Daily social connectedness as a mediator of the relationship between experimentally induced increases in status updating and changes in loneliness. a = Effect of Condition on Daily Social Connectedness, b = Effect of Daily Social Connectedness on Residualized Change in Loneliness controlled for Condition. c = Effect of Condition on Residualized Change in Loneliness, c' = Direct effect of Condition on Residualized Change in Loneliness controlled for Daily Social Connectedness.

2.6.4 Test for Moderation: Is It Important for the Posted Status Updates to Receive

Responses?

Finally, we explored whether the intervention effect, that is the reduction in loneliness after status updating more, was moderated by how many of the status updates received a comment. It is possible that status updates require social feedback or a minimum degree of reciprocity to foster a sense of social inclusion. To test this idea, we added the proportion of commented status updates (standardized) and the condition by proportion-of-commented-status-updates interaction to the regression analysis. The main effect of condition remained significant ($\beta = -0.17$, $t[65] = -2.14$, $p = .04$) but neither the main effect of proportion of commented status updates ($\beta = -0.13$, $t[65] = -1.46$, $p = .15$), nor the interaction term ($\beta = -0.06$, $t[65] = -0.65$, $p = .52$) significantly predicted residualized changes in loneliness. This null-effect replicated for both the proportion of liked status updates and the proportion of status updates that received

any kind of social feedback, that is at least one comment or one like. Interestingly, this suggests that posting status updates itself—independent of whether it is “answered”—affected participants’ feelings of loneliness.

2.7 Discussion

Our online social networking experiment revealed that status updating more over seven days reduced loneliness. As expected, the reduction in loneliness was accounted for by feeling more connected and in touch with friends on a daily basis. Causal priority of status updating and connectedness was established by (1) experimentally manipulating status updating and (2) measuring connectedness temporally before changes in loneliness (Preacher & Hayes, 2004). Additionally, the content of status updates posted during the study is consistent with the idea that posting status updates helps maintain connectedness by sharing daily experiences and by letting friends take part in one’s life. Status updates covered a wide range of topics (e.g., school, personal relationships, sports, social events, politics, popular culture) reflecting content also common in daily casual conversations with friends (see Dunbar, Duncan, & Marriott, 1997).

2.7.1 Responses to Status Updates

Interestingly, the results revealed that direct social feedback (i.e., comments and likes) was not a necessary condition for the positive social effects of status updating to emerge. How can “uni-directional” status updating foster a sense of social inclusion? In the following, potential explanations will be discussed.

Studies on expressive writing have consistently found that writing about personally important topics can confer psychological benefits including improvements in social functioning

(Pennebaker, & Chung, 2011). However, status updating appears to lack some of expressive writing's identified "active ingredients" (i.e., privacy, repeated elaboration, in-depth exploration) rendering a "working through" account to our findings unlikely. Nevertheless, the act of writing itself—in the absence of any direct effects status updates may have on one's social network—might create a feeling of connectedness. Gardner, Pickett, and Knowles (2005) identified "social snacking behaviors" (such as looking at photos or re-reading old emails) as symbolic social behaviors that can alleviate loneliness through serving as a reminder of existing social bonds. In a similar way, Facebook users have a target audience—their online social network—in mind when composing status updates. It is through this symbolic process of thinking of a target audience that status updating can have a significant "social snacking" component. Similar to a snack temporarily reducing hunger until the next meal, social snacking may help tolerate the lack of "real" social interaction for a certain amount of time. Such an explanation would be consistent with findings by Sheldon, Abad and Hinsch (2011) that, paradoxically, Facebook use was associated with both increased relatedness satisfaction and increased relatedness dissatisfaction. The authors argue that relatedness dissatisfaction drives Facebook use but remains unchanged because Facebook use does not resolve existing problems within the "real-life" social network which ultimately cause relatedness dissatisfaction. Instead of fostering long-term relatedness satisfaction, Facebook use is—as postulated by Sheldon and colleagues (2011)—a short-term coping mechanism resulting only in transient relatedness satisfaction.

However, in contrast to social snacking behaviors as identified by Gardner and colleagues (2005), status updating is (also) a communicative act. Of the 545 status updates posted during the study, 79% (428) received responses affirming that most status updates do reach the recipients. Increased status updating activity can alleviate loneliness independently of

comments by friends, but comments on status updates only represent public social interaction on Facebook. Private messages via Facebook, emails, phone calls, face-to-face interactions etc. were not tracked within the present study. Thus, the positive social effect of status updating might nevertheless result from (unmeasured) influences on one's social interactions. Status updates draw attention to the user, and hence, might motivate friends to initiate social interaction. In support of this argument, 45% of the participants in a survey study on status updating indicated that over the last six months their status updates have resulted at least once in an in-person encounter (Köbler et al., 2010).

Moreover, research suggests that self-disclosure—and status updates disclose at least personal thoughts and feelings—fosters intimacy and affection which is considered important for maintaining relationships (Collins & Miller, 1994; Reis & Shaver, 1988). The content of status updates might allow a conversation to transition more quickly from small talk to more intimate levels (e.g. “I read you got a new job. How is that going?”) thereby fostering feelings of social inclusion (Aron, Melinat, Aron, Vallone & Bator, 2007; Mehl, Vazire, Holleran, & Clark, 2010).

Future research needs to disentangle the effect of status updating as a symbolic social behavior (social snacking) and as a catalyzer of actual changes in one's social network, for example by comparing a public status update condition against one in which participants post status updates “privately” so that only the experimenter (and no Facebook friend) can read them.

2.7.2 Limitations and Venues for Future Research

Participants were aware of taking part in an online social networking study and therefore, might have formulated their own hypothesis about the effects of the intervention. Yet, consistent with the skepticism expressed in the opening quote and reviewed in the recent article by Stephen Marche, their own hypotheses were often contrary to the actual results. In the debriefing, many participants expressed critical opinions around Facebook use and, to different degrees, held the notion that Facebook can make people lonely. Ultimately, this is hardly surprising in consideration of the predominantly negative media coverage on internet use and Facebook (e.g., McKenna & Bargh, 2000). Furthermore, no effect of experimental condition on broader outcome variables such as depression or happiness emerged. Because status updating was manipulated over seven days only, broader effects on well-being would have likely pointed to expectancy effects rather than to a broad, omnibus impact of the intervention. However, if the study duration was longer and if status updating positively affects one's social interactions, downstream broader affective consequences could be expected as well (e.g., Brage & Meredith, 1994; Cacioppo et al., 2008; Cacioppo, Hughes, Waite, Hawkley, & Thisted, 2006). Future research needs to replicate our findings and the extent to which increased status updating activity can boost feelings of social inclusion over longer periods of time.

Participants in the present study were college students in the United States. Status updating is pervasive in this population because Facebook was specifically created for this group (Boyd & Ellison, 2007). However, Facebook is rapidly gaining popularity in other age groups (Madden, 2010) and is by now a world-wide phenomenon ("Facebook Statistics", 2011). Future research should broaden the focus and test the impact of status updating in other populations and locations.

In the present study, only the effect of status update quantity (i.e., frequency) but not quality (i.e., content) was assessed. Research recently demonstrated that likeability of Facebook users as judged by strangers decreased with the number of negative status updates; a fact that might hinder the development of new friendships. Moreover, status updates that differed from the users' typical pattern elicited more comments by friends (Forest & Wood, 2012). Will negativity in status updates weaken existing friendships? What is the effect of selectively posting positive status updates? Future research needs to address these and related questions to develop a better understanding of how the content of status updates affects social inclusion.

2.7.3 An Online Social Networking Experiment

The present study successfully applied an experimental procedure to manipulate status updating activity within participants' natural online environment. Participants' compliance was high and recruitment easy because the experiment was conducted completely online which reduced the burden of participation. Many participants provided feedback on the study in the last online questionnaire session expressing that they felt that this research was relevant to their lives, and important for society. No participant refused to add the "Research Profile" as a friend or indicated in the post-experimental survey or during the debriefing unease with the fact that the investigators had access to their profile. This was also true for participants who had to be asked to temporarily alter their privacy settings in order to grant the "Research Profile" full access to the wall of their profile (< 5). Considering that participants had on average about 500 friends on Facebook—suggesting a rather low threshold to add a friend—it is hardly surprising that participants expressed no privacy concerns.

In sum, the procedures used in the present study suggest that research on online social networking sites can be a fruitful methodological approach (for a recent review on Facebook

research see: Wilson et al., 2012). For drawing robust scientific conclusions that carry important practical implications, it is equally important to determine causality and to preserve a real-world social ecology. It is our hope that the present study will encourage researchers to directly observe behavior on online social networking sites (Ellison et al., 2007). Many participants were surprised to learn how many or how few status updates they usually post, indicating that the validity of self-reports of online activities might be limited. Moreover, the extent to which biases in these self-reports are linked to personality traits (e.g., narcissists overestimating their status updating activity) is unclear given that online behavior might be subject to fewer social constraints and therefore more susceptible to impression management than real-world social behavior. Hence, research on the relationship between personality traits and online behavior might particularly benefit from using direct observational data to minimize shared method variance with the self-reported personality traits.

2.8 Conclusion

The present study contributes to the growing body of research assessing psychological effects of internet use. It used an experimental online social networking design to focus on one specific online activity and found that status updating can reduce loneliness. Hence, in line with recent studies, the present investigation points to merits rather than perils of (social) internet use. Technological change often creates ungrounded fears but also over-inflated hopes (see Boase and Wellman, 2006). In order to minimize risks and to seize chances, systematic, empirical and ideally experimental research is crucial to isolate the conditions under which online social engagement can serve as a psychological asset versus a psychological liability.

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Chapter 3

Narcissistic Power Poster?

On the Relationship between Narcissism and Status Updating

Activity on Facebook

große Deters, F., Mehl, M. R., & Eid, M. (2014). Narcissistic power poster? On the relationship between narcissism and status updating activity on Facebook. *Journal of Research in Personality*, 53, 165-174. doi:10.1016/j.jrp.2014.10.004

<http://dx.doi.org/10.1016/j.jrp.2014.10.004>

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Abstract

The pervasiveness of social networking sites and the popularity of status updates have prompted the question whether excessive online self-presentation is motivated by narcissism. The present studies assessed (1) whether this concern is shared by users of social networking sites, and (2) the actual relationship between narcissism and frequency of status updates using self- and informant reports of narcissism and an observational measure of status updating activity. Results confirmed that users of social networking sites believe that narcissism strongly predicts status updating activity. However, analyses of the actual relationship in a German and US sample yielded null-results. Using the equivalence testing approach allowed us to conclude that the effect of narcissism on status updating activity is not substantial.

Keywords: Status Updates, Narcissism, Facebook, Online Self-Presentation, Internet Methodologies, Social Networking Sites

Narcissistic Power Poster?

On the Relationship between Narcissism and Status Updating Activity on Facebook

The rise of the internet and especially the emergence of social networking sites have changed our ways of communication and self-expression dramatically (Bazarova, Taft, Choi, & Cosley, 2013; Weiser, 2001). With about 1,28 billion users of Facebook alone (Facebook Newsroom, 2014), it can be postulated that online self-presentation has become a “normal thing” to do (Buffardi & Campbell, 2008). While Facebook is by far the most popular social networking site world-wide (Mander, 2014), a broad range of these sites exist often tailored to a geographical region (e.g., Russia: VKontakte; China: Sina Weibo), created for a particular target group (e.g., mothers: CafeMom; researchers: ResearchGate), or focused on a specific life domain like business (e.g., Xing, LinkedIn), dating (e.g., PlentyofFish, Badoo), or traveling (e.g., CouchSurfing, WAYN).

Apart from inviting users to create and maintain a profile, many social networking sites also offer more dynamic tools for self-expression and communication (Winter et al., 2014). A very prominent example—implemented in most social networking sites—are so called status updates (Facebook’s term) or, more general, microblogs (Banerjee et al., 2009). In contrast to more traditional forms of communication like phone calls, e-mails, or text messages, these short one-to-many messages enable and encourage users to quickly share short updates about their daily lives with a large audience, like for example, all their friends on Facebook (Mango, Taylor, & Greenfield, 2012; Ong et al., 2011). Users might then receive social feedback, that is, “likes” or comments. Around 400 million Facebook status updates created each day (Pring, 2012) clearly indicate that users enjoy the opportunity to keep their family, friends, and

acquaintances posted about their thoughts, ideas, and feelings, as well as their current activity or state of mind (Banerjee et al., 2009).

Due to the popularity of status updates and the pervasiveness of social networking sites researchers started to wonder about the motivations for excessive online self-expression and raised the concern that frequent posting might be a sign of narcissism (e.g., Bergman, Ferrington, Davenport, & Bergman, 2011; Carpenter, 2012; Rosen, Whaling, Rab, Carrier, & Cheever, 2013). And while there are no systematic studies on the public opinion yet, countless press articles, blog posts, and comics (e.g., Jayson, 2009; O'Dell, 2010; Rosen, 2007) provide at least anecdotal evidence that this concern is also shared by the general public (Buffardi & Campbell, 2008; McKinney, Kelly, & Duran, 2012).

Narcissism, in its subclinical conceptualization as a personality trait, is characterized by a grandiose self-view, a pronounced self-focus, strong feelings of entitlement, a need for social admiration but a lack of concern for others and hence is related to many intra- and interpersonal problems (Back, Küfner, Dufner, Gerlach, Rauthmann, & Denissen, 2013; Back, Schmukle, & Egloff, 2010; Campbell, Rudich, & Sedikides, 2002; Morf & Rhodewalt, 2001). Even though subclinical narcissism is conceptualized and measured as a continuous trait (Campbell & Campbell, 2009), for the ease of exposition in the following we will use the term “narcissist” to describe people who score relatively high on measures of narcissism.

3.1 Why Status Updates Might be Attractive for Narcissists?

First of all, status updates are easily accessible and instantly reach a broad audience that is invited to provide feedback in form of “likes” or comments. Therefore, status updates might cater perfectly to narcissists’ sustained need for attention and external affirmation (Bergman

et al., 2011; Campbell et al., 2002). Moreover, status updates provide high-control over self-presentation because content, timing, and wording can be chosen carefully (Buffardi & Campbell, 2008; Mehdizadeh, 2010). Even after having posted the status update, it is possible to remove it as well as to censor unflattering comments—an amount of control not known in e-mail or text message communication. Thus, narcissists have several ways of ensuring that their online self-presentations reflect their overly positive self-views (Morf & Rhodewalt, 2001).

Secondly, status updates are not directed towards a specific receiver but a large audience and all this audience might share is one common friend: the poster him- or herself because interconnections in Facebook friends' lists are usually scarce (Hampton, Goulet, Marlow & Rainie, 2012). This, as a matter of course, determines a certain self-focus of status updates. Additionally, in contrast to many other forms of communication, like for example, face-to-face communication or phone calls, there is no need to grant even a minimum amount of attention to your communication partners—it is feasible to post status updates non-stop without having to read or respond to anybody else's post (Panek, Nardis, & Konrath, 2013). Because narcissists tend to be self-centered, egoistic, like to talk about themselves, and show a lack of empathy (Bergman et al., 2011; Buss & Chiodo, 1991), these characteristics of status updates should suit them well.

Last but not least, on social networking sites, it is common to have many “friends” or “followers” rather than just a few selected intimate friends. Narcissists are primarily interested in superficial relationships to gain admiration or to achieve status and also often fail to establish deeper and longer friendships (Campbell & Campbell, 2009; Carlson, 2013; Back et al., 2010) Hence, social networking sites might be the perfect social environment for

narcissists (Bergman et al. 2011; Buffardi & Campbell, 2008).

On the other hand, status updates also have drawbacks for narcissists and it could be argued that several functions of status updates cater more to a non-narcissistic population. Firstly, narcissists might fail to receive the intended attention and affirmation if nobody comments on or “likes” their status updates. Similar to narcissists’ interpersonal problems arising in real-life long-term relationships (Campbell & Campbell, 2009; Carlson, Vazire, & Oltmanns, 2011; Back et al., 2010; Paulhus, 1998), narcissists’ status updates might be charming and pleasant in the beginning but potentially start to annoy their “friends” or followers once their arrogance and entitlement become too obvious. As a result, friends on Facebook possibly choose to give no or even negative feedback, block the status updates from being shown to them or might decide to unfriend or unfollow the narcissist. In comparison to real-life situations, the fact that status updating is easily accessible, has no constraint of time or location, and addresses a large audience at once might speed up the process of getting to know the “dark” sides of a narcissist. For the narcissistic poster this might result in a quick loss of “friends” and followers and thus, might render status updating less appealing.

Secondly, several studies point to other important functions of status updating than just self-presentation (McKinney et al., 2012). Morris, Teevan, and Panovich (2010) reported that users often ask questions via status updates in order to gather reliable information from their social network. Seeking advice from friends and caring about their opinion would not be expected to be associated with narcissistic personality traits. Similarly, status updates are used to initiate ad hoc meetings (Barkhuus & Tashiro, 2010) and therefore potentially boost users’ social life. Non-narcissists might also turn to status updates for social support (Manago, Taylor, & Greenfield, 2012) maximizing their chances to reach all potentially helpful friends

without investing much time. Moreover, sharing good news via status updates might just as well be seen as a way to capitalize on positive events and enhance social bonds (Gable, Reis, Impett, & Asher, 2004; Sas, Dix, Hart, & Su, 2009) rather than seeking to impress friends and followers to gain admiration. Narcissists are not very interested in maintaining relationships or investing into strong ties but status updating might be a very useful tool for just that (McKinney et al., 2012). Due to increased residential mobility, friends and family are often spread all over the country or even world (Oishi, 2010) and status updating can help to maintain a shared reality (French, Zech, Quinten, & Kerschreiter, in preparation), increase feelings of connectedness (Köbler, Riedl, Vetter, Leimeister, & Krcmar, 2010), and reduce feelings of loneliness (große Deters & Mehl, 2013).

Last but not least, while it is common to include many short-term acquaintances in one's friends list, users of social networking sites vary dramatically in their number of such friends (see e.g., Manago et al., 2012: Range: 29-1200 friends on Facebook). Hence, for some users status updating might be a way to communicate with a circle of intimate friends rather than presenting themselves to superficial acquaintances.

3.2 Empirical Evidence Regarding Narcissism and Status Updating

To date, only a few studies have investigated the association between narcissism and status updating activity. Panek et al. (2013) found positive relationships between narcissism and self-reported frequency of Facebook status updates as well as tweets on Twitter both for college students and adults. Similarly, in a sample of adolescents, narcissism predicted status updating activity measured with open-ended questions over and above extraversion (Ong et al., 2011). Winter et al. (2014) also found a positive relationship between self-reported frequency of status updates and narcissism in a sample of German students. However, in

another study even though posting tweets on Twitter was significantly associated with narcissism, no significant correlation with status updating activity on Facebook emerged (McKinney et al., 2012). Similarly, Bergman et al. (2011) found no significant relationship between narcissism and Facebook status updates.

Several studies did not specifically measure status updating activity but aggregated over several Facebook behaviors what renders interpretation difficult (Smock, Ellison, Lampe, & Wohn, 2011). Rosen et al. (2013) report a positive relationship between narcissism and general Facebook use which was operationalized to include behaviors like status updating, “liking”, commenting, or browsing photos. “Self-promotional behaviors”, a measure aggregating over status updating, changes of profile info or profile picture, and posting or tagging of photos of oneself were positively related to grandiose exhibitionism, a subscale of narcissism (Carpenter, 2012). Similarly, a preference for status updates was positively correlated with the subscale exhibitionism but unrelated to overall narcissism (Ryan & Xenos, 2011).

In summary, empirical evidence regarding narcissism and status updating activity is sparse and results are mixed. This warrants further assessment of the topic and our second study aimed to address two major limitations of previous research. Firstly, instead of asking participants to self-report how often they post status updates as in the aforementioned studies, we measured status updating activity objectively by collecting information from participants’ profile pages. Hampton et al. (2012) reported only moderate correlations between actual and self-reported status updating activity ($r_s = .42$) and observed systematic biases in self-reports of Facebook behaviors. Particularly due to shared method variance, associations between self-reported behavior and self-reported personality might be inflated (Back & Eggloff, 2009;

Carpenter, 2012, Ong et al., 2011). Fortunately, social networking sites offer the great opportunity to unobtrusively observe behavior – especially in the case of status updates as they permanently stay on the users’ profile pages (große Deters & Mehl, 2013).

Secondly, we included informant reports of friends and family of the respective participant to complement the self-report measure of narcissism. With narcissism being a socially toxic personality trait and defined by biased self-perceptions, the perspective of others seems to be of particular importance (South, Oltmanns & Turkheimer, 2003, Oltmanns & Lawton, 2011) and has so far not been taken into account.

3.3 Definition of Status Updates

In order to clearly distinguish between status updates and shares or photo posts we defined status updates as posts that only consist of text. Hence, in the present studies all posts that contained either links or photos were excluded. This rather conservative definition has several advantages. Firstly, the focus of posts with links or photos is often not the poster him- or herself anymore. Users might simply share promotions in order to receive rewards (give-aways, being placed on the guest list etc.) (Goodson, 2012), post a photo of a friend, distribute information among their friends, for example, on apartments for rent, events that could be of interest or a missing person, or allow apps and games to automatically post on their timeline. While this could also be considered a form of self-presentation, we argue that it appears to be less deliberate and explicit than textual posts and is not so much an explicit demand for attention. Secondly, our conservative definition is straightforward and leaves no room for interpretation so that any coder would arrive at the same classification.⁴

⁴ In study 2A, we captured shares as well. They were more frequent than (text-only) status updates (Shares: *Md*= 2, *Interquartile Range (IQR)* = 0–6, *Min* = 0 ; *Max* = 75). Analysis with all posts (i.e., status updates and shares) as well as just shares yielded comparable results to the analysis presented in this paper.

3.4 Study 1

Study 1 aimed to assess the lay assumptions of the average user of social networking sites regarding the association between narcissism and status updating activity with a specific focus not only on the direction but also on the expected size of the effect. We focused on the opinion of users of social networking sites and not the general public in order to (1) avoid capturing just a general mistrust towards new technologies (McKenna & Bargh, 2000), and (2) to ensure that participants were familiar with the concept of status updates.

3.4.1 Participants

A snowballing procedure starting from the Facebook contacts of the first author as well as the friends' lists of two undergraduate students was employed. The median Facebook user is able to reach about 31,000 other Facebook users (Hampton et al., 2012). Hence, in comparison to traditional recruiting of college students for psychological studies, this snowballing procedure probably resulted in a more diverse sample. The study was advertised as a short online questionnaire on the topic of status updates and participants were encouraged to share the link with their Facebook friends. No compensation was offered. Of 364 participants who started the questionnaire, 301 completed it and had fewer than 25% missing values. Five participants were excluded due to implausible values (e.g., negative numbers where only positive values were valid). Therefore, the final sample consisted of 296 participants (133 male, 161 female; 2 not stated). 213 participants (80%) were 19–31 years old (29 not stated) and 163 (55%) reported to be a student (7% with a psychology major).

3.4.2 Procedures and Results

The online questionnaire was administered in German using the web-based survey software SoSci Survey (Leiner, 2014) and consisted of several questions regarding status updates. Most

of them, like for example, questions assessing emotional reactions to status updates were not related to the research topic of the present paper and will therefore not be presented here.

First, participants were asked whether they believed that narcissists post fewer, just as much or more status updates than somebody who is not narcissistic. While a definition of status updates was offered to ensure that participants did not count shares as status updates, the term “narcissists” was deliberately left undefined as we were specifically interested in lay perspectives which are also captured in the media. Only 4% of all participants assumed a lower status updating activity of narcissists, 14% did not expect any association and 82% thought that narcissists would show a higher status updating activity. Next, depending on their previous answer, participants indicated how many status updates they believed narcissists would post less, respectively more per week. Participants assumed that narcissists would post $Mdn = 3$ ($n = 12$, $IQR = 2.25-5$, $Min = 1$, $Max = 8$) status updates less per week, respectively $Mdn = 7$ ($n = 238$, $IQR = 5-10$, $Min = 0.1$, $Max = 100$) status updates more per week. Taking into account that participants, who believed in a higher status updating activity of narcissists considered $Mdn = 2$ ($n = 238$, $IQR = 1-3$, $Min = 0$, $Max = 200$) status updates per week as normal, they expected narcissists to post 350% more status updates than somebody with a normal posting behavior.

Complementary to the question of whether status updates are assumed manifestations of narcissism, we captured expectations of how status updating is perceived by others with respect to narcissism. 64% of all participants agreed to the statement that if they posted many status updates, their friends on Facebook would probably see them as narcissistic, while 19% disagreed and 17% neither agreed nor disagreed. Anyhow, only a small percentage (12%) of those participants that expect such an unfavorable judgment by their friends indicated that

they refrain from posting on that account whereas most participants (57%) reported that “other reasons” kept them from posting more, they posted nonetheless (27 %), or neither agreed nor disagreed (4%).

Finally, participants answered the question whether they believed that posting many status updates might make somebody more narcissistic. Only 28% of all participants thought of a high status updating activity as a potential cause for narcissism, whereas the majority (71%) indicated that they do not see that risk.

3.4.3 Discussion

The results of study 1 confirmed that not only some researchers and a few selected journalists but also the actual users of social networking sites expect a strong association between narcissism and a high status updating activity. Additionally, many users consider status updating to be socially costly due to the widespread assumption that it is indicative of narcissism. These social costs of status updating keep some users – even if only a relative small group – from posting status updates. On the other hand, the concern of many researchers that status updating causes narcissism (e.g., Buffardi & Campbell, 2008; Ong et al., 2011; Rosen et al., 2013) appears not to be widely shared among users of social networking sites.

3.5 Study 2

Study 2A and Study 2B aimed to empirically assess the actual relationship between narcissism and frequency of status updates. In order to examine generalizability across cultures, study 2A was conducted with a German sample and study 2B with a US sample. There appear to be differences in the use of social networking sites (Krasnova & Veltri, 2010)

as well as in level of narcissism (Schütz, Marcus, & Sellin, 2004) between Germany and the USA. In both studies participants' natural status updating activity was recorded and self-reports of narcissism were collected. Additionally, in study 2A, informed-reports on narcissism were included to complement the self-reports.

3.6 Study2A

3.6.1 Participants

The study was advertised via mailing lists of student organizations from universities all over Germany as a “Psychological Study about Facebook Use” and a compensation of 20€ was offered. Of 270 participants who got invited to participate, 57 did not complete the personality measures and 4 participants did not follow instructions to add the “Research Profile” as a friend on Facebook. Therefore, the final sample consisted of 209 students (164 female, 45 male) of whom 168 (80%) were 18-25 years old ($M_{age} = 23.49$).

For the analysis of narcissism reported by friends and family, 18 participants with not at least one informant report were excluded (final sample informant reports: 151 female, 40 male, 80% between 18–25 years; $M_{age} = 23.57$). Most participants (113) had two to three informant reports, whereas 44 (23%) had only one and 34 (17%) had more than four informant reports. In total, 470 informant reports (166 male, 299 female, 5 not stated) were collected. 353 (75%) of all informants were 18–29 years old ($M_{age} = 28.84$) and most indicated to be friends (271), boyfriend or girlfriend (59), or family (127) of the participant they rated.

3.6.2 Procedures and Measures

The study was conducted completely online and questionnaires were administered using the web-based survey software SoSci Survey (Leiner, 2014). Participants completed a large set of

questionnaires on personality, well-being, Facebook use, attitudes towards Facebook etc. In the following only measures relevant to the present research questions will be described. Participants filled out the 15-item German short version (Schütz et al., 2004) of the Narcissistic Personality Inventory (NPI; Raskin & Terry, 1988). The NPI is the most commonly used questionnaire to measure subclinical narcissism (Miller & Campbell, 2008). Participants have to choose between two alternative statements of which one is indicative of narcissism (e.g., “I really like to be the center of attention.”) and the other one is not (e.g., “It makes me uncomfortable to be the center of attention.”). Reliability (Cronbach’s $\alpha = .73$) and descriptive statistics ($M = 0.32$, $SD = 0.20$) were comparable to those reported by Schütz et al. (2004). Participants also completed the German version (Collani & Herzberg, 2003) of the Rosenberg Self-Esteem Scale (RSES; Rosenberg, 1965; Cronbach’s $\alpha = .87$, on a 4-point Likert-type scale: $M = 3.26$, $SD = 0.53$).

For the collection of informant ratings, participants were asked to provide up to six e-mail addresses of friends or family. Informants were invited via email to complete an online questionnaire about the target, including a 4-item measure of narcissism (Vazire, Naumann, Rentfrow, & Gosling, 2008). Informants rated the following items in their German translation on a 5-point Likert scale: “Always wants to be the center of attention.”, “Tends to brag.”, “Thinks too much of him/herself.”, and “Overestimates his/her abilities.” To form a composite measure of the targets’ narcissism from the perspective of well-acquainted others, the informant ratings were aggregated (Cronbach’s $\alpha = .87$, $M = 1.97$, $SD = .71$).

Finally, participants were asked to log on to Facebook and add the “Research Profile” as a friend in order to grant the investigators access to the wall of their profile. Amongst other things, the wall contains previously posted status updates. We measured participants status

updating activity by counting all status updates they had posted in the six weeks prior to study entry ($Md = 1$, $IQR = 0-4$, $Min = 0$; $Max = 28$) (see Figure 3.1 A).

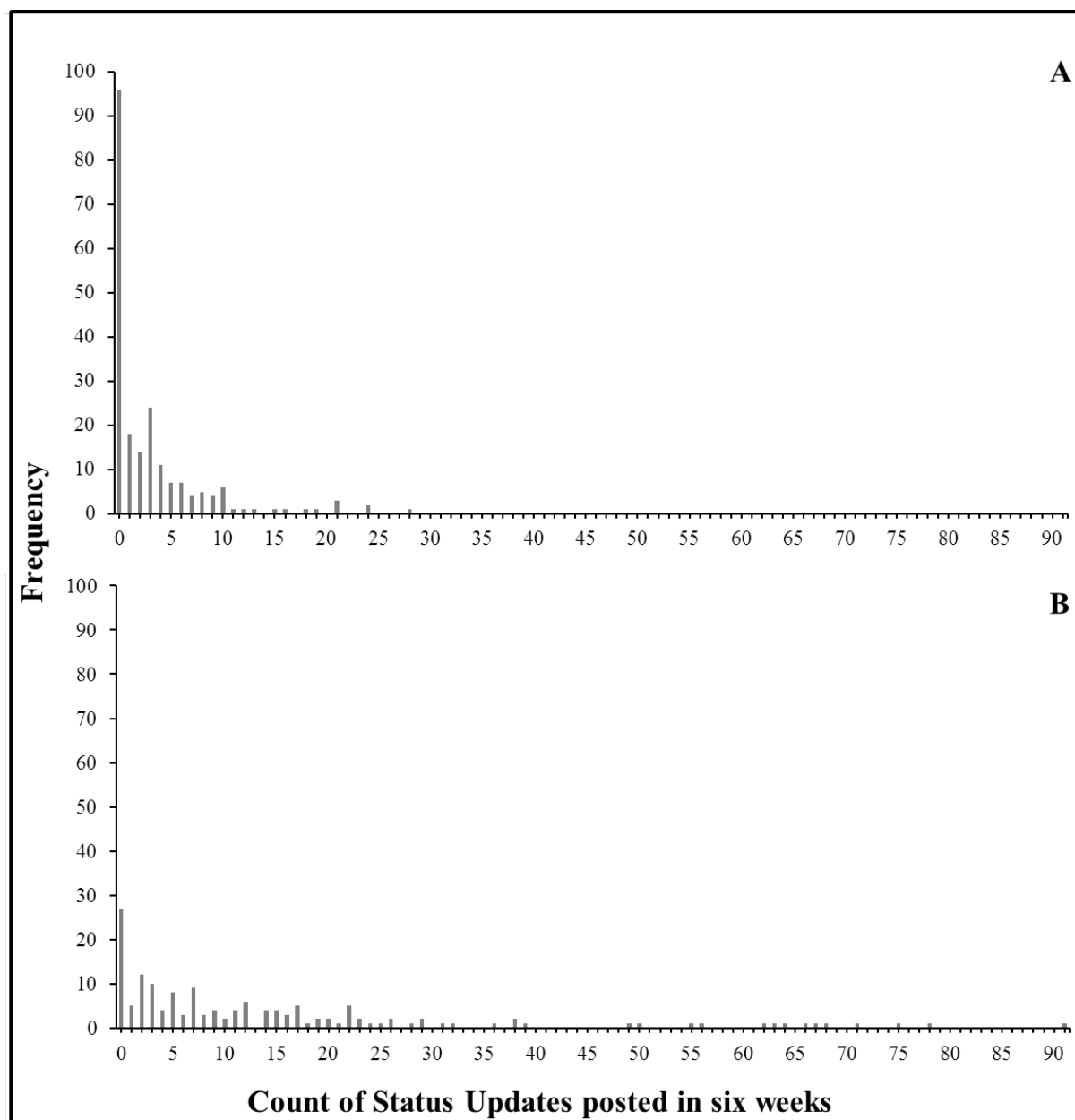


Figure 3.1. Histogram of participants' status updating activity during six weeks. A: German sample; B: US Sample

3.6.3 Results Study 2A

To assess whether narcissism predicts status updating activity, we used Poisson regression models because our outcome—the number of posted status updates within six weeks—was a count variable with a small mean (Coxe, West, & Aiken, 2009). Count variables reflect counts of events or objects and therefore, can take on only nonnegative integer values. As an outcome variable, count variables often violate assumptions of ordinary least square regression. These violations may result in biased standard errors, biased tests of significance as well as problems with statistical power. Therefore, it is strongly advised to use Poisson regression models (Gardner, Mulvey, & Shaw, 1995). Instead of the standard Poisson model, which has the strict assumption of equal conditional mean and variance, we used the negative binomial model, which allows for unexplained between-subjects variability because it had a significantly better fit (Coxe et al., 2009). All analyses were conducted using Mplus (Version 7; Muthén & Muthén, 2011).

Self-Reported Narcissism and Status Updating Activity

In order to control for measurement error in the measured predictor variable, we specified a structural equation model with self-reported narcissism as a latent predictor variable for the observed status updating activity. The 15 items of the NPI were assigned to three five-item parcels (Parcel 1: Items 5,7,8,9,14; Parcel 2: Items 3,4,10,11,15; Parcel 3: Items 1,2,6,12,13) based on their loadings in a single-factor model to achieve parcels balanced with respect to their item-to-construct relations (see Little, Cunningham, Shahar, & Widaman, 2002) and the means of all items of each parcel were computed. Additionally to other advantages of using parcels as indicators (e.g., higher reliability, fewer parameters to be estimated), this approach is especially advised to alleviate problems that may arise with dichotomous items (Coffman & MacCallum, 2005; Floyd & Widaman, 1995). A confirmatory factor analysis (estimator

maximum likelihood; analyzed matrix: covariance matrix) showed a good fit for the measurement model with freely estimated equal loadings of all three indicators on the latent variable and the variance of the latent variable fixed to one ($\chi^2 = 0.679$; $df = 2$; $N = 209$; $p = .37$; CFI = 1.0; RMSEA = .00, $p_{RMSEA} = .48$) (Schermelleh-Engel, Moosbrugger, & Müller, 2003).

In the next step, we estimated a negative binomial regression model (maximum likelihood estimation with robust standard errors) and regressed the counted status updating activity on the latent predictor narcissism (see Figure 3.2). Self-reported narcissism did not emerge as a significant predictor of status updating activity ($b = 0.16$, $SE = 0.11$, one-tailed test, $p = .08$, 90% CI [-0.02, 0.35])^{5,6,7,8}. Please note that the interpretation of regression coefficients in count regression is different than in ordinary least squares regression (Coxe et al., 2009). In this sample, the number of status updates was estimated to increase by 17% ($e^{0.16} = 1.17$) given a 1 SD increase in narcissism. When controlling for self-esteem in order to test whether the maladaptive and socially toxic part of narcissism alone (Paulhus, Robins, Trzesniewski, & Tracy, 2004) is predictive of status updating activity, residualized self-reported narcissism did not emerge as a significant predictor ($b = 0.19$, $SE = 0.12$, one-tailed test, $p = .06$, 90% CI [-0.01, 0.40]).

⁵ Controlling for gender, which was not a significant predictor, did not change the results substantially.

⁶ Despite a lack of theoretical justification to remove cases, we checked whether specific cases strongly influenced the result of our analysis. Therefore, we identified cases that had a large influence using the log-likelihood distance influence measure and Cook's D (Muthén & Muthén, 2011). Removal of the four most influential cases (in four separate analyses) did not substantially change the results reported here.

⁷ As expected, analysis with narcissism as a manifest predictor (i.e., the simple NPI total score) yielded comparable but considerably less precise results: $b = 0.74$, $SE = 0.51$, one-tailed test, $p = .07$, 90% CI [-0.09, 1.58].

⁸ Excluding all participants with no posting activity yielded comparable results: $n = 113$, $b = 0.06$, $SE = 0.10$, $p = .28$, 90% CI [-0.11, 0.23].

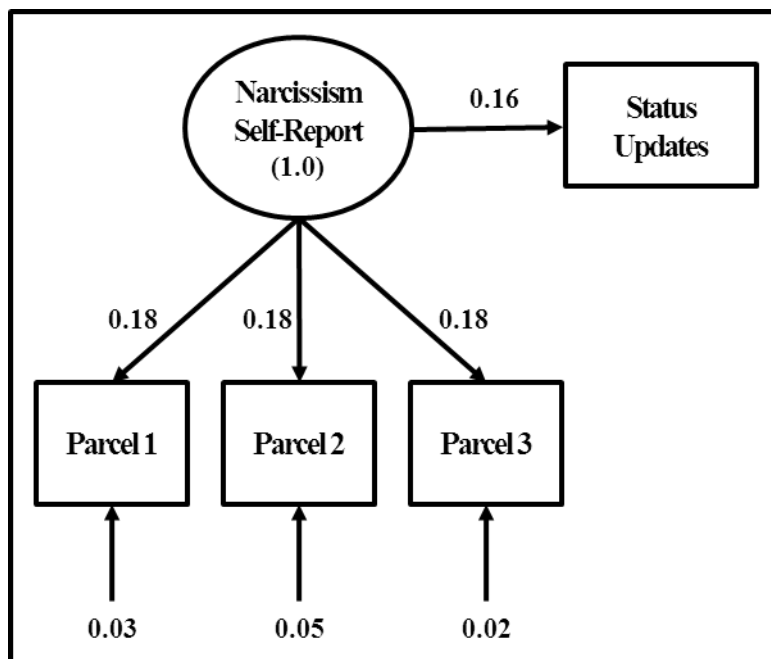


Figure 3.2. The structural equation model of self-reported narcissism (standardized) and frequency of status updates (German sample).

Narcissism Reported by Informants and Status Updating Activity

For parceling and validation of the measurement model, we followed the same procedure as for self-reported narcissism. The four items of the narcissism scale for informant reports were assigned to two parcels (Parcel 1: Items 1, 2; Parcel 2: Items 3, 4) and a confirmatory factor analysis showed a good fit for the measurement model with freely estimated equal loadings and equal intercepts of both indicators and the variance of the latent variable fixed to one ($\chi^2 = 0.800$; $df = 1$; $N = 191$; $p = .71$; $CFI = 1.0$; $RMSEA = .00$, $p_{RMSEA} = .82$).

Next, we estimated a negative binomial regression model with informant-reported narcissism as a latent predictor of status updating activity (see Figure 3.3). Again informant-reported narcissism did not significantly predict status updating activity ($b = 0.12$, $SE = 0.12$, one-tailed test, $p = .17$, 90% CI [-0.08 0.32])^{9,10,11,12}. As noted above, the regression coefficient

⁹ When controlling for gender of the poster, which was not a significant predictor, results did not change substantially.

could be best interpreted as an estimated increase of 13% ($e^{0.12} = 1.13$) in status updating, given a 1 SD increase in informant-reported narcissism. Again, controlling for self-esteem in order to partial out the prosocial parts of narcissism, did not substantially alter the results of the analysis ($b = 0.15$, $SE = 0.12$, one-tailed test, $p = .11$, 90% CI [-0.05, 0.36]).

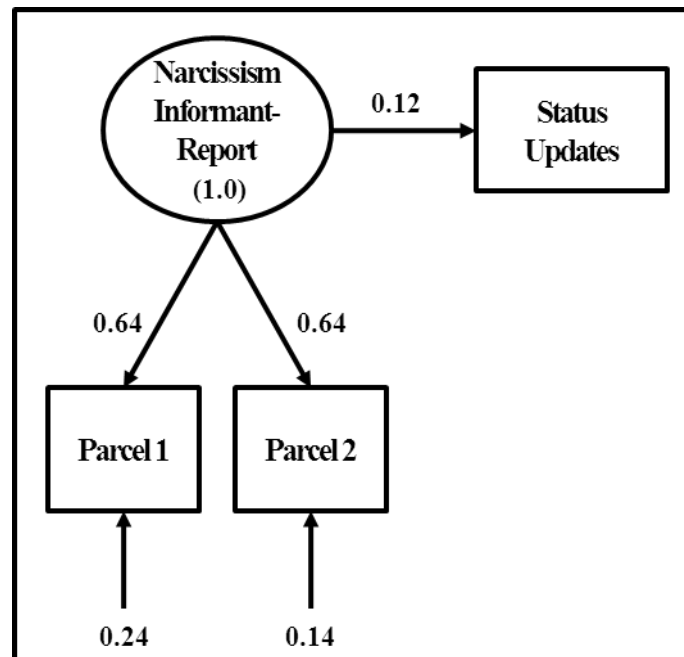


Figure 3.3. The structural equation model of informant-reported narcissism (standardized) and frequency of status updates (German sample).

Equivalence Testing

Narcissism—self-reported as well as informant-reported—did not significantly predict status updating activity. However, we cannot conclude from the absence of a significant effect

¹⁰ We again identified cases that had a large influence using the log-likelihood distance influence measure and Cook's D (Muthén & Muthén, 2011). Removal of the four most influential cases (in four separate analyses) did not change the interpretation of the results reported here.

¹¹ Again, as expected, an analysis with narcissism as a manifest predictor (i.e., the simple total score) yielded comparable but considerably less precise results: $b = 0.16$, $SE = 0.16$, one-tailed test, $p = .15$, 90% CI [-0.10, 0.43].

¹² Excluding all participants with no posting activity yielded comparable results: $n = 103$, $b = -0.03$, $SE = 0.12$, $p = .40$, 90% CI [-0.22, 0.16].

(failure to reject the null hypothesis) that the relationship between narcissism and status updating is indeed zero in the population (acceptance of the null hypothesis) (Cohen, 1990). An approach to nevertheless gain information from such a null-finding while avoiding the pitfalls of post-hoc power analysis is equivalence testing (Hoenig & Heisey, 2001; Parkhurst, 2001). In comparison to traditional null hypothesis significance testing, equivalence testing essentially flips null and alternative hypothesis (Hoenig & Heisey, 2001). In equivalence testing, the alternative hypothesis states that the effect in question is of negligible size whereas the “null hypothesis” assumes an effect that is non-trivial. Hence in a first step—similar to power analysis—researchers need to define how big an effect needs to be in order to be considered important (Parkhurst, 2001; Rogers, Howard, & Vessey, 1993). For this decision, we drew upon the results of study 1. On average, participants expected narcissistic Facebook users to post 350% more status updates than non-narcissistic user. Arguably, a considerably smaller effect than the one expected by users of social networking sites might still be non-trivial. Therefore, we deemed effects smaller than a seventh of that effect negligible which corresponds to a 50% increase ($b = 0.41$) respectively 50% decrease ($b = -0.69$) in status updating activity given a 1 SD increase in narcissism. Next, following the confidence interval approach in equivalence testing (see Rogers et al., 1993), we assessed whether the $1-2\alpha$ confidence intervals (self-reported narcissism: 90% CI [-0.02, 0.35]; informant-reported narcissism: 90% CI [-0.12, 0.32]) would completely fall within our equivalence interval [-0.69, 0.41]. As this was the case, we now can reject the hypothesis that narcissism has a substantial effect on status updating activity and can conclude that—in contrast to popular belief—the influence of narcissism on status updates is negligible.

3.7 Study 2B

3.7.1 Participants

One hundred and fifty three undergraduate (93 female, 60 male) students at the University of Arizona participated in the study for partial course credit. The majority (93%) were 18-25 years old ($M_{age} = 20.18$). Participants' natural status updating activity was recorded and self-reports of narcissism were collected before participant took part in an intervention study (see große Deters & Mehl, 2013).

3.7.2 Procedures and Measures

The study was conducted completely online and questionnaires were administered using the web-based survey software DatStat Illume (DatStat, Inc., Seattle, WA). Participants completed a large set of questionnaires on personality and well-being. In the following only measures relevant to the present research questions will be described. Participants filled out the 16-item English short version (Ames, Rose, & Anderson, 2006) of the Narcissistic Personality Inventory (NPI; Raskin & Terry, 1988). Reliability (Cronbach's $\alpha = .72$) and descriptive statistics ($M_{mean} = 0.37$, $SD = 0.21$) were comparable to those reported by Ames et al. (2006). Participants also completed the Rosenberg Self-Esteem Scale (RSES; Rosenberg, 1965; Cronbach's $\alpha = .88$, on a 4-point Likert-type scale: $M = 3.23$, $SD = 0.56$). At the end of the online questionnaire session, participants were asked to log on to Facebook and add the "Research Profile" as a friend in order to grant the investigators access to the wall of their profile. We measured participants status updating activity by counting all status updates they had posted in the six weeks prior to study entry ($Md = 7$, $IQR = 2-19$, $Min = 0$; $Max = 91$) (see Figure 3.1B).

3.7.3 Results Study 2B

For parceling and validation of the measurement model, we followed the same procedure as in study 2. The 16 items of the NPI-16 were assigned to three parcels (Parcel 1: Items 3,4,7,12,14; Parcel 2: Items 8,9,10,11,15; Parcel 3: Items 1,2,5,6,13,16) and a confirmatory factor analysis showed an acceptable fit for the measurement model with freely estimated equal loadings of all three indicators and the variance of the latent variable fixed to one ($\chi^2 = 2.978$; $df = 2$; $N = 153$; $p = .23$; $CFI = 0.99$; $RMSEA = .06$, $p_{RMSEA} = .35$).

Again, we estimated a negative binomial regression model with self-reported narcissism as a latent predictor of the counted status updating activity (see Figure 3.4). Self-reported narcissism did not significantly predict status updating activity ($b = -0.02$, $SE = 0.12$, one-tailed test, $p = .45$, 90% CI [-0.21 0.18])^{13,14,15,16}. The regression coefficient could be best interpreted as an estimated decrease of 2% ($e^{-0.01} = 0.98$) in status updating activity, given a 1 SD increase in narcissism. As in sample 2A, we controlled for self-esteem but the maladaptive part of narcissism also did not emerge as a significant predictor of status updating activity ($b = -0.01$, $SE = 0.11$, one-tailed test, $p = .46$, 90% CI [-0.17, 0.19]).

¹³ When controlling for gender (female = 0, male = 1), the interpretation of the results did not change substantially even though gender emerged as a significant predictor of status updating activity ($b = -0.85$, $SE = 0.21$, one-tailed test, $p = .00$, 90% CI [-1.20 -0.50])

¹⁴ Despite of no theoretical justification to remove cases, we checked whether specific cases dramatically influenced the result of our analysis. Therefore, we identified cases that had a large influence using the log-likelihood distance influence measure and Cook's D (Muthén & Muthén, 2011). Removal of the three most influential cases (in three separate analyses) did not substantially change the interpretation of the results reported here.

¹⁵ As expected, an analysis with narcissism as a manifest predictor (i.e. the simple NPI total score) yielded comparable but considerably less precise results: $b = -0.12$, $SE = 0.53$, one-tailed test, $p = .42$, 90% CI [-0.98, 0.77].

¹⁶ Excluding all participants with no posting activity yielded comparable results: $n = 126$, $b = -0.04$, $SE = 0.13$, $p = .37$, 90% CI [-0.26, 0.17].

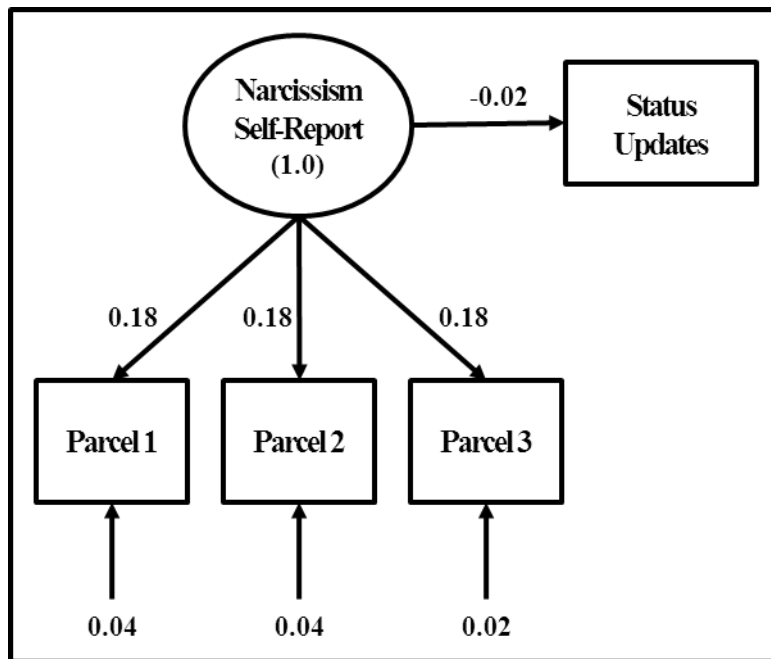


Figure 3.4. The structural equation model of self-reported narcissism (standardized) and frequency of status updates (US sample).

Equivalence Testing

In order to reject the hypothesis that self-reported narcissism has a substantial effect on status updating activity, we again followed the confidence interval approach for equivalence testing (see Rogers et al., 1993). The $1-2\alpha$ confidence interval for narcissism as a predictor (90% CI [-0.21 0.18]) fell completely within our equivalence interval [-0.69, 0.41]. Hence, we can conclude that—just as in the German sample—the association between narcissism and status updating activity was trivial in magnitude.

3.8 Discussion

In the present paper, firstly, we empirically assessed the assumptions of users of social networking sites regarding the relationship between narcissism and one of the most prominent forms of online self-presentation, that is, status updating. And secondly, we studied the actual association between narcissism and frequency of status updates. Results of study 1 confirmed

the—so far only anecdotal evidence—that it is indeed widely assumed that narcissism is strongly related to the frequency of status updating. However, studies 2A and 2B revealed no substantial relationship between narcissism and status updating activity both in a German as well as in an US sample of college students.

These null results of study 2 are not in line with the majority of the—admittedly not large amount of—published research on this topic, although two studies in the literature yielded comparable results (Bergman et al., 2011; McKinney et al., 2012). This discrepancy may have several reasons. Firstly, previous studies measured narcissism as well as status updating activity exclusively with self-reports. However, it should be taken into consideration that—as shown in study 1—users of social networking sites hold the implicit theory that narcissism is highly predictive of status updating activity. Hence, effects in studies applying only self-report measures might be inflated by a substantial amount of common method variance (Carpenter, 2012; Podsakoff, MacKenzie, Lee, & Podsakoff, 2003).

Secondly, some studies did not specifically measure status updating activity but aggregated over several activities on Facebook (Carpenter, 2012; Rosen et al. 2013). Hence, the positive relationships with narcissism found in these studies could as well be driven by some of the other activities included in the overall measure. Therefore, our results are not necessarily contradictory to the results of these studies.

Last but not least, null results are generally difficult to publish in our field and therefore, published research is probably not representative of all studies assessing narcissism and status updating but biased towards studies with “positive” results. (Ferguson & Heene, 2012; Rosenthal, 1979; Sterling, Rosenbaum, & Weinkam, 1995). This is at least partly due to the

fact that the interpretation of null results is widely perceived as difficult (Ferguson & Heene, 2012). The equivalence testing approach taken in this paper helps to circumvent this problem.

3.8.1 Equivalence Testing

The equivalence testing approach enabled us to reject the hypothesis that narcissism has a substantial effect on status updating activity—a statement at least as informative as the rejection of the null hypothesis in traditional null hypothesis significance testing. However, a challenge of equivalence testing is that it forces researchers to make an informed judgment on which effect size should be deemed non-trivial (Parkhurst, 2001; Rogers et al., 1993). Unfortunately, in the research area of the present paper no benchmarks exist yet. Helpful information—like for example, what difference in status updating activity users of social networking sites are able to notice or what should be considered a low, moderate and extreme status updating activity—was not available. Thus, the results of study 1 had to serve as point of reference for our informed judgment. Based on the reasoning that a considerably smaller effect than the one expected by users of social networking sites might still be detectable and meaningful, one seventh of the effect of study 1, corresponding to an increase exceeding 50%, was defined as the limit for a substantial (or non-trivial) effect. This evaluation ultimately constitutes a subjective judgment on part of the researchers. Hence, as with other decisions in the research process like the choice of study design, measures, or statistical analysis, it is crucial to communicate them transparently and thus, enable other researchers to draw their own conclusions (Cumming, 2014). Moreover, by making this choice explicit, we hope to stimulate efforts to understand and discuss the (practical) relevance of effects depending on their magnitude in studies on the associations between personality and online-behavior. This appears particularly warranted in the area of social networking research because studies with enormous sample sizes are feasible (see e.g., Bachrach, Kosinski, Graepel, Kohli, & Stillwell,

2012; Das & Kramer, 2013) in which essentially every effect might reach the traditional level of significance but nevertheless may be of little importance (Cohen, 1990).

As illustrated by our first study, the belief that narcissism strongly predicts status updating activity translates into real-world consequences: Posting status updates might be socially costly because it probably causes Facebook friends to draw unduly (i.e., false positive) unfavorable conclusions about the poster's personality. Taking into account that status updating may (also) have positive effects (see e.g., French, et al., in preparation.; große Deters & Mehl, 2013; Köbler et al., 2010; Manago et al., 2012; McKinney et al., 2012) it might be harmful if people refrain from posting on the basis of a questionable assumption. Even though the existing evidence on the relationship between narcissism and status updating activity is far from conclusive, it might be warranted to caution the general public that the lay assumption that status updating activity is a sign of narcissism may not be true. Additionally, researchers have raised concerns that constant exposure to content primarily produced by narcissists, might alter existing norms on self-promotional and egocentric behavior and ultimately raise levels of narcissism in users of SNS, i.e., the majority of the (younger) population, with many negative outcomes (Buffardi & Campbell, 2008; Gentile, Twenge, Freeman, & Campbell 2012; Ong et al., 2011). However, the present results allay those concerns showing that more narcissistic users are not substantially more active posters and that hence, narcissistic posts cannot be expected to outnumber other posts and dominate the experiences of SNS users.

3.8.2 The Lay Perspective

There are at least two explanations for why users of social networking sites may believe that narcissism strongly predicts high status updating activity. Firstly, as outlined in the introduction, there are good theoretical reasons to expect such a relationship and hence, not

only lay persons but also many researchers hypothesize an association between narcissism and status updating activity (see e.g., Carpenter, 2012; Ong et al., 2011; Winter et al., 2014). Moreover, media coverage of already published “positive” studies probably fueled these assumptions. Whereas theoretical reasons that make a case against such a relationship might have failed to substantially influence the public opinion due to negativity bias (Rozin & Royzman, 2001) and a tendency to focus on the perils of new technologies (McKenna & Bargh, 2000). However, despite of the consensus among lay persons and many researchers, it should be considered that the lay concept of narcissism may differ from its definition in social and personality psychology. Future research should focus on assessing the lay concept of narcissism and which aspects of that concept in particular drive the assumption of a strong association between narcissism and status updating activity.

Secondly, narcissistic users may craft status updates to attract as much attention as possible (see e.g., Mehdizadeh, 2010; Winter et al., 2014). Certainly, more attention grabbing and potentially more annoying status updates could be expected to be recalled more easily in comparison to more pleasant and socially accepted status updates. When asked to judge the relationship between narcissism and frequency of status updates, our participants might have applied the availability heuristic which would have lead them to believe that narcissistic users post substantially more status updates (Tversky & Kahneman, 1973).

3.8.3 Limitations and Venues for Future Research

Measurement of Narcissism

Despite being the most widely used measure for narcissism in social and personality research (Brown & Tamborski, 2011), the NPI has been repeatedly criticized both on a conceptual level as well as with regard to its psychometric properties (Carlson, 2013; Back et al., 2013;

Brown & Tamborski, 2011). Recently, several alternative conceptualizations and measures of narcissism have been proposed, like for example, the distinction between narcissistic grandiosity and narcissistic entitlement (Brown, Budzek, & Tamborski, 2009), the agency-communion model of narcissism (Gebauer, Sedikides, Verplanken, & Maio, 2012), or the narcissistic admiration and rivalry concept (Back et al., 2013). Moreover, because in the present research only overall and self-esteem-residualized NPI scores were assessed, associations between potential subcomponents of narcissism and frequency of status updating cannot be ruled out. Thus, future research would benefit from not exclusively relying on the NPI but should additionally apply measures that distinguish well between different components of narcissism.

Focus on Facebook

Another limitation of the present studies is that they focus exclusively on status updates on Facebook even though similar forms of one-to-many communication are implemented in most social networking sites. Results on the relationship between narcissism and status updating on Facebook might not be readily transferable to Twitter or other social networking sites. Lin and Qui (2013) showed, for example, that Facebook status updates and tweets on Twitter differ substantially in their linguistic “fingerprints” and concluded, *inter alia*, that impression management plays a more important role in tweets. Moreover, research has also shown differences in personality between users of Facebook and Twitter (Hughes, Rowe, Batey, & Lee, 2012) and Panek et al. (2013) found different patterns of correlations between subscales of narcissism and Facebook status updates versus tweets. Therefore, future research should expand its focus from Facebook to other social networking sites as well.

Measurement of Status Updates

Due to limited resources, in the present studies, status updating activity over a period of six weeks was chosen and assumed to be representative for the general status updating activity of participants. Empirical evidence suggests that status updating is highly consistent (Ivcevic & Ambady, 2013). Moreover, this was confirmed by an additional analysis in the US sample for which the necessary information was available: A comparison of the frequency of status updates posted during six weeks with the frequency of posted status updates during the two weeks prior to the six week period yielded a correlation of $r_s = .86$. Nevertheless, a longer time period could be expected to increase reliability of the measure.

Sample

Participants in the present studies were predominantly college-aged young adolescents. This demographic group is still the biggest user group of Facebook (Nayak, 2014) but the number of older users is quickly growing (Madden, 2010). Research linking narcissism to content generation in different forms of social media, that is, Facebook, blogs, and forums points to generational differences. Whereas for the so called Baby Boomers (age 50–68), subscales of narcissism were predictive of social media use, no significant associations were found for the Net-Generation (age 17–37) (Leung, 2013). Hence, future research needs to assess the relationship between narcissism and status updating in different age groups.

Even though results from the German and the US sample led to the same conclusion regarding the association between narcissism and status updating activity, interesting differences emerged on a descriptive level with Americans showing a distinctly higher status updating activity (German sample: $Md = 1$, US sample: $Md = 7$). Hence, it might also be fruitful for

future research to bear in mind that cultural differences in the use of social networking sites might exist.

3.8.4 Future Directions

Bigger and more diverse samples and a longer time period for the observation of status updates could efficiently be realized using Facebook applications like the myPersonality project (<http://mypersonality.org/wiki/doku.php>; also see e.g., Bachrach et al., 2012). Unfortunately, in the myPersonality project—at least up until now—narcissism was not assessed. Co-operations with Facebook may also offer access to data on the automatically tracked status updating activity of many participants (see e.g., Hampton et al., 2012). But it should be taken into consideration that Facebook's economic success depends on content generation and self-disclosure of its users (Krasnova, Spiekermann, Koroleva, & Hildebrand, 2010). Hence, studies conducted in close co-operation with Facebook that encourage these behaviors or claim benefits of Facebook use might not have the same credibility as independent studies.

While the present study exclusively focuses on the relationship between narcissism and the *frequency* of status updates it would be promising to also assess the *content* of status updates and how it relates to narcissism. First empirical evidence indicates that the status updates of narcissistic users are more self-promotional (Mehdizadeh, 2010; Winter et al., 2014). On a less specific level, using status updates to show off or to broadcast one's overly positive self-view as could be expected from narcissists should be reflected in the overall positivity and negativity of status updates. Hence, the content of status updates might be one of the valid cues that allow raters to accurately predict narcissism from viewing profile pages (Buffardi & Campbell, 2008). Moreover, as pointed out before, lay persons' assumption that narcissists

post more status updates might be due to distinctive characteristics of narcissists' status updates which might make them more memorable (e.g., using more explicit language). Hence, in addition to further exploring the relationship between content of status updates and narcissism, it would be worthwhile to assess whether status updates of more narcissistic users versus less narcissistic users differ in their effect on their intended audience.

3.9 Conclusion

For many people, social networking sites have become an integral part of their daily life (Ivcevic & Ambady, 2013). Hence, it is crucial to test and understand the association between online behavior and personality (Hughes et al., 2012). The present studies contribute to the growing body of research on this topic and hopefully encourage other researchers to use non-self-report measures of online behaviors and to publish null results. Moreover, by empirically assessing the implicit theories of lay persons, the present research specifically aimed at also informing the general public. The results call for a more balanced debate suggesting that narcissists are far from flooding social networking sites with their status updates and should caution us against premature conclusions on the personality of our power posting friends on Facebook.

3.10 References

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Chapter 4

Social Responses to Facebook Status Updates: The Role of Extraversion and Social Anxiety

große Deters, F., Mehl, M. R., & Eid, M. (2015). Social Responses to Facebook Status Updates: The Role of Extraversion and Social Anxiety. *Manuscript submitted for publication.*

Abstract

Posting, reading, and responding to Facebook status updates is an integral part of many peoples' daily lives. However, the role of personality in predicting social responses to status updates remains largely unexplored. Based on two hypotheses prominent in research on online communication, the social enhancement and the social compensation hypothesis, we assessed the influence of extraversion and social anxiety on (1) objectively measured direct social responses to status updates (likes and commenters) and (2) the interpersonal appraisal of the posters' status updates by their friends captured by informant reports. Moreover, we explored the interplay between personality, valence of the status updates, and direct social responses. In a US and a German sample, no support for either social enhancement or social compensation effects emerged for direct social responses. However, analyses of the informant reports showed that—in line with the social compensation hypothesis—the status updates of individuals higher in social anxiety were appreciated more by their friends. Furthermore, results pointed to the importance of valence of status updates in this context revealing associations between valence and direct social responses, valence and extraversion and a moderation effect of personality on the association between valence and likes in the US sample.

Keywords: Facebook Status Updates, Social Responses, Social Compensation Hypothesis, Social Enhancement Hypothesis, Extraversion, Social Anxiety

Social Responses to Facebook Status Updates: The Role of Extraversion and Social Anxiety

By now online communication is an integral part of many peoples' everyday lives and often important social relationships are primarily maintained online (Burke, 2011; Winter et al., 2014). Since online communication plays such a major role in our social lives, differences between face-to-face and online communication have prompted the question whether personality traits like extraversion and social anxiety that are associated with sociability and social competence *offline* similarly shape social interactions *online* (Valkenburg & Peter, 2009). In this context, two prominent hypotheses have emerged: the social enhancement and the social compensation hypothesis. The social enhancement or “the-rich-get-richer” hypothesis is based on the idea that online communication offers “just another opportunity” for social interaction (Moore & McElroy, 2012). Therefore, as in the offline world, online communication should mainly serve socially competent individuals (Kraut et al., 2001). On the other hand, the social compensation or “the-poor-get-richer” hypothesis argues that the internet is not just an extension of the offline world but that, instead, due to unique characteristics of online communication like, for instance, the absence of nonverbal cues and the increased control over self-presentation, it caters better to the needs of less socially skilled individuals (Moore & McElroy, 2012; Valkenburg & Peter, 2007). While this question has been assessed on a global level for general internet or social media usage (e.g. Indian & Grieve, 2014; Kraut et al., 2001) as well as for some specific forms of online communication like online chatting (e.g. Sheeks & Birchmeyer, 2007; van Zalk, Branje, Denissen, van Aken & Meeus, 2011), empirical evidence hardly exists for Facebook status updates. With around 400 million status updates posted each day (Pring, 2012) this is not only a novel but also a very popular form of online communication. Moreover, status updates are

particularly interesting as they popularized a new type of communication—so called “masspersonal communication” (O’Sullivan, 2003). It addresses audiences larger than usual in both offline and online interpersonal communication (median audience for Facebook posts: 78 friends, Bernstein, Bakshy, Burke, & Karrer, 2013) while its content is more personal than that of classical mass communication like newspaper articles. Hence, the present paper aims to explore the role that extraversion and social anxiety, as two core interpersonal individual differences, play in predicting social responses to Facebook status updates.

4.1 Extraversion and Social Anxiety

Extraversion, as one of the “Big Five” personality traits and has often been the focus in research on personality and online communication (e.g., Kraut et al., 2001; Zywicka, & Danowski, 2008, van Zalk et al., 2011). Individuals high in extraversion can be described as energetic, assertive, outgoing, enthusiastic, and adventurous (John & Srivastava, 1999). Unsurprisingly, social anxiety is negatively associated with extraversion (Ebeling-Witte, Frank & Lester, 2007; Kotov, Gamez, Schmidt, & Watson, 2010; Norton, Cox, Hewitt, & McLeod, 1997). However, the concept of social anxiety is less broad and exclusively relevant to the social domain (Briggs, 1988). Individuals high in social anxiety are characterized by a desire to convey a positive impression on others while believing that they lack the ability to achieve that (Schlenker & Leary, 1982). Hence, while socially anxious individuals often avoid social interaction to prevent failure, they are not necessarily less interested in social contact and might only appear less sociable (Brown, Silvia, Myin-Germeys & Kwapil, 2007). As a consequence, social anxiety particularly sparked interest in the context of the social compensation hypothesis (e.g., Caplan, 2007; McKenna & Bargh, 1999).

4.2 Social Responses to Status Updates

When Facebook friends read a status update, they can provide direct social feedback in form of expressing a “liking” by clicking the famous, evolved cultural icon, the thumb-up like-button or by writing a verbal comment in response. Hence, the number of likes a status update received as well as the number of friends who post a comment in response constitute objective measures of social feedback directly and uniquely tied to a status updates. Importantly, these measures can be collected unobtrusively from Facebook by accessing the poster’s profile page which we did in the present research.

4.2.1 Likes

Likes as one-click-communication require almost no effort (Burke & Kraut, 2014). First and foremost, they signal that the friend wants to express a positive response to the status update. But sad (e.g., sharing of obituaries) or angry (e.g., complaints about inappropriate behavior) status updates can receive likes as well. Therefore, the meaning of likes has probably evolved to mimic comparably effortless and common cues in face-to-face communication like smiles and nods. These non-verbal cues indicate agreement, sympathy, friendliness, and involvement (Siegman & Feldstein, 1987). Accordingly, Utz (2015) found that if friends liked a status update they also indicated that the status update had made them feel more connected to the poster.

4.2.2 Commenters

In comparison to likes, comments require more time and cognitive effort and hence, convey a deeper interest (Burke & Kraut, 2014; Schöndienst & Dang-Xuan, 2011). Moreover, because they are generally verbal (i.e., text-based; conceivably a comment could consist exclusively of

emoticons), they should typically provide richer feedback and social or informational support. They could also contain self-disclosure by the posters' friends and start conversations between the poster and the commenters (Burke & Kraut, 2014). Even though comments can conceivably be negative, empirical research shows that almost all comments are positive (88 % of all comments; Greitemeyer, Mügge, & Bollermann, 2014) and well-liked by the receivers (only 3% were "not liked at all"; Forest & Wood, 2012). Therefore, they can be seen as equally positive but more valuable than likes (Schöndienst & Dang-Xuan, 2011).

4.2.3 Interpersonal Appraisal of Participants' Status Updates by Facebook Friends

However, while the numbers of likes and unique commenters capture the amount of direct positive social feedback they might not be well-suited to assess less direct social responses. Friends might enjoy reading status updates and feel closer to the poster but might not decide to respond to them (Burke & Kraut, 2014). Similarly, likes and comments do not capture whether status updates annoy friends or alienate them because, in that case, friends would most likely just refrain from responding at all (Bryant & Marmo, 2012; Forest & Wood, 2012). Moreover, status updates could prime friends to respond to and interact with the poster using private communication channels on or beyond Facebook (e.g., Messenger, WhatsApp, text messaging) or turn to more traditional means of remote communication such as the phone (Ellison, Steinfield, & Lampe, 2011). Hence, another approach to measure social responses to status updates more broadly is to directly assess evaluations of posters' friends. Therefore, we developed a measure of friends' appraisal of the poster's status updates for the present research.

4.3 Valence, Personality, and Social Responses to Status Updates

Valence is a fundamental dimension to describe status updates and has hence received considerable attention in research on status updates (Utz, 2015; Kramer, Guillory, & Hancock, 2014; Zhang, 2010). Moreover, research indicates that the valence of status updates is related to the social responses a status update elicits. There seems to exist a social norm of honest but positive self-presentation on Facebook (Bryant & Marmo, 2012). Accordingly, if status updates contained expressions of positive emotions they received more likes (Zhang, 2010) and friends indicated to feel closer to the poster after reading more positive status updates (Utz, 2015). However, more positive status updates received fewer comments (Zhang, 2010) just as more uplifting status updates in comparison to more depressing ones (Barash, Ducheneaut, Isaacs, & Bellotti, 2010). While more negative status updates get more elaborate direct feedback, i.e., more comments and fewer likes, especially the responses of weak ties might be unpleasant. More negativity in status updates was related to less liking of the poster by strangers (Forest & Wood, 2012) and more negativity in tweets predicted a loss of followers (Hutto, Yardi, & Gilbert, 2013).

Both extraversion and social anxiety are related to the expression of positivity and negativity. Individuals high in extraversion habitually experience more positive emotions than introverts (Larsen & Augustine, 2008). Unsurprisingly, they also use more positive words in their naturalistic speech (Augustine, Mehl, & Larsen, 2011) as well as in their status updates (Schwartz et al., 2013). In contrast, socially anxious individuals experience and express less positive and more negative affect (Brown et al., 2007; Kashdan, 2007; Kashdan & Breen, 2008; Turk, Heimberg, Luterek, Mennin, & Fresco, 2005) which will likely also be reflected in their status updates. Hence, in order to assess whether the valence of status updates drives or masks a

potential effect of extraversion or social anxiety on social responses of status updates, we included it in the present research.

Furthermore, following Forest and Wood's (2012) line of reasoning that Facebook friends particularly "reward" non-typical emotional expressions with direct social feedback, we also assessed whether extraversion respectively social anxiety moderates potential effects of valence on social responses to status updates. In their study on self-esteem and direct social feedback to status updates, Forest and Wood (2012) found that more negativity in status updates was associated with more social feedback for individuals high in self-esteem who are assumed to habitually express less negativity than individuals low in self-esteem. For positivity they found the reverse effect. More positive status updates by individuals high in self-esteem did not gain more social feedback but positivity by low self-esteem individuals was rewarded by their Facebook friends.

4.4 Frequency of Status updating

Even though this paper focusses on social responses to status updates, we also assessed whether extraversion and social anxiety are related to the extent to which somebody engages in status updating behavior based on the reasoning that posting status updates is a necessary precondition for eliciting social responses to status updates. So far, empirical evidence has been mixed. While some studies did not find a significant association between extraversion and self-reported (Ross et al., 2009; Winter et al., 2014) or objectively measured status updating activity (Ivcevic & Ambady, 2012), others found that extraversion positively predicted status updating (self-reported: Garcia & Sikström, 2014; Ong et al., 2011; objectively measured: Bachrach, Kosinski, Graepel,

Kohli, & Stillwell, 2012). Similarly, one study found evidence for a negative relationship between social anxiety and objectively measured status updating activity (Weidman & Levinson, 2015), while another study did not find a significant relationship (Fernandez, Levinson, & Rodebaugh, 2012).

4.5 Overview

In summary, the present research aimed to assess the following hypotheses respectively research questions:

Part 1: Personality and Status Updating Activity

- Hypothesis 1A: Extraversion positively predicts status updating activity.
- Hypothesis 1B: Social anxiety negatively predicts status updating activity.

Part 2: Personality and Direct Social Feedback

- Research question 1A: Do more extraverted individuals—as suggested by the social enhancement hypothesis—or more introverted individuals—as suggested by the social compensation hypothesis—receive more direct social feedback to their status updates?
- Research question 1B: Do individuals lower in social anxiety—as suggested by the social enhancement hypothesis—or higher in social anxiety—as suggested by the social compensation hypothesis—receive more direct social feedback to their status updates?

Part 3: Valence of Status Updates, Personality, and Direct Social Feedback

- Hypothesis 2A: More positive status updates receive more likes.
- Hypothesis 2B: Less positive status updates are commented on by more friends.
- Hypothesis 3A: Status updates posted by individuals higher in extroversion are more positive.
- Hypothesis 3B: Status updates posted by individuals higher in social anxiety are less positive.
- Research question 2A: Does valence drive or mask an effect of extraversion on the amount of direct social feedback a status update receives?
- Research question 2B: Does valence drive or mask an effect of social anxiety on the amount of direct social feedback a status update receives?
- Research question 3A: Does extraversion moderate potential effects of valence on direct social feedback to status updates?
- Research question 3B: Does social anxiety moderate potential effects of valence on direct social feedback to status updates?

Part 4: Interpersonal Appraisal of Participants' Status Updates by Facebook Friends

- Research question 4A: Are the status updates of more extraverted individuals—as suggested by the social enhancement hypothesis—or the status updates of more introverted individuals—as suggested by the social compensation hypothesis appreciated more by their Facebook friends?

- Research question 4B: Are the status updates of individuals lower in social anxiety—as suggested by the social enhancement hypothesis—or the status updates of individuals higher in social anxiety—as suggested by the social compensation hypothesis appreciated more by their Facebook friends?

In order to test these hypotheses and address our research questions, we used data from two studies. Study 1 was conducted with a US American sample and study 2 with a German sample. In both studies participants reported their extraversion and social anxiety, and their natural status updating activity as well as the number of likes and the number of individual commenters for each status update were recorded from their Facebook profile pages. Moreover, raters judged the status updates in respect to their valence. In study 2, Facebook friends of the participants also completed a measure of their appraisal of the participant's status updates.

4.6 Study 1

4.6.1 Participants

153 undergraduate students (93 female, $M_{age} = 20.18$, $SD_{age} = 3.24$) at the University of Arizona participated in the study for partial course credit. After participants had completed the personality questionnaires and we had accessed their Facebook profile to extract information about their status updating activity, participants took part in an intervention study (see große Deters & Mehl, 2013, for a description of the intervention study, and große Deters, Mehl, & Eid, 2014, for other, non-overlapping results based on this dataset).

4.6.2 Procedures and Measures

The study was conducted completely online and questionnaires were administered using the web-based survey software DatStat Illume (DatStat, Inc., Seattle, WA). Participants completed a large set of questionnaires on personality and well-being. In the following only measures relevant to the present research questions will be described. Because the measures used different scales what makes comparisons difficult, we applied a linear transformation to convert all scores to “percentage of maximum possible scores” (POMP-Scores; Cohen, Cohen, Aiken, & West, 1999). Participants completed the Big Five Inventory (John & Srivastava, 1999) which assesses extraversion with eight items on a seven-point Likert-type scale (Cronbach’s $\alpha = .85$, $M = 61.21$, $SD = 18.27$). Participants also filled out the 6-item social anxiety subscale of the Self-Consciousness Scale (Fenigstein, Scheier, & Buss, 1975). Participants indicated on a five-point Likert-type scale to what extent they agreed with statements such as “It takes me time to overcome my shyness in new situations.”, “I get embarrassed very easily.”, or “I feel anxious when I speak in front of a large group.” (Cronbach’s $\alpha = .80$, $M = 47.17$, $SD = 21.54$).

In addition to completing the questionnaires, participants were asked to add our “Research Profile” as a friend on Facebook. We accessed the wall (now referred to as timeline) of their profile which, among other things, shows previously posted status updates as well as comments and likes which these status updates have received. Please refer to große Deters et al. (2014) for a definition of status updates. Focusing on a time period of 59 days prior to study entry, we then (1) counted the number of status updates posted by the participant ($Md = 11$, $IQR = 3-27$, $Min = 0$, $Max = 116$), (2) recorded the number of likes each of those status updates had received ($Md = 2$, $IQR = 1-4$, $Min = 0$, $Max = 28$), (3) determined how many different friends had commented on

each status update ($Md = 1$, $IQR = 0-2$, $Min = 0$, $Max = 17$), and (4) copied, pasted, and anonymized the text of the status updates for later ratings of their valence.

For the ratings of valence, two research assistants rated how much positivity respectively negativity was expressed in each status update on 5-point scales (1 = none at all, 5 = a great deal). Again we converted all scores to POMP-scores. 127 of the 3161 status updates could not be rated (e.g., due to containing foreign languages such as Arabic). The interrater reliability was $ICC(2,2) = .86$ for positivity and $ICC(2,2) = .87$ for negativity (Shrout, & Fleiss, 1979). All valence ratings for each status update were averaged (positivity: $M = 34.85$, $SD = 29.52$; negativity: $M = 15.79$, $SD = 24.29$; $r = -.53$) and we then formed a measure of overall valence for each status update by subtracting negativity from positivity ($M = 59.52$, $SD = 23.63$; higher numbers indicate more positive status updates).¹⁷

4.6.3 Results Study 1

Part 1: Personality and Status Updating Activity

In a first step, we assessed whether extraversion and social anxiety predicted the number of posted status updates. Because our outcome—the number of status updates—was a count variable with a small mean (Coxe, West, & Aiken, 2009) we used Poisson regression models. Count variables can take on only nonnegative integer values as they reflect counts of events or objects. Hence, Poisson regression models should be used instead of ordinary least square regression (OLS) because count variables as outcomes often violate assumptions of OLS regression which may result in biased standard errors, biased tests of significance, and problems with statistical

¹⁷ Separate analyses for positivity and negativity yielded comparable results.

power (Gardner, Mulvey, & Shaw, 1995). We chose negative binomial models for our analyses instead of the standard Poisson model because their fit was significantly better. Negative binomial models allow for unexplained between-subjects variability, while the standard Poisson model necessitates the strict assumption of equal conditional mean and variance (Coxe et al., 2009).

In two separate count regression analyses ($N = 153$), neither extraversion nor social anxiety emerged as significant predictors of the number of status updates posted by participants ($b_{extraversion} = 0.011, SE = 0.007, p = .10, 95\% CI [-0.002, 0.024]$; $b_{social\ anxiety} = -0.005, SE = 0.005, p = .35, 95\% CI [-0.014, 0.005]$).

Part 2: Personality and Direct Social Feedback

To assess whose status updates elicit more direct social feedback by Facebook friends, we applied Generalized Linear Mixed Models to account for the nested structure (status updates nested within participants) and the fact that our outcome variables (likes and commenters) were count variables (Aiken, Mistler, Coxe & West, 2015). On level 2 of the models, $n = 131$ participants with at least one status update were included in the analyses. On level 1 of the models, a total of 3,161 status updates for analyses of likes and 3,145 status updates for analyses of commenters were available (status updates per participant: $Md = 15, IQR = 5 - 30, Min = 1, Max = 116$). For all analyses we used the R package “glmmADMB” (Skaug, Fournier, Nielsen, Magnusson & Bolker, 2013) which allows to compare the fit of different count regression models. Again, the Negative Binomial Models showed the best fit and we fitted Random-Intercept Models with Laplace approximation for parameter estimation (Bolker et al., 2009).

Likes

Neither extraversion nor social anxiety significantly predicted the number of likes received per status update ($estimate_{extraversion} = 0.003$, $SE = 0.003$, $z = 0.95$, $p = .34$, 95% CI [-0.003, 0.009]; $estimate_{social\ anxiety} = -0.005$, $SE = 0.003$, $z = -1.78$, $p = .08$, 95% CI [-0.010, 0.000]).¹⁸

Commenters

Again, both extraversion and social anxiety did not significantly predict the number of individual commenters per status update ($estimate_{extraversion} = -0.001$, $SE = 0.003$, $z = -0.40$, $p = .69$, 95% CI [-0.006, 0.004]; $estimate_{social\ anxiety} = -0.002$, $SE = 0.002$, $z = -0.92$, $p = .36$, 95% CI [-0.007, 0.002])¹⁹

Part 3: Valence of Status Updates, Personality, and Direct Social Feedback

In the next step, we explored the role of valence of status updates. Specifically, we assessed (1) whether valence predicted how much direct social feedback a status update elicits, (2) how valence of status updates was related to personality, (3) whether valence influenced the relationship between personality and direct social feedback, and (4) whether interactions between personality and valence predicted direct social feedback.

Valence and Direct Social Feedback

To assess whether the valence of a status update predicts direct social feedback to that status update, we used Generalized Linear Mixed Models with valence as a predictor on level 1 of the

¹⁸ When controlling for the number of Facebook friends, which was significantly correlated with extraversion ($r(130) = .42$, $p = .00$) and social anxiety ($r(130) = -.35$, $p = .00$), the effects for personality remained non-significant.

¹⁹ Again, when controlling for the number of Facebook friends, the effects for personality remained non-significant.

model. Our analyses showed that status updates that are more positive in comparison to other status updates of the same individual (group-mean centered valence) as well as more positive in comparison to all other status updates in our sample (grand-mean centered valence) received more likes ($estimate_{group-mean} = 0.009$, $SE = 0.001$, $z = 7.96$, $p < .000$, 95% CI [0.007, 0.011]; $estimate_{grand-mean} = 0.009$, $SE = 0.001$, $z = 8.31$, $p < .000$, 95% CI [0.007, 0.011])²⁰. However, more positive status updates were commented on by significantly fewer different commenters ($estimate_{group-mean} = -0.005$, $SE = 0.001$, $z = -6.23$; $p < .000$, 95% CI [-0.007, -0.004]; $estimate_{grand-mean} = -0.005$, $SE = 0.001$, $z = -6.12$; $p < .000$, 95% CI [-0.007, -0.004]).

Valence and Personality

Next, we assessed whether valence could be predicted by personality. Because valence is not a count variable but we still needed to account for the nested structure (status updates in participants), we applied Linear Mixed Models using the R package “lme4” (Bates, Maechler, Bolker & Walker, 2013; estimator: Restricted Maximum Likelihood). Extraversion significantly predicted a more positive valence of status updates ($estimate = 0.095$, $SE = 0.043$, $t(128) = 2.20$, $p = .03$, 95% CI [0.010, 0.180]). However, social anxiety did not emerge as a significant predictor of valence ($estimate = -0.035$, $SE = 0.037$; $t(128) = -0.94$; $p = .35$, 95% CI [-0.108, 0.038])

Controlling for Valence

Next, we included (grand-mean centered) valence as a control variable in our analyses predicting direct social feedback with personality. Results (see Tables 4.1 A & B) showed that after

²⁰ Due to a better fit of those models, we included a random slope.

controlling for valence which was a significant predictor, both extraversion and social anxiety still did not significantly predict likes or commenters.

Table 4.1 A
Generalized Linear Mixed Models Predicting Likes With Personality While Controlling For Grand Mean-Centered Valence (US Sample)

	Estimate	SE	z value	p value	CI 95%	
(Intercept)	0.810	0.205	3.96	<.000	0.409	1.211
Extraversion	0.002	0.003	0.72	.47	-0.004	0.008
Valence	0.009	0.001	8.31	<.000	0.007	0.011
$\sigma^2_{\text{intercept}}$	0.298					
$\sigma^2_{\text{valence}}$	0.000					
(Intercept)	1.171	0.132	8.89	<.000	0.913	1.429
Social Anxiety	-0.005	0.003	-1.84	.07	-0.010	0.000
Valence	0.009	0.001	8.33	<.000	0.007	0.011
$\sigma^2_{\text{intercept}}$	0.289					
$\sigma^2_{\text{valence}}$	0.000					

Table 4.1 B
Generalized Linear Mixed Models Predicting Commenters With Personality While Controlling For Grand Mean-Centered Valence (US Sample)

	Estimate	SE	z value	p value	CI 95%	
(Intercept)	0.303	0.187	1.62	.11	-0.063	0.670
Extraversion	-0.001	0.003	-0.20	.84	-0.006	0.005
Valence	-0.005	0.001	-6.11	<.000	-0.007	-0.004
$\sigma^2_{\text{intercept}}$	0.220					
(Intercept)	0.368	0.121	3.04	.00	0.131	0.605
Social Anxiety	-0.002	0.002	-0.91	.36	-0.007	0.002
Valence	-0.005	0.001	-6.13	<.000	-0.007	-0.004
$\sigma^2_{\text{intercept}}$	0.218					

Personality as a Moderator

Following Forest and Wood's (2012) line of reasoning, that non-typical emotional expressions might be rewarded more, we assessed whether interactions between personality and (group-mean centered) valence predicted social feedback. Indeed, for likes as an outcome, the interactions between valence and extraversion respectively social anxiety emerged as significant predictors (see Tables 4.2 A & B). For probing the interactions we plotted the conditional effect of valence at different levels of the moderator, i.e., extraversion respectively social anxiety using the javascript program provided by Preacher, Curran, and Bauer (2003) (Figure 4.1). Please note that—as recommended by Coxé et al. (2009) —the outcome is displayed as the logarithm of likes and not in its original metric. Presented in this way, the interpretation of the interactions is the same as for Ordinary Least Square Regression. More positive status updates elicited more likes

but this effect was more pronounced for individuals with low extraversion or high social anxiety. In contrast, in our analyses for the number of commenters as an outcome, no interaction emerged as a significant predictor but valence remained a significant negative predictor.

Table 4.2 A

Generalized Linear Mixed Models Predicting Likes With (Centered) Personality, (Group-Mean Centered) Valence, and the Interaction of Personality and Valence (US Sample)

	Estimate	SE	z value	p value	CI 95%	
(Intercept)	0.948	0.059	16.17	<.000	0.833	1.063
Extraversion	0.003	0.003	1.03	.30	-0.003	0.010
Valence	0.009	0.001	8.50	<.000	0.007	0.011
Valence x Extraversion	0.000	0.000	-2.37	.02	0.000	0.000
$\sigma^2_{\text{intercept}}$	0.338					
$\sigma^2_{\text{valence}}$	0.000					
(Intercept)	0.948	0.058	16.36	<.000	0.834	1.062
Social Anxiety	-0.005	0.003	-1.84	.07	-0.010	0.000
Valence	0.009	0.001	8.63	<.000	0.007	0.011
Valence x Social-Anxiety	0.000	0.000	2.78	.01	0.000	0.000
$\sigma^2_{\text{intercept}}$	0.329					
$\sigma^2_{\text{valence}}$	0.000					

Table 4.2 B
Generalized Linear Mixed Models Predicting Commenters With (Centered) Personality, (Group-Mean Centered) Valence, and the Interaction of Personality and Valence (US Sample)

	Estimate	SE	z value	p value	CI 95%	
(Intercept)	0.272	0.051	5.38	<.000	0.173	0.371
Extraversion	-0.001	0.003	-0.37	.71	-0.007	0.004
Valence	-0.005	0.001	-6.12	<.000	-0.007	-0.004
Valence x Extraversion	0.000	0.000	-0.16	.88	0.000	0.000
$\sigma^2_{\text{intercept}}$	0.217					
<hr/>						
(Intercept)	0.269	0.050	5.34	<.000	0.170	0.367
Social Anxiety	-0.002	0.002	-0.84	.40	-0.007	0.003
Valence	-0.005	0.001	-6.17	<.000	-0.007	-0.004
Valence x Social-Anxiety	0.000	0.000	0.18	.86	0.000	0.000
$\sigma^2_{\text{intercept}}$	0.215					

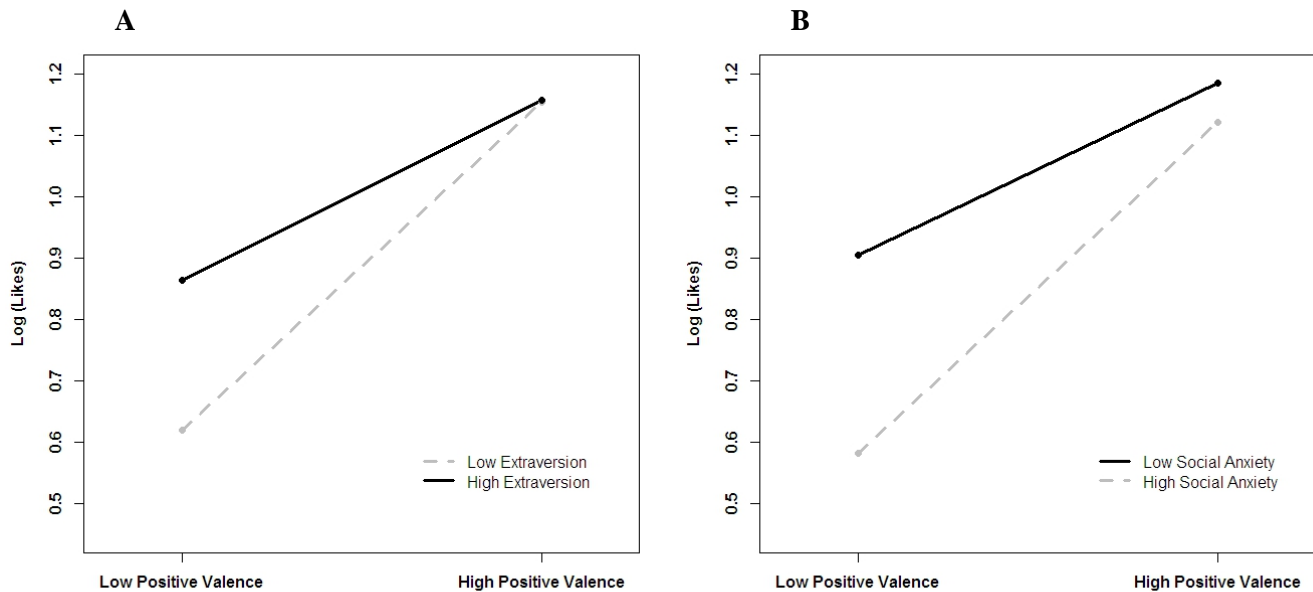


Figure 4.1. Simple slopes of valence predicting the logarithm of likes for (A) low and high extraversion and (B) low and high social anxiety. For valence, extraversion, and social anxiety, low refers to the value one standard deviation below the mean, and high refers to the value one standard deviation above the mean.

4.7 Study 2

4.7.1 Participants

270 students from universities all over Germany were invited to participate in the study for a small financial compensation (see große Deters, Mehl & Eid, 2014 for other, non-overlapping results from this dataset). We excluded 57 participants because they did not complete all relevant self-report measures and four participants because they did not grant us access to their Facebook profile by adding our “Research Profile” as a friend. The final sample consisted of $N = 209$ ²¹ participants (185 female; $M_{age} = 23.50$, $SD_{age} = 3.54$).

The study consisted of two main parts: Firstly, the collection of self-report measures and extraction of information directly from participants’ Facebook profiles and secondly, an experimental intervention (see große Deters & Mehl, 2013 for a similar intervention) to assess the effects of an increase in status updating over the course of one week on participants’ loneliness which is not relevant to the research questions of the present paper. However, the interpersonal appraisal of participants’ status updates by Facebook friends was collected after this intervention. Hence, for these analyses, we only included participants with at least one informant report²² who had been randomly assigned to one of the two control conditions ($n = 91$) and excluded all experimental participants. In control condition 1, participants only received feedback on how many status updates they usually post per week. In control condition 2, participants were

²¹ Please note that only 207 of the participants reported on in this paper are identical to the sample in the paper of große Deters, Mehl, & Eid (2014) because two participants who completed the self-report measures relevant for this paper failed to complete the narcissism questionnaire which constituted the basis for the analyses of große Deters et al. (2014), whereas two participants included in the other paper failed to complete the self-report measures relevant for the present analyses and thus were excluded.

²² There was no significant difference in extraversion or social anxiety between control participants with at least one informant report ($n = 91$) and control participants who were excluded from the analyses ($n = 47$).

additionally asked to post more status updates than usually but to restrict the audience of these status updates to our “Research Profile” by changing their privacy settings for status updates accordingly. Hence, Facebook friends did not see any changes in status updating behavior because they could not see the additional updates (which we were able to check) and therefore, no influence of the experimental manipulation on the interpersonal appraisal ratings by Facebook friends of the control participants can be expected.

4.7.2. Procedures and Measures

The study was conducted completely online and questionnaires were administered using the web-based survey software SoSci Survey (Leiner, 2014). Participants completed a large set of questionnaires on personality, well-being, and Facebook use. In the following, only measures relevant to the present research questions will be described. Again, all scores were converted to POMP-scores. Participants filled out the German short version (Rammstedt & John, 2005) of the Big Five Inventory (John & Srivastava, 1999). Extraversion was assessed with four items on a five-point Likert-type scale (Cronbach’s $\alpha = .82$; $M = 65.16$, $SD = 21.43$). For the assessment of social anxiety, participants completed the 12-item social anxiety subscale of the German version (Merz, 1986) of the Self-Consciousness Scale (Fenigstein et al., 1975; Cronbach’s $\alpha = .89$, $M = 41.95$, $SD = 18.15$).

As in study 1, participants were asked to add our “Research Profile” as a friend on Facebook and we then accessed the wall of their profile to extract information for a time period of six weeks prior to study entry (17 days less than in study 1). Specifically, we (1) counted the number of status updates posted by the participant during those six weeks ($Md = 1$, $IQR = 0-4$, $Min = 0$,

$Max = 27$), (2) recorded the number of likes each of those status updates had received ($Md = 2$, $IQR = 1-4$, $Min = 0$, $Max = 34$), (3) determined how many different friends had commented on each status update ($Md = 1$, $IQR = 0-2$, $Min = 0$, $Max = 17$), and (4) copied, pasted, and anonymized the text of the status updates for later ratings of their valence.

For the ratings of valence, four research assistants rated how much positivity respectively negativity was expressed in each status update on 9-point scales (1 = none at all, 9 = a great deal). Again, we converted scores to POMP-scores. Unfortunately, due to a loss of data, the ratings of two of the raters for 201 of 655 status updates could not be used in the present research. The interrater reliability based on the status updates that were rated by all four raters was $ICC(2,4) = .90$ for positivity as well as for negativity (Shrout, & Fleiss, 1979). All valence ratings for each status update were averaged (positivity: $M = 26.63$, $SD = 19.90$; negativity: $M = 9.27$, $SD = 14.44$; $r = -.58$) and we then formed a measure of overall valence for each status update by subtracting negativity from positivity ($M = 58.68$, $SD = 15.30$; higher numbers indicate more positive status updates).²³

To assess the interpersonal appraisal of participants' status updates by Facebook friends, we followed the procedure to collect informant reports proposed by Vazire (2006). Firstly, participants were asked to provide up to six e-mail addresses of friends or family. Then, friends and family members were invited via email to complete an online questionnaire about the participant, including a newly developed 6-item measure of their appraisal of the participant's status updates. The stem "If (name of the participant) posts a status update..." was followed by the items "... I find that annoying (reverse coded)"; "...I get motivated to contact him/her (to call,

²³ Separate analyses for positivity and negativity yielded comparable results.

write a private message etc.)”; “...I think he/she just wants to brag” (reverse coded); “...I like to read them”; “...I get the feeling that I am taking part in his/her life.”; and “...I wonder, who finds what he/she posts interesting at all.”. All close ties who had previously indicated that they are Facebook friends with the participant and that they had at least once read a status update by the participant, rated those items in their German translation (see Appendix for the original items) on a 5-point Likert-type scale. We again converted the scores to POMP-scores (for ratings aggregated over all informants of each participant: Cronbach’s $\alpha = .78$, $M = 74.98$, $SD = 15.98$). Most participants (53%) had one informant report, whereas 34% had two and 13% had three informant reports. In total, 146 informant reports (93 female, 50 male, 3 not stated; $M_{age} = 29.46$, $SD_{age} = 11.62$.) were collected. Most informants indicated to be friends (65%), boyfriend or girlfriend (14%), or family (18%) of the participant they rated.

4.7.3 Results Study 2

Part 1: Personality and Status Updating Activity

As in study 1, we ran two separate count regression analyses ($N = 209$) and neither extraversion nor social anxiety emerged as significant predictors of the number of status updates posted by participants ($b_{extraversion} = 0.009$, $SE = 0.007$, $p = .20$, 95% CI [-0.005, 0.024]; $b_{social\ anxiety} = -0.010$, $SE = 0.006$, $p = .08$, 95% CI [-0.022, 0.001]).

Part 2: Personality and Direct Social Feedback

To assess whose status updates elicit more direct social feedback by Facebook friends, we used the same analyses as in study 1 (Generalized Linear Mixed Models, distribution of the outcome: negative binomial). On level 2 of the models, all participants with at least one status update for

whom we were able to record the number of likes ($n = 116$) and the number of different commenters ($n = 114$) for each status update were included in the analyses. On level 1 of the models, a total of 655 status updates for analyses of likes and 647 status updates for analyses of commenters were available (status updates per participant: $Md = 4$, $IQR = 2-8$, $Min = 1$, $Max = 27$).

Likes

For likes as an outcome, just as in study 1, neither extraversion nor social anxiety significantly predicted the number of likes received per status update ($estimate_{extraversion} = 0.006$, $SE = 0.003$, $z = 1.91$, $p = .06$, 95% CI [-0.000, 0.012]; $estimate_{social\ anxiety} = -0.003$, $SE = 0.000$, $z = -0.89$, $p = .37$, 95% CI[-0.011, 0.004]).²⁴

Commenters

Again, both extraversion as well as social anxiety did not significantly predict the number of individual commenters ($estimate_{extraversion} = 0.002$, $SE = 0.003$, $z = 0.62$, $p = .53$, 95% CI [-0.004, 0.008]; $estimate_{social\ anxiety} = -0.001$, $SE = 0.003$, $z = -0.26$, $p = .79$, 95% CI[-0.008, 0.006]).²⁵

²⁴ When controlling for the number of Facebook friends, which was significantly correlated with extraversion ($r(116) = .36$, $p = .00$) but not with social anxiety ($r(116) = -.17$, $p = .06$), the effects for personality remained non-significant.

²⁵ Again, when controlling for the number of Facebook friends, the effects for personality remained non-significant.

Part 3: Status Updates' Valence, Personality, and Direct Social Feedback

As in study 1, we explored the role of the valence of status updates. Again we assessed (1) whether valence predicted direct social feedback, (2) the association between valence of status updates and personality, (3) whether valence influenced the relationship between personality and direct social feedback, and (4) whether interactions between personality and valence predicts direct social feedback.

Valence and Direct Social Feedback

Just as in study 1, status updates that are more positive in comparison to other status updates of the same individual (group-mean centered valence) as well as more positive in comparison to all other status updates (grand-mean centered valence) received more likes ($estimate_{group-mean} = 0.026$, $SE = 0.004$, $z = 6.66$, $p < .000$, 95% CI [0.018, 0.033]; $estimate_{grand-mean} = 0.027$, $SE = 0.004$, $z = 7.58$, $p < .000$, 95% CI[0.020, 0.034])²⁶. However in contrast to study 1, valence did not emerge as a significant predictor of number of different commenters ($estimate_{group-mean} = -0.003$, $SE = 0.003$, $z = -0.88$, $p = .38$, 95% CI [-0.009, 0.004]; $estimate_{grand-mean} = -0.002$, $SE = 0.003$; $z = -0.73$; $p = .47$, 95% CI[-0.008, 0.004]).

Valence and Personality

In order to test, whether personality predicted the valence of status updates, we applied Linear Mixed Models with valence as the outcome. As in study 1, extraversion significantly predicted more positive valence ($estimate = 0.089$, $SE = 0.039$, $t(114) = 2.30$, $p = .02$, 95% CI [0.013,

²⁶ Due to a better fit of those models, we included a random slope.

0.165]) and social anxiety did not emerge as a significant predictor ($estimate = -0.044$, $SE = 0.048$; $t(114) = -0.92$, $p = .36$, 95% CI[-0.139, 0.051])

Controlling for Valence

Next, we included (grand-mean centered) valence as a control variable in our analyses predicting direct social feedback with personality. Just as in Study 1, results (see Table 4.3 A) showed that after controlling for valence which was a significant predictor, both extraversion and social anxiety still did not significantly predict likes. However, for commenters, neither personality nor valence were significant predictors (see Table 4.3 B).

Table 4.3 A
Generalized Linear Mixed Models Predicting Likes With Personality While Controlling For Grand Mean-Centered Valence (German Sample)

Likes	Estimate	SE	z value	p value	CI 95%	
(Intercept)	0.670	0.226	2.97	.00	0.228	1.113
Extraversion	0.004	0.003	1.24	.22	-0.002	0.010
Valence	0.027	0.004	7.53	<.000	0.020	0.034
$\sigma^2_{intercept}$	0.215					
$\sigma^2_{valence}$	0.000					
(Intercept)	1.033	0.162	6.40	<.000	0.717	1.350
Social Anxiety	-0.002	0.004	-0.65	.51	-0.010	0.005
Valence	0.027	0.004	7.56	<.000	0.020	0.034
$\sigma^2_{intercept}$	0.219					
$\sigma^2_{valence}$	0.000					

Table 4.3 B
Generalized Linear Mixed Models Predicting Commenters With Personality While Controlling For Grand Mean-Centered Valence (German Sample)

	Estimate	SE	z value	p value	CI 95%	
(Intercept)	0.216	0.215	1.00	.32	-0.206	0.638
Extraversion	0.002	0.003	0.65	.52	-0.004	0.008
Valence	-0.002	0.003	-0.79	.43	-0.008	0.004
$\sigma^2_{\text{intercept}}$	0.128					
(Intercept)	0.216	0.215	1.00	.32	-0.206	0.638
Social Anxiety	0.002	0.003	0.65	.52	-0.004	0.008
Valence	-0.002	0.003	-0.79	.43	-0.008	0.004
$\sigma^2_{\text{intercept}}$	0.128					

Personality as a Moderator

Next, we assessed whether non-typical emotional expressions were rewarded more by friends. Hence, we tested whether interactions between mean-centered personality and group-mean centered valence predicted social feedback. In contrast to study 1, no significant interaction effects emerged for likes and, just as in study 1, the interaction effects for commenters were non-significant (see Tables 4.4 A & B).

Table 4.4 A

Generalized Linear Mixed Models Predicting Likes With (Centered) Personality, (Group-Mean Centered) Valence, and the Interaction of Personality and Valence (German Sample)

	Estimate	SE	z value	p value	CI 95%	
(Intercept)	0.958	0.068	14.02	<.000	0.824	1.092
Extraversion	0.005	0.003	1.60	.11	-0.001	0.012
Valence	0.025	0.004	6.58	<.000	0.018	0.033
Valence x Extraversion	0.000	0.000	0.96	.33	0.000	0.001
$\sigma^2_{\text{intercept}}$	0.278					
$\sigma^2_{\text{valence}}$	0.000					
(Intercept)	0.962	0.069	13.89	<.000	0.826	1.098
Social Anxiety	-0.003	0.004	-0.78	.44	-0.011	0.005
Valence	0.026	0.004	6.59	<.000	0.018	0.033
Valence x Social-Anxiety	0.000	0.000	-0.33	.74	0.000	0.000
$\sigma^2_{\text{intercept}}$	0.290					
$\sigma^2_{\text{valence}}$	0.000					

Table 4.4 B

Generalized Linear Mixed Models Predicting Commenters With (Centered) Personality, (Group-Mean Centered) Valence, and the Interaction of Personality and Valence (German Sample)

	Estimate	SE	z value	p value	CI 95%	
(Intercept)	0.346	0.060	5.73	<.000	0.228	0.465
Extraversion	0.002	0.003	0.56	.57	-0.004	0.007
Valence	-0.003	0.003	-0.99	.32	-0.010	0.003
Valence x Extraversion	0.000	0.000	-0.26	.79	0.000	0.000
$\sigma^2_{\text{intercept}}$	0.127					
(Intercept)	0.347	0.061	5.72	<.000	0.228	0.466
Social Anxiety	-0.001	0.004	-0.27	.79	-0.008	0.006
Valence	-0.003	0.003	-0.99	.32	-0.010	0.003
Valence x Social-Anxiety	0.000	0.000	-0.06	.96	0.000	0.000
$\sigma^2_{\text{intercept}}$	0.129					

Part 4: Interpersonal Appraisal of Participants' Status Updates by Facebook Friends

Next, we assessed the role of personality in predicting broader social consequences of status updating as captured by our interpersonal appraisal measure. Because the interpersonal appraisal ratings made by Facebook friends were nested in participants, we again applied Linear Mixed Models using the R package “lme4” (Bates et al., 2013). On level 2 of the models, all control participants who had at least one rating of interpersonal appraisal were included ($n = 91$). On level 1, 146 ratings were available ($Md = 1$, $IQR = 1-2$, $Min = 1$, $Max = 3$). Results showed that extraversion ($estimate = -0.068$, $SE = 0.078$, $t(89) = -0.88$, $p = .38$, 95% CI [-0.220, 0.085]) did not significantly predict interpersonal appraisal of status updates as measured by our questionnaire. However, social anxiety significantly predicted a more positive appraisal of

participants' status updates by their Facebook friends ($estimate = 0.223$, $SE = 0.080$, $t(89) = 2.80$, $p < .01$, 95% CI [0.066, 0.378]).

Interpersonal Appraisal and Direct Feedback and Valence of Status Updates

In a last step, we explored the relationship between our interpersonal appraisal measure and the number of likes respectively commenters as well as the valence of status updates. Only for $n = 47$ participants both appraisal ratings were available and they had posted at least one status updates in the six weeks before they entered the study. Hence, due to this small sample size the results of the following analyses need to be interpreted with caution. We calculated the average number of likes respectively commenters per status updates and averaged the valence ratings of all status updates per participant. Neither the average number of likes per status updates nor the average number of commenters per status update significantly predicted the interpersonal appraisal ratings ($estimate_{likes} = 1.262$, $SE = 1.057$, $t(45) = 1.19$, $p = .24$, 95% CI [-0.841, 3.350]; $estimate_{commenters} = 5.191$, $SE = 3.007$, $t(44) = 1.73$, $p = .09$, 95% CI [-0.699, 11.09]). The average valence of status updates also did not significantly predict interpersonal appraisal ($estimate = 0.405$, $SE = 0.238$, $t(45) = 1.70$, $p = .10$, 95% CI [0.045, 0.892]).

4.8 Discussion

Table 4.5 provides an overview of all hypotheses and research questions along with the respective findings which will be discussed in the following.

Table 4.5
Overview Hypotheses, Research Questions and Findings

	US sample	German sample
Part 1: Personality and Status Updating Activity		
H 1A: Extraversion positively predicts status updating activity.	-	-
H 1B: Social anxiety negatively predicts status updating activity.	-	-
Part 2: Personality and Direct Social Feedback		
RQ 1A: Do more extroverted or more introverted individuals receive more direct social feedback to their status updates?	-	-
RQ 1B: Do individuals lower in social anxiety or higher in social anxiety receive more direct social feedback to their status updates?	-	-
Part 3: Valence of Status Updates, Personality, and Direct Social Feedback		
H 2A: More positive status updates receive more likes.	✓	✓
H 2B: More positive status updates are commented on by fewer friends.	✓	-
H 3A: Status updates posted by individuals higher in extraversion are more positive.	✓	✓
H 3B: Status updates posted by individuals higher in social anxiety are less positive.	-	-
RQ 2A: Does valence drive or mask an effect of extraversion on the amount of direct social feedback a status update receives?	-	-
RQ 2B: Does valence drive or mask an effect of social anxiety on the amount of direct social feedback a status update receives?	-	-
RQ 3A: Does extraversion moderate potential effects of valence on direct social feedback to status updates?	yes, on likes	-
RQ 3B: Does social anxiety moderate potential effects of valence on direct social feedback to status updates?	yes, on likes	-
Part 4: Interpersonal Appraisal of Participants' Status Updates by Facebook Friends		
RQ 4A: Are the status updates of more extroverted individuals or the status updates of more introverted individuals appreciated more by their Facebook friends?		-
RQ 4B: Are the status updates of individuals lower in social anxiety or the status updates of individuals higher in social anxiety appreciated more by their Facebook friends?		those of individuals lower in social anxiety

4.8.1 Personality and Status Updating Activity

Even though this paper's main focus is on social responses to status updates, in part 1, we tested the relationship between personality and posting status updates. In both samples our analyses yielded no significant results for either extraversion or social anxiety but the effects were in the

hypothesized direction. In an exceptional study, Bachrach et al. (2012) succeeded to objectively measure the status updating activity of 180,000 participants and to collect self-reports of their extraversion. Based on such a large sample, the reported correlation of $r = .12$ is probably a very good estimate of the true effect size. This small effect size indicates that the failure to find a significant effect for extraversion in our study is likely due to a lack of power. However, while higher power would have been desirable, our study nevertheless contributes much needed high-quality data to the existing body of literature. Firstly, empirical evidence for social anxiety is with just two studies so far scarce. And secondly, just as Bachrach et al. (2012), we were able to measure status updating activity objectively. This is crucial because self-reports of status updating activity are potentially biased and have been shown to correlate only moderately with actual behavior (Hampton, Goulet, Marlow, & Rainie, 2012). And more importantly, if both personality and status updating activity are measured with self-reports, shared method variance can inflate their relationship (Back & Egloff, 2009; Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). Hence, the present results are an important contribution to the existing literature and once included in meta-analyses should help to draw valid conclusions in the future.

4.8.2 Personality and Social Responses

Personality and Direct Social Feedback

To identify potential social enhancement or social compensation effects, we tested whether extraversion respectively social anxiety predicted how much direct feedback participants received to their status updates. Again, in both samples no significant effect emerged. This result is in line with a finding by Marshall, Lefringhausen, and Ferenczi (2015) who showed that extraversion was not significantly associated with the self-reported number of likes and comments participants

indicated to receive on average per status update. As clearly evident, the empirical evidence is still scarce and two studies—even though they yielded similar results—do not allow to draw strong conclusions. However, it is conceivable that main effects might not adequately describe the relationship between personality and direct social feedback to status updates. Personality likely influences various factors which might impact the amount of direct social feedback, like style and content of status updates (e.g., Winter et al., 2014; Schwartz et al. 2013) or the composition of the audience (e.g., differences in the diversity of their social network; Golbeck, Robles, & Turner, 2011). But effects of personality on direct social feedback mediated through these factors might not emerge all in the same direction. For instance, extraverts might overshare mundane information about their current activity (e.g., “chillin with my bestie”; see Schwartz et al. 2013) and unsurprisingly, boring status updates are associated with fewer comments (Barash, et al., 2010). At the same time, friends of extraverts tend to be more extraverted themselves (Feiler & Kleinbaum, 2015) and therefore, are generally more inclined to comment on status updates (Ryan & Xenos, 2011). Hence, such different effects potentially cancel each other out, resulting in an overall association between personality and direct social feedback that is not substantial.

Status Updates’ Valence, Personality, and Direct Social Feedback

In line with this reasoning, in part 3 of our paper, we explored the role of valence, one important factor which could be expected to be associated with both personality and direct social feedback. Indeed, consistent with the results by Zhang (2010) in both samples a more positive valence predicted more likes. However, the inverse relationship for the number of different commenters only emerged in the US sample. Also in line with previous research, more extraverted individuals

tended to post more positive status updates (Schwartz et al., 2013) but we did not find evidence for the hypothesized negative association between social anxiety and more positive valence of posts. Controlling for valence did not reveal masked effects of personality on direct social feedback. However, because valence was related to both direct feedback and extraversion, it is clearly a predictor that could prove useful in future studies assessing the influence of personality on social responses to status updates.

Furthermore, our analyses—even though only in the US sample—revealed that both extraversion and social anxiety significantly moderated the positive effect of valence on likes. More positive status updates elicited more likes but this effect was more pronounced for individuals with low extraversion or high social anxiety. As shown in the present paper, individuals low in extraversion express less positivity in status updates. Moreover, the literature suggests that both individuals low in extraversion as well as high in social anxiety experience and express less positivity in general (e.g., Augustine et al., 2011; Brown et al., 2007; Kashdan, 2007; Larsen & Augustine, 2008; Turk et al. 2005). Hence, the results of the moderation analyses are in line with the interpretation that Facebook friends are particularly inclined to encourage non-typical emotional expressions by providing more direct social feedback as Forest and Wood (2012) argued explaining a similar effect for self-esteem on an aggregate of likes and commenters in a Canadian sample. Even though these explorative findings need to be backed up by further research, they suggest that it is worthwhile to explore potential moderation effects of personality in order to fully understand how personality influences social responses to status updates. Moreover, they highlight that Facebook friends might judge status updates in the context of their previous experiences with the poster. This might particularly be the case because status updates

are generally short, often provide no context, and remain ambiguous without additional background information (Kramer & Chung, 2011; Strässle, 2015). Facebook is an online environment mostly built around users' real-life identities (Utz, 2015) and it is primarily used to connect with already existing offline ties (Ellison et al., 2011). Hence, for many friends these previous experiences and contextual information will be dominated by the offline behavior of the poster which might be largely determined by his or her personality (e.g., Asendorpf & Wilpers, 1998; Paunonen, 2003). Therefore, personality might not only directly influence the content of status updates but also how status updates with different types of content are evaluated by Facebook friends. A misanthropic status update by a usually cheerful and sociable poster probably is interpreted differently by friends than the very same status update posted by a loner (Forest, Kille, Wood, & Holmes (2014). This additional pathway through which personality might influence social responses to status updates certainly deserves additional attention.

Interpersonal Appraisal and Direct Feedback and Valence of Status Updates

In order to capture social responses to status updates more broadly, friends' appraisal of the poster's status updates were assessed directly in the German sample. No significant effect for extraversion emerged. However, in line with the social compensation hypothesis, the status updates of individuals higher in social anxiety received better appraisal ratings than those of individuals lower in social anxiety. High social anxiety is related to problems in social interactions offline (Schlenker & Leary, 1982) but the opposite might be true for communication via status updates. Notably, as previously reported, we did not find any evidence that the status updates of socially anxious individuals also elicit more direct social feedback. However, there are several important differences between these two measures of social responses to status updates.

Firstly, the interpersonal appraisal ratings captured the evaluations of strong ties and not those of a selected sample of all Facebook friends of the participants. Almost all individuals who completed the interpersonal appraisal measure were friends who reported to know the participant on average for more than four years, or family members respectively partners. In contrast, for direct social feedback we could not distinguish between feedback of strong and weak ties. Hence, it is possible that strong ties also express their appraisal for the status updates of socially anxious individuals by liking and commenting more. However, if social anxiety does not or negatively predict the direct social feedback of weak ties—who are in the majority on Facebook (Manago, Taylor & Greenfield, 2012)—this association would be hidden. Secondly, in comparison to the number of likes and unique commenters, the interpersonal appraisal ratings measured social consequences of status updates more broadly. For instance, it also captured negative social responses to status updates like feelings of annoyance. Such negative feelings and subsequent unfavorable judgements of the posters are common (Lapides, Chokshi, Carpendale, & Greenberg, 2015). Because socially anxious individuals are afraid to leave a bad impression on others (Schlenker & Leary, 1982), they might take more time to carefully craft their status updates and avoid content that potentially annoys their audience (Shaw, Timpano, Tran, & Joormann, 2015). Consistent with this idea, based on their Facebook profile pages individuals high in social anxiety were judged as more likable by strangers than individuals low in social anxiety (Fernandez et al., 2012).

Furthermore, the interpersonal appraisal rating also measured whether status updates fostered feelings of closeness and prompted friends to initiate social interaction—other than direct public responses to the status update—with the poster. Because socially anxious individuals typically

self-disclose less in face-to-face interactions (Cuming & Rapee, 2010; Meleshko & Alden, 1993; Reno & Kenny, 1992; Schlenker & Leary, 1982; Sparrevohn & Rapee, 2009) than non-socially anxious individuals, their status updates likely broadcast more information yet unknown even to their close ties. Hence, these status updates likely promote feelings of closeness and motivate friends to follow-up on the news. Moreover, because socially anxious individuals tend to avoid social situations and do not draw attention to themselves (Baker & Oswald, 2010; Schlenker & Leary, 1982), friends might more easily lose sight of them. Therefore, more often than in case of non-socially anxious individuals a status update might be the much needed reminder for friends to do that long intended phone call or finally respond to an old email. Taken together, there are good reasons to believe that social anxiety predicts more pleasant social responses to status updates – at least if the focus is on less direct responses by close ties.

4.8.3 Limitations and Directions for Future Research

A limitation of the present research, as noted before, is that it only assessed the overall amount of direct feedback but did not capture *who* liked and commented on status updates. A more fine-grained analysis differentiating for instance between likes and comments by strong versus weak ties of the posters might help to reveal effects of extraversion or social anxiety otherwise hidden. However, participants might not be very committed to the tedious and time-consuming task of categorizing each Facebook friend who liked or commented on one of their status updates. Hence, such analyses might only be possible with small samples of participants and status updates. Likewise but easier to implement, it would be a good extension of the present research to investigate broader social responses to status updates as measured with our interpersonal appraisal rating of weak and not only of strong ties. Negative reactions to status updates appear to

be particularly prevalent for status updates of distant acquaintances (Lapides et al., 2015) and hence, they should be assessed also within weak ties. Moreover, future research should continue to explore the complex interplay between personality, qualities of the status updates, and the audience on social responses to status updates. Importantly, while valence of status updates could be easily and reliably judged by independent raters, this is not necessarily the case for other potentially interesting aspect of status updates like humor or reassurance seeking (Utz, 2015; Forest & Wood, 2012). In comparison to independent raters, even distant acquaintances of the poster can rely on more contextual knowledge to interpret a status update. Hence, future research should collect ratings of, e.g., humor by members of the actual audience of the status update as has been successfully done in studies assessing impression management (Barash et al., 2010) or effects of status updates on feelings of connection (Utz, 2015). Another limitation of the present research is that all participants attended college. Considering the fact that young and old Facebook users have been shown to differ in respect to the content of their status updates (Schwartz et al., 2013), it is conceivable that different associations between extraversion or social anxiety and social responses to status updates might emerge in other age groups which should be assessed empirically.

Last but not least, even though the data collection is more complicated and time-consuming than relying exclusively on self-reports, future research should continue to use observational measures and informant reports to capture social responses to status updates. Because it is desirable to receive many and positive social responses to one's status updates, self-reports of social responses likely also reflect to an unknown degree individual differences in tendencies for self-enhancement (Podsakoff et al., 2003). And informant reports on social responses are particularly

valuable because they provide information which is—at least partially—not accessible to participants (Vazire, 2006). Moreover, employing different measures avoids the risk of inflated effects due to shared method variance (Back & Egloff, 2009; Podsakoff et al., 2003). Particularly for studying associations between social anxiety and social responses, self-reports are problematic because empirical evidence suggests that socially anxious individuals have a biased perception and systematically underestimate positive reactions of others to their social performances (Clark & Arkowitz, 1975; Voncken, & Bögels, 2008).

4.8.4 Transparency in Reporting

Overall, as clearly evident from Table 4.5, the present results only supported very few of our theoretically derived hypotheses and did not provide conclusive answers to the majority of our research questions. Even though the present study provides rather precise estimates as indicated by the small confidence intervals, we are aware that readers are used to expect a higher proportion of significant results and might be disappointed by the “story” this paper is telling. However, in light of intense debates on “false-positive psychology” (Simmons, Nelson, & Simonsohn, 2011) and the non-replicability of published results (Open Science Collaboration, 2015; Pashler & Wagenmakers, 2012), we decided to follow recommendations to “prioritize transparency over tidiness” (Simmons et al., 2011, p. 1363) by reporting all hypotheses and results independent of whether or not they have reached significance. Selective reporting and the aversion in our field to publish null-findings ultimately lead to biased estimates of the true effect in meta-analyses and impair our ability to falsify theories (Ferguson & Heene, 2012; Rosenthal, 1979). Hence, while this paper does not offer a fully coherent narrative, we believe that a

transparent presentation of “imperfect” (yet methodologically strong) results ultimately better serves the purpose to advance our knowledge.

4.9 Conclusion

The present study aimed to provide more insight into the role of extraversion and social anxiety, two core interpersonal individual differences, in predicting social responses to status updates. Because posting as well as reading status updates is an integral part of many peoples’ daily routines and (guilty) pleasures (Pring, 2012), it is important to understand whether and how individuals depending on their personality might get socially “richer” online. As pertinent to explorative research, the present study does not offer conclusive empirical evidence but provides the base for further studies by opening up a wide array of future research questions. Furthermore, it intends to encourage researchers to rely on many different sources of information like objectively measured behaviors or ratings by friends in order to assess social responses to status updates.

4.10 References

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4.11 Appendix

Interpersonal Appraisal of Participants' Status Updates by Facebook friends: Original Items

Wenn (*name of the participant*) ein Status Update schreibt, dann...

...finde ich das nervig. (*r*)

...motiviert es mich, mit (*name of the participant*) in Kontakt zu treten (anrufen, Nachrichten schreiben usw.)

...glaube ich, dass (*name of the participant*) vor allem angeben möchte. (*r*)

...lese ich sie gerne.

...habe ich das Gefühl an ihrem/seinem Leben mehr teilzuhaben.

...frage ich mich, wen das, was sie/er schreibt überhaupt interessiert. (*r*)

Chapter 5

General Discussion

General Discussion

With three independent studies, assessing the effect of status updating on loneliness (Study 1), the association between status updating frequency and narcissism (Study 2), and the role of personality in predicting social responses to status updates (Study 3), the present dissertation contributed to a growing body of empirical evidence on Facebook status updates. In the following, the main findings of each study will be summarized and shortly discussed before the overall contribution of the present dissertation to the literature and directions for future research will be outlined. The general discussion will close with remarks on challenges and opportunities for research on Online Social Networking Sites.

5.1 Summary and Discussion of Main Findings

5.1.1 Study 1: The Effect of Status Updating on Loneliness

Study 1 successfully implemented an experimental design to assess the effect of status updating on loneliness of the posters. Results showed that the experimentally-induced increase in status updating reduced loneliness. This decrease in loneliness was accounted for by participants feeling more connected to and in touch with friends on a daily basis. However, rather surprisingly, the effect of status updating on loneliness was independent of direct social feedback by participants' Facebook friends. Two potential explanations are offered. Status updating might have functioned as a symbolic social behavior fostering feelings of connectedness because participants envisioned the audience of their status updates and hence, were reminded of their existing social ties. Like a "social snack" this might have temporarily satisfied their social needs and reduced feelings of loneliness (Gardner, Pickett, & Knowles, 2005). However, an alternative explanation is that status updating decreased loneliness because it influenced social interactions beyond those apparent in direct social feedback. In this study only direct social feedback displayed on Facebook was captured, but it is feasible

that status updating stimulated and facilitated communication in face-to-face contexts or communication through private channels. By experimentally manipulating the actual audience of status updates, e.g., via changing the privacy settings on Facebook, it might be possible to disentangle these two potential effects in future research. Furthermore, this study could be extended by (1) manipulating status updating behavior over a longer period to test whether the effect on loneliness remains the same, (2) by studying the effect in other populations and locations than in college students in the US, and (3) by controlling for—or potentially even manipulating—qualitative dimensions of status updates like their content.

However, most importantly, direct replication studies are needed in order to establish the effect by cumulating evidence (Maxwell, Lau, & Howard, 2015). In two—so far unpublished—conceptual replication studies in German samples, no significant effect of status updating on loneliness emerged. These results might point to a false positive in the original study, boundary conditions of the effect (e.g., cultural differences), the importance of procedural differences between the studies, or a smaller true effect size which requires bigger samples for detection (Maxwell et al., 2015). Hence, the observed effect of the study should be interpreted with caution until more conclusive evidence exists.

5.1.2 Study 2: The Relationship between Narcissism and Status Updating Frequency

Study 2 empirically assessed whether Facebook users believe that narcissism predicts status updating activity and the actual association between narcissism and status updating frequency. Results confirmed that Facebook users assumed that individuals high in narcissism post more status updates than individuals low in narcissism. However, in contrast to this, both in the US American and the German sample, the actual relationship between narcissism and the frequency of status updates did not reach significance. Unfortunately, in null hypothesis

significance testing, such non-significant results are difficult to interpret because a failure to reject the null-hypothesis does not allow for the conclusion that the null-hypothesis is true (Cohen, 1990). Hence, null-results often disappear in the “file drawer” and popular lay beliefs or theoretically based assumptions remain unchallenged even though they might lack empirical support (Ferguson & Heene, 2012). To avoid this, the equivalence testing approach was used in this study to gain useful information from the findings. In equivalence testing, null and alternative hypothesis are essentially flipped: The alternative hypothesis assumes an effect that is too small to be of any importance whereas the “null hypothesis” states a substantial effect (Hoenig & Heisey, 2001). In this study, an increase of less than 50% in status updating was defined as negligible. Using the equivalence testing approach allowed concluding that the effect of narcissism on status updating activity is not substantial.

However, it should be noted that this definition of a negligible effect size constitutes a subjective judgment on part of the researchers. Due to a lack of other helpful empirical evidence, the judgment was informed by the size of the effect that Facebook users expected for narcissism as well as information on the magnitude of observed variation in posting frequency. In the future, this judgment might be re-evaluated based on more informative empirical evidence. Firstly, studies could explicitly assess what difference in status updating frequency Facebook users can detect, e.g., by asking participants to classify their Facebook friends as low, moderate, and extreme posters and examine the actual posting activity of those friends. Secondly, it would be beneficial if more studies reported effect sizes for the relationship between personality or demographic variables and counts of status updates because then effects could be judged in comparison to each other. So far, the informative value of the existing literature was not only limited by its scarcity but also by the fact that many studies measured status updating frequency on a variety of rating scales with rather

arbitrary and often very broad response options (e.g., Panek, Nardis, & Konrath, 2013: “never”, “less than once a month”, “once a month”, “once a week”, “2–3 a week”, “daily”, “more than once a day”).

Furthermore, building on this study, future research should (1) use other and more nuanced measures of narcissism instead of relying exclusively on the Narcissistic Personality Inventory, (2) test the hypothesis in other age groups, and (3) assess the relationship between narcissism and the *content* of status updates. More attention grabbing and annoying status updates by narcissists could explain why Facebook users assumed that narcissism is a strong predictor of high status updating frequency. Such status updates would be recalled more easily and hence, Facebook users would overestimate the status updating frequency of narcissists if they applied the availability heuristic (Tversky & Kahneman, 1973).

5.1.3 Study 3: Social Responses to Status Updates and the Role of Personality

Based on the social enhancement and the social compensation hypothesis, Study 3 assessed the role of extraversion and social anxiety, two core personality traits, in predicting social responses to status updates in a US American and a German sample. Moreover, it explored the influence of valence, an important dimension to describe status updates, in this context. For likes and the number of unique commenters neither extraversion nor social anxiety emerged as significant predictors. However, analyses of the informant reports collected in the German sample showed that status updates of individuals higher in social anxiety were appreciated more by their friends. Furthermore, the results highlighted the importance of valence of status updates. More positive status updates were associated with higher extraversion as well as with more likes and—in the US sample—fewer commenters. Moreover, in the US sample the association between valence and likes was moderated by

personality in a way that suggests that Facebook friends particularly “reward” non-typical emotional expressions in status updates (Forest & Wood, 2012).

As one of the first studies to explore predictors of different social responses to status updates, this study opens up a wide array of future research questions. Good extensions of the study would be (1) to collect interpersonal appraisal ratings of status updates not only from strong but also from weak ties of the posters, and (2) to assess the role of personality and valence in predicting social responses to status updates in samples from other age groups. Moreover, future research should continue to explore how personality predicts specific qualities of status updates as well as the composition of the audience, and how these qualities of status updates and characteristics of the audience in turn influence social responses to status updates. Theoretically important qualities of status updates that might be associated with personality as well as with social responses to status updates are—among others—expressions of humor (extraversion and humor: e.g., Vernon, Martin, Schermer, & Mackie, 2008; direct social feedback and humor: e.g., Barash, Ducheneaut, Isaacs, & Bellotti, 2010), and reassurance seeking (social anxiety and reassurance seeking: Heerey and Kring, 2007; negative reactions to reassurance seeking: e.g., Segrin, & Abramson, 1994). Homophily and the extent to which friends know each other and belong to the same social circles, i.e., the density of a friends network, are characteristics of the audience that likely play an important role in understanding the influence of personality in predicting social responses to status updates (Golbeck, Robles, & Turner, 2011). Ideally, future studies should also combine data from different sources. In addition to self-reports, informant reports, ratings by independent raters, and observational data, it might be worthwhile to include ratings of status updates, e.g., with respect to expressions of humor, by Facebook friends who have more contextual information than

independent raters, and to extract data from Facebook which allows determining important characteristics of participants' friends networks, such as their density (Hogan, 2008).

5.2 Overall Contribution of the Present Dissertation

Technological changes which bring about new forms of communication prompt many questions about their potential merits and perils (Boase & Wellman, 2006). Despite the popularity of status updates (O'Neill, 2010), in 2011, at the time of the first data collection for this dissertation, hardly any empirical evidence existed yet to answer urgent questions with respect to status updating. Hence, the present dissertation addressed three independent research questions about different important aspects of status updating to provide first empirical evidence as well as good starting points for future research. Naturally, all results from individual studies should be interpreted with caution (Maxwell et al., 2015) and thus, more research is necessary to allow drawing conclusions with more confidence. However, even at this point, the results of this dissertation might help allay concerns associated with status updating, offer a nuanced perspective, and point to potential benefits: This dissertation provides evidence challenging the often voiced notions that communication via Online Social Networking Sites results in loneliness (e.g., Marche, 2012; Meltzer, 2010) and creates social environments which are dominated by narcissists popularizing a culture of egomania (e.g., Rosen, 2007; Runkevičius, 2014). Moreover, the results suggest that individuals might even benefit from status updating and that status updates might not only level the playing field for socially less competent individuals in comparison to their socially more skilled peers but actually give them an advantage.

Apart from offering a nuanced perspective on status updating by providing empirical evidence as well as opening up a wide range of future research questions, an important contribution of

the present dissertation lies in using and thereby also promoting particular methods in research on Online Social Networking Sites. Firstly, the present dissertation illustrates how the specific opportunities for data collection that Online Social Networking Sites offer can be used – namely, by pioneering the implementation of a field experiment directly on Facebook and by recording observational data. A detailed discussion of these approaches will follow in sections 5.4.1 and 5.4.2. And secondly, this dissertation hopefully helps to advertise the use of appropriate statistical methods when analyzing count data. Particularly, in research on Online Social Networking Sites the frequency of a certain behavior like log-ins (e.g., Sheldon, 2008) or using a particular communication feature is often an outcome variable of interest (e.g., Ong et al., 2010; Ross et al., 2009; Winter et al., 2014). However, count regression analyses and even more so Generalized Linear Mixed Models to assess nested count data are not yet well-known in psychology (Aiken, Mistler, Coxe, & West, 2015). Papers with applied research questions in which these analyses are used likely have the potential to help drawing the interest of other researchers in the field to these statistical methods.

5.3 Directions for Future Research

Moving beyond research questions directly related to the studies which compose this dissertation, several directions for future research can be identified from a broader perspective and will be discussed in the following.

5.3.1 Social Norms and Status Updating

A topic largely unexplored so far is social norms in respect to status updating. Social norms can shape behavior and violations of social norms usually have negative social consequences (Cialdini, Kallgren, & Reno, 1991). Hence, beliefs about implicit rules for appropriate status updating behavior might help to explain variation in status updating frequency as well as in

style and content. Moreover, whether status updating harms or benefits an individual likely depends on an individual's ability and motivation to identify and follow these social rules. Study 2 points to social costs of norm violations in regard to status updating frequency as well as the potential of these implicit rules to shape posting behavior. Specifically, results indicate that individuals who post "too much" are at risk to be perceived as narcissistic and some Facebook users reported that they alter their posting behavior in order to avoid this unflattering impression. Evidence based on research in focus groups confirms that excessive posting is considered a violation of social etiquette (McLaughlin & Vitak, 2012). As consequences of such a violation, Facebook users indicated that they might make sure that they are not exposed to content from an excessive poster anymore by altering the settings of their News Feed accordingly or even deleting somebody permanently from their friends list. Hence, firstly, future research could assess individual differences in beliefs about existing social norms in order to (a) quantify the influence of these beliefs on participants' own actual posting behavior, and (b) examine whether certain personality traits like agreeableness or narcissism, moderate a potential association between perceived norms and actual posting behavior (Amichai-Hamburger, & Vinitzky, 2010). Secondly, it would be worthwhile to assess what amount of status updates Facebook users consider as "too much" and whether this social norm differs between cultures or demographic groups like teenagers versus the generation of their parents or grandparents. Such differences in social norms might help to explain, for example, why in the research for this dissertation US American participants were observed to post considerably more status updates than German participants.

Not only have social norms relating to frequency of status updates been understudied, social norms with respect to their content have also not gained much attention in research so far. While McLaughlin and Vitak (2012) report that participants disapproved of status updates

that were too emotional as well as status updates that broadcasted content that was considered too private, so far only qualitative research on regrets provides first insights into what specific content might violate social norms (Wang et al., 2011). However, information on social norms with respect to the content of status updates and how these norms differ between different social circles might help individuals to navigate the social pitfalls of posting.

Furthermore, future research should study social norms in the context of social responses to status updates. Social norms probably influence direct social feedback to status updates in two ways. Firstly, recipients might refrain from providing direct social feedback to status updates that violate social norms and secondly, most likely particular social norms also exist in respect to liking and commenting. For example, qualitative research indicates that some Facebook users feel obligated to reciprocate likes (Lapides, Chokshi, Carpendale, & Greenberg, 2015). Moreover, it could be speculated that the closeness of the relationship between poster and recipient determines whether and which kind of social feedback is considered appropriate: Close friends might be expected to provide feedback while comments by weak ties could be perceived as intrusive or awkward.

5.3.2 Recipients of Status Updates

In addition to assessing correlates and consequences of status updating for the *posters*, research could focus on the *recipients* of status updates. This perspective is particularly interesting because individuals appear to spend more time consuming than producing content on Online Social Networking Sites (Neubaum & Krämer, 2015; Pempek, Yermolayeva, & Calvert, 2009; Verduyn et al. 2015). Several studies indicate that content consumption on Facebook might be associated with negative outcomes like lower perceived social capital and higher loneliness (Burke, Marlow, & Lento, 2010), decreased life satisfaction (Wenninger,

Krasnova & Buxmann, 2014), less perceived social closeness (Neubaum & Krämer, 2015), and reduced affective well-being (Verduyn et al., 2015). Particularly, because users tend to present themselves in a favorable way on Facebook (Qui, Lin, Leung, & Tov, 2012), researchers raised the concern that exposure to such content would prompt upward social comparisons and result in feelings of envy which in turn have negative emotional consequences (Krasnova, Wenninger, Widjaja & Buxmann, 2013; Kross et al., 2013; Lin & Utz, 2015; Verduyn et al., 2015). In line with this, Krasnova et al. (2013) found that envy mediated the association between passive Facebook use and reduced life satisfaction. Moreover, an experience sampling study assessing participants' natural Facebook use and predicting changes in affective well-being also pointed to a detrimental effect of passive usage mediated through increased envy (Verduyn et al., 2015). However, studies assessing direct emotional responses to passive consumption suggest that positive emotional reactions are common (Wise, Alhabash, & Park, 2010) and outweigh negative ones (Krasnova et al., 2013; Lin & Utz, 2015) even if participants are exposed to posts that are meant to induce envy (Lin & Utz, 2015: study 2). Moreover, Kramer, Guillory, and Hancock (2014) showed that if Facebook users' News Feed is manipulated in a way that status updates with more positive words are displayed more often, they also tend to post more positive status updates themselves, while the opposite is true if they get to see more negative status updates. The authors argue that this highlights emotional contagion effects and could allay concerns that exposure to positive content on Facebook prompts feelings of envy. However, at least the pattern of results for positive status updates could also be in line with the hypothesis of an "self-promotion – envy spiral" on Facebook (Krasnova et al., 2013, p. 12): Exposure to self-promotional posts triggers envy, which motivates users to post more self-promotional status updates themselves, which in turn increases envy in their friends and so on. Hence, future research should continue to explore whether, how and under which conditions status updates

might benefit or harm their recipients. Experimental designs (Verduyn et al., 2015) as well as a clear distinction between the consumption of status updates versus other types of prominent content in the News Feed like shared web links, commercial content, photos, or activities of one's network (e.g., liking, commenting, friending) would facilitate the interpretation of results. Moreover, it would be worthwhile to assess differential effects of exposure to status updates depending on characteristics of the recipients like, for example, personality, dispositional envy, self-esteem, subjective well-being, and loneliness (Burke, Kraut, & Marlow, 2011; Krasnova et al., 2013; Lin & Utz, 2015) as well as characteristics of the content (positive/negative; calm/excited etc.) and the relationship between content producer and recipient (Lin & Utz, 2015).

5.3.3 Status Updates as Tools

Status updates are natural expressions of thoughts and feelings that are automatically archived and hence, provide comparatively easy access to rich data (Kosinski, Matz, Gosling, Popov, & Stillwell, 2015; Schwartz et al., 2013). This data—often in combination with self-reports—might be helpful to assess or measure a variety of psychological phenomena. For example, researchers already used status updates to study the effect of mood swings on measurements of satisfaction with life (Collins, Sun, Kosinski, Stillwell, & Markuzon, 2015), to examine the associations between language and personality (Carey et al., 2015²⁷; Golbeck et al., 2011; Schwartz et al., 2013), and to measure happiness (Kramer, 2010). As more and more status updates accumulate every day, future research should continue to tap into this rich source of information and capitalize on status updates as “a window into people’s lives”.

²⁷ Data collected as part of the present dissertation was included in this study on the association between the use of personal pronouns and narcissism.

However, apart from serving as a source of data, status updates might also be used as a tool to promote beneficial attitudes and behaviors. Facebook users could be asked to post about a particular topic, such as the benefits of vaccinations, the dangers of unprotected sex, the opportunities of political participation, or the importance to fight racial discrimination or xenophobia. There are several reasons to assume that such an approach would be highly effective: Firstly, publically advocating a particular behavior might induce cognitive dissonance in participants if they get reminded of their potential hypocrisy and ultimately motivates them to change their own behavior accordingly (e.g., Aronson, Fried, & Stone 1991; Stone, Aronson, Crain, Winslow, & Fried, 1994). Secondly, because status updates reach a big audience composed of friends and acquaintances and might be re-shared by friends, they appear ideal to capitalize on mechanisms like social influence and social contagion to increase the likelihood of behavioral or attitudinal changes in friends (and friends of friends) of the participants (see Bond et al., 2012 for a Facebook experiment to increase participation in elections). Thirdly, it appears that status updates are particularly memorable in comparison to other texts of similar length (Mickes et al., 2013). And last but not least, the format and audience of status updates might encourage narrative communication like sharing a personal experience or telling a short story. In research on health-behavior change this kind of communication has been shown to be very effective and often more influential than the presentation of facts (Betsch et al., 2012; Hinyard & Kreuter, 2006). In conclusion, future research should explore the potential of status updates as a tool for the promotion of beneficial behaviors and attitudes.

5.4 Opportunities and Challenges of Research on Online Social Networking Sites

Online Social Networking Sites are a rather new phenomenon and consequently, experiences with Online Social Networking Sites as a setting for research are limited. Therefore, this

dissertation closes with a short review of opportunities and challenges of doing research on Online Social Networking Sites. Specifically, the implementation of field experiments, the collection of observational data, recruitment of participants, and the challenge of the ever changing nature of Online Social Networking Sites will be discussed.

5.4.1 Field Experiments

As demonstrated in Study 1 of this dissertation, Online Social Networking Sites allow for the implementation of experiments while preserving the natural environment of participants. Often it is possible to experimentally manipulate exactly the behavior of interest by asking participants to change their posting, liking, commenting, uploading, or consumption behavior. Moreover, in most cases, researchers are able to directly control whether participants followed the instructions instead of having to rely on participants' reports of compliance as in other field settings. However, despite the fact that many research questions in research on Online Social Networking Sites are—at least implicitly—about the consequences of certain behaviors (e.g., Ahn, 2011; Burke et al., 2010; Ellison, Steinfield, & Lampe, 2011; Kross et al., 2013; Park, Jin, & Jin, 2011), so far, experimental studies manipulating behaviors and hence, allowing for strong causal conclusions (Shadish, Cook, & Campbell, 2002), are extremely scarce (for exceptions see: Gentile, Twenge, Freeman, & Campbell, 2012; Gonzales & Hancock, 2011; Tobin, Vanman, Verreynee, & Saeri, 2014; Verduyn et al., 2015). It can be hoped that in the future more researchers will explore the opportunities of Online Social Networking Sites to study the consequences of behaviors in their real-world setting.

5.4.2 Observational Data

Research on Online Social Networking Sites or on computer-mediated communication offers the opportunity to directly and often even unobtrusively observe the behavior of interest as it

naturally occurs (Kosinski et al., 2015; Wilson, Gosling, & Graham, 2012). In comparison to self-reports of behavior, direct observational data has the advantage that it is not biased by, e.g., consistency seeking or self-enhancement of participants as well as response styles or response sets like socially desirable responding, acquiescent responding, or extreme responding (Fleeson, 2009; Paulhus & Vazire, 2007). Direct observation of behavior also circumvents the problem that participants might not be able to accurately recall their behavior if they are asked to report it (Fleeson, 2009; Back & Egloff, 2009). Moreover, due to the reference group effect (Heine, Lehman, Peng, & Greenholtz, 2002) the interpretation of differences in self-reported behaviors between different cultures or demographical groups is questionable, while observational data like counts of status updates can be directly compared (Wilson et al., 2012). And last but not least, combining observational data with data collected with other methods such as self-reports, avoids the risk of inflated effects due to shared method variance (Back & Egloff, 2009; Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). Despite the many advantages of directly observing behavior, self-reports have dominated psychological research (Furr & Funder, 2007). However, while in many research settings the collection of observational data is a great burden for participants, this is not the case for research on Online Social Networking Sites (Kosinski et al., 2015). Many behaviors on Online Social Networking Sites or in online communication like status updates, blog posts, likes, wall posts, whatsapp messages, tweets and the like get—by default—archived and are either publically available or can be accessed by the user (Piazza & Bering, 2009). Hence, in most cases, participants can simply grant researchers access to this information. However, due to the amount and richness of the data that can be collected online, granting researchers access to non-publically available (archived) information—e.g., by adding a research profile as a friend on Facebook—requires either a strong belief of participants in the trustworthiness of the researchers or quite a bit of unconcern and naiveté (Anderson, Fagan, Woodnutt, &

Chamorro-Premuzic, 2012). Interestingly, during the data collection at the University of Arizona in spring 2011, no participant indicated any concern with adding the research profile as a friend, and in the sample of German students in summer 2012 less than 3% did not agree to grant the researchers access to their profile. However, in both samples participants were incentivized to follow the instructions by receiving either course credit (US sample) or a financial compensation of 20€(German sample) and without any reward participants seem to be a little more reluctant to share their data. Kosinski et al. (2015) report that only about one third of all Facebook users who participated in the MyPersonalityProject by completing several questionnaires agreed later on to the automatic extraction of information from their profile. Similarly, in a sample of German students only about 30% volunteered to grant researchers access to their profile for manual data extraction (Rust, 2015). Moreover, while for the present dissertation privacy concerns of participants did not pose a problem, it is possible that individuals become more aware of the risks of sharing their data and hence, will be less willing to grant researchers access in the future (Anderson et al., 2012). Importantly, due to the sheer amount of the collected data, it goes without saying that researchers should make sure that all information is adequately protected and handled carefully (Kosinski, 2015; Wilson et al., 2012)

Manual and Automatic Data Collection

For the present dissertation all observational data was collected by accessing participants profile pages and coding their behaviors after they had added a “Research Profile” as a friend. To manually collect data on behaviors not displayed on Facebook users’ own profile pages like comments on content produced by friends, participants could be asked to provide a screenshot of their “activity log”, i.e., a protocol of all activities of a Facebook user—except for sending private messages—only visible to the Facebook user him- or herself. For the

present dissertation, all observational data was collected manually because at the time when the first study was conducted, Facebook did not allow to automatically extract any data. However, this policy has changed and several studies used, for example, specifically built applications to automatically collect data (Guadagno et al., 2013; Kosinski et al., 2015). Both approaches—manual and automatic data collection—have advantages and disadvantages. Manual coding is time-consuming, labor-intensive, and prone to random errors (which can be reduced by double coding as done for this dissertation). In contrast, once the particular application is set-up, automatic data collection is fast, easy and hence, allows for much bigger sample sizes. Moreover, some participants might feel more comfortable if no human actually gets to see their profile or activity log. However, an advantage of manual coding is that the close examination of participants' profile pages does not only help to generate research questions but more importantly, might be crucial for a correct interpretation of the data (Kosinski et al., 2015). Moreover, automatically collected data also is not immune to random or even systematic errors which might remain undetected with no direct access to the raw data. For example, in a study on emotional expressions in messages sent to pagers after September 11, the results of an automatic analysis were distorted by messages about a server error created by the system which appeared more often later in the day and resulted in an overestimation of the increase of anger expressions over time (Back, Küfner, & Egloff, 2011). Hence, before automatically collecting observational data in a bigger sample, a pilot study combining automatic and manual coding might be advisable. Last but not least, when considering automatic data collection, it is important to keep in mind that Facebook's policies as well as its markup might continue to change as often and dramatically as in the last years rendering carefully designed applications useless (Guadagno et al., 2013; Kosinski, 2014).

5.4.3 Recruitment of Participants

In the present dissertation, two of the three samples were traditional college student samples recruited directly from the participant pool of the psychology department (US American sample) or via mailing lists of student organizations from different universities (German sample). Because Facebook was initially developed as an Online Social Network exclusively for students this was the largest group of users in the beginning (Boyd & Ellison, 2007) and thus, it was reasonable to simply rely on samples of college students. However, as obvious from the fact that currently over one billion individuals regularly log in to Facebook (Fowler, 2012), by now Facebook users are very diverse in respect to their age, education level, income, ethnicity, and nationality (Facebook Newsroom, 2015; PewResearchCenter, 2015). Hence, it is crucial to expand research from college students to more diverse samples and therefore, alternative recruiting strategies should be considered. A clear advantage of research on Online Social Networking Sites is that the population of interest, i.e. users of Online Social Networking Sites, is comparatively easy to reach by using the sites themselves for recruiting. One quick and very effective way to find participants on Online Social Networking Sites is snowball sampling (Kosinski et al., 2015). In this approach, participants are encouraged to either directly invite friends to take part in the study or simply advertise the study by sharing a post about it with their friends' network. For example, as reported in Study 2, snowball sampling resulted in about 300 participants recruited within roughly a week for the assessment of lay theories about the relationship between narcissism and status updating activity. However, when using snowball sampling, several issues need to be considered. Firstly, diversity of the recruited sample will largely depend on the diversity of the seeds of the snowballing procedure, i.e., the first individuals who invite their friends, and it needs to be considered that participants are not a random sample but that, for example, individuals with more friends are more likely to be reached (Kosinski et al., 2015; McPherson, Smith-Lovin, &

Cook, 2001). Secondly, Facebook users will only participate in, and also share or invite friends to take part in, short or particularly engaging or entertaining studies (Kosinski et al., 2015). Yet, when Online Social Networking Sites are the focus of a study, it might be comparatively straightforward to motivate Facebook users to participate as they are often interested in the topic. Even of the participants who were incentivized by course credit or a financial reward to participate in research for this dissertation, many expressed that they felt that this kind of research was very important and interesting without being prompted to do so. Last but not least, depending on the topic of the study, it could be problematic to start the “snowball” based on the personal friend network of the researchers. Particularly in smaller samples, being friends with some of the participants might bias the results of the study, e.g., because participants are highly motivated to be “a good subject” (Nichols & Maner, 2008). Another more expensive but still very cost-efficient recruitment strategy which can also be combined with snowball sampling is to publish a Facebook advert. Facebook offers the possibility to show the advert only to a specific target audience, e.g., based on location or demographic information (Kosinski et al., 2015). Moreover, for bigger projects it might be feasible to create a “participant pool” by setting up a page on Facebook. Individuals who have participated in a study and are generally interested in similar research can then follow this page and receive regular updates on new opportunities for study participation (Kosinski et al., 2015).

5.4.4 The Ever Changing Nature of Online Social Networking Sites

A particular challenge for research on Online Social Networking Sites is that Online Social Networking Sites constantly evolve (Wilson et al., 2012). Online Social Networking Sites rise and fall in popularity (Boyd & Ellison, 2007), new features such as the now almost omnipresent “like button” on Facebook are introduced (Bosworth, 2014), Facebook’s

interface gets transformed substantially, e.g., by adding the News Feed (Lampe, Ellison & Steinfield, 2008), and privacy options change frequently (Wilson et al., 2012). Hence, due to recent changes, a study might already be outdated at the time of publication. Wilson et al. (2012) compare this challenge to the assessment of culture which also constantly evolves. They suggest that researchers on Online Social Networking Sites should also directly assess changes as well as carefully take them into account when interpreting or comparing the results of studies. Moreover, studies about different online settings or forms of online communication might be informative independent of whether or not the settings or communication features have changed in the meantime. To capitalize on this knowledge, in the long run, it might be fruitful to carve out similarities and differences between different online settings for social interaction or forms of online communication to identify psychologically relevant characteristics and integrate knowledge about their effects.

5.5 General Conclusion

About one seventh of the world's population spends time on Facebook and several millions of status updates are posted and read every day (Fowler, 2012; O'Neill, 2010). The novelty and immense popularity of Online Social Networking Sites and its unique features for communication and social interaction prompt many questions for psychologists to answer. By focusing on one specific—very popular but so far understudied—communication feature on Facebook, i.e., status updates, the present dissertation helps to build a body of empirical evidence to further our understanding of the psychological correlates and consequences of using Online Social Networking Sites. Specifically, this dissertation provides empirical evidence on (1) the effects of posting status updates on loneliness, (2) the relationship between narcissism and status updating, and (3) the role of extraversion and social anxiety in predicting social responses to status updates. Moreover, it promotes capitalizing on the unique

opportunities for data collection on Online Social Networking sites, i.e., implementing field experiments and extracting observational data, and advertises the use of appropriate statistical methods for analyzing the type of data that is often the outcome of interest in research on Online Social Networking Sites.

Despite bold warnings like that of Manfred Spitzer in his best-selling book that Social Media makes us “fett, dumm, aggressiv, einsam, krank und unglücklich” [fat, stupid, aggressive, lonely, sick, and unhappy] (Spitzer, 2012, p. 325), it seems unlikely that anytime soon humans will go back to communicating and interacting exclusively in face-to-face settings. Hence, it is crucial that psychologists continue to explore these new social environments, advance our understanding of online communication, and offer a nuanced perspective based on empirical evidence.

5.6 References

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Appendix (in German)

Zusammenfassung

Über ein Siebtel aller Menschen nutzt regelmäßig Facebook und jeden Tag werden mehrere Millionen Status-Updates veröffentlicht und gelesen (Fowler 2012; O’Neill, 2010). Facebook-Status-Updates stellen eine neuartige und faszinierende Form der Kommunikation dar. Sie unterscheidet sich in Bezug auf wichtige Aspekte wie Textlänge, Empfänger und Arten des sozialen Feedbacks nicht nur von der Face-to-Face-Kommunikation, sondern auch von anderen etablierten Formen der Online-Kommunikation. In Anbetracht dieser Unterschiede und der immensen Popularität von Status-Updates stellen sich wichtige Fragen nach den psychologischen Auswirkungen von Status-Updates und ihrer Beziehung zu relevanten psychologischen Konstrukten wie beispielsweise Persönlichkeit.

Facebook ist in den vergangenen Jahren zunehmend in den Fokus psychologischer Forschung gerückt (Wilson, Graham & Gosling, 2012). Jedoch sind bislang Studien rar, die zwischen verschiedenen Aktivitäten auf Facebook differenzieren, obwohl eine grobe Erfassung von "Facebook-Nutzung allgemein" das Risiko birgt, dass Effekte einzelner Aktivitäten verdeckt werden (Smock, Ellison, Lampe & Wohn, 2011). Weitere Forschung mit einem Fokus auf Facebook-Status-Updates ist deswegen dringend erforderlich, zumal die in geringem Umfang vorhandene Literatur zu diesem Thema einige Schwächen aufweist. Zum einen fehlt es an experimentellen Studien zu den Auswirkungen von Status-Updates, um Ergebnisse kausal interpretieren zu können (Shadish, Cook & Campbell, 2002). Zum anderen, verwenden die meisten bisherigen Studien ausschließlich Selbstberichtsdaten, obwohl Facebook gute Möglichkeiten zur Erhebung von Beobachtungsdaten bietet (Wilson et al., 2012). Dies ist unter anderem deswegen problematisch, da gemeinsame Methodenvarianz zwischen verschiedenen Selbstberichtsmaßen eine Überschätzung der Effekte zur Folge haben kann (Back & Egloff, 2009; Podsakoff, MacKenzie, Lee & Podsakoff, 2003). Ziel der vorliegenden

Dissertation ist es – unter Berücksichtigung der Schwächen der bisherigen Literatur – empirische Evidenz zum Thema Status-Updates beizutragen. Sie besteht aus drei separaten Studien, die jeweils verschiedene wichtige Forschungsfragen in Bezug auf Status-Updates untersuchen.

In **Studie 1** wurde untersucht, welche Auswirkungen das Schreiben von Status-Updates auf das soziale Wohlbefinden der Verfasser hat. Hierfür wurde ein Feldexperiment direkt auf Facebook durchgeführt, bei dem das Status-Updating-Verhalten der Nutzer manipuliert wurde. Basierend auf der Überlegung, dass Status-Updates – wegen ihrer Kürze und der Vielzahl von Empfängern – den Nutzern ermöglichen, ihre Freunde ohne großen Aufwand auf dem Laufenden zu halten, wurde die Hypothese aufgestellt, dass das Schreiben von Status-Updates ein Gefühl von Nähe befördert und dadurch letztlich Einsamkeit reduziert (Köbler, Riedl, Vetter, Leimeister & Krmar, 2010). Eine Woche lang wurden die Studienteilnehmer in der Experimentalbedingung dazu aufgefordert, mehr Status-Updates als üblicherweise zu schreiben, während die Teilnehmer in der Kontrollbedingung keine Anweisungen erhielten. Alle Teilnehmer fügten ein sogenanntes “Forschungsprofil” auf Facebook als Freund hinzu, wodurch es möglich war, direkt zu kontrollieren, ob die Studienteilnehmer den Instruktionen folgten, sowie soziales Feedback (Kommentare und Likes) von Freunden zu erfassen. Die Ergebnisse zeigten, (1) dass die experimentell-induzierte Zunahme an Status-Updating-Aktivität das Gefühl von Einsamkeit reduzierte, (2) dass diese Verringerung des Einsamkeitsgefühls darauf zurückzuführen war, dass die Versuchspersonen sich ihren Freunden näher fühlten und (3) dass die Wirkung der erhöhten Status-Updating-Aktivität auf das Gefühl von Einsamkeit unabhängig war von direktem sozialem Feedback von Freunden auf Status-Updates.

Studie 2 griff die von einigen Forschern (z.B. Bergman, Fearington, Davenport & Bergman 2011; Carpenter, 2012) sowie Journalisten (z.B. Jayson, 2009; Rosen, 2007) geäußerte Sorge auf, dass Narzissten Status-Updates exzessiv nutzen und somit narzisstische Beiträge auf Facebook dominieren würden. Die Studie testete erstens, ob diese Bedenken von Facebook-Nutzern geteilt werden und untersuchte zweitens die tatsächliche Beziehung zwischen Narzissmus und Status-Updating-Aktivität in einer US-amerikanischen und einer deutschen Stichprobe. Aufgrund der Vorteile eines multimethodalen Ansatzes wurde die Status-Updating-Aktivität der Teilnehmer direkt auf deren Facebook-Profilseiten beobachtet. In der deutschen Stichprobe wurden zusätzlich zu selbstberichtetem Narzissmus auch noch Fremdbenachrichtigungen von Freunden und Familienmitgliedern der Teilnehmer erhoben. Die Ergebnisse bestätigten, dass auch Facebook-Nutzer annehmen, dass Narzissten deutlich mehr Status-Updates schreiben. Jedoch erbrachten die Analysen der tatsächlichen Beziehung zwischen Narzissmus und Status-Updating-Aktivität in beiden Stichproben Null-Ergebnisse. Da die Interpretation nicht-signifikanter Ergebnisse schwierig ist, wurde auf den "Equivalence Testing"-Ansatz zurückgegriffen (Hoenig & Heisey, 2001). Dieser ließ die Schlussfolgerung zu, dass Narzissmus nur in unbedeutendem Ausmaß mit Status-Updating-Aktivität zusammenhängt.

Basierend auf zwei prominenten Hypothesen aus der Forschung zu Online-Kommunikation, der "Social Enhancement-" und der "Social Compensation"-Hypothese (Kraut et al., 2001; Valkenburg & Peter, 2007), untersuchte **Studie 3** die Rolle von Extraversion und sozialer Ängstlichkeit bei der Vorhersage von sozialen Reaktionen auf Status-Updates in einer US-amerikanischen und einer deutschen Stichprobe. Da Valenz eine grundlegende Dimension zur Beschreibung von Status-Updates (Utz, 2015) ist, wurde zudem das Zusammenspiel zwischen Persönlichkeit, Valenz von Status-Updates, und direktem sozialem Feedback erforscht. Um

von den Vorzügen der Kombination verschiedener Untersuchungsmethoden zu profitieren, wurde Persönlichkeit mit Selbstberichtsfragebögen erhoben und die Valenz der Status-Updates von unabhängigen Ratern eingeschätzt. Soziale Reaktionen auf Status-Updates wurden auf zwei Arten erfasst: Zum einen wurde direktes soziales Feedback (Anzahl Likes und Kommentatoren) auf den Facebook-Profilseiten der Teilnehmer ausgezählt und zum anderen wurde in der deutschen Stichprobe über Fremdbenichte erfasst, wie Freunde und Familienmitglieder die Status-Updates der Teilnehmer beurteilen und darauf reagieren. In beiden Stichproben sagte weder Extraversion noch Soziale Ängstlichkeit direktes soziales Feedback signifikant vorher. Allerdings zeigte sich bei den Analysen der Fremdbenichte, dass die Status-Updates sozial ängstlicherer Personen von Freunden und Familienmitgliedern mehr geschätzt wurden. Ferner wiesen die Ergebnisse auf die Bedeutung von Valenz in diesem Forschungskontext hin, da Valenz sowohl mit direktem sozialem Feedback als auch mit Extraversion signifikant zusammenhing und – in der amerikanischen Stichprobe – die Assoziation zwischen Valenz und direktem sozialem Feedback von Persönlichkeit moderiert wurde.

Die vorliegende Dissertation trägt dazu bei, bestehende Forschungslücken zum Thema Facebook-Status-Updates zu schließen und greift dabei auf die besonderen Möglichkeiten zurück, die sich Forschern auf Facebook zur Datenerhebung bieten. Technische Neuerungen schüren häufig Ängste und werfen Fragen nach ihren potentiellen Risiken und Chancen auf (Boase & Wellman, 2006). Auch wenn die Resultate einzelner Studien zunächst nur unter Vorbehalt interpretiert werden sollten (Maxwell, Lau & Howard, 2015), so tragen die Ergebnisse der vorliegenden Arbeit doch dazu bei, Bedenken im Hinblick auf Facebook-Status-Updates zu verringern sowie auf deren möglichen Nutzen hinzuweisen. Richtungen für

zukünftige Studien sowie spezifische Chancen und Herausforderungen für Forschung zu Sozialen Online-Netzwerken werden diskutiert.

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große Deters, F. & Mehl, M. R. (2013). Does posting Facebook status updates increase or decrease loneliness? An online social networking experiment. *Social Psychology and Personality Science*, 4, 579-586. doi:10.1177/1948550612469233

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Lebenslauf

Der Lebenslauf ist aus Gründen des Datenschutzes nicht enthalten.

Erklärung

Hiermit versichere ich, dass ich die vorgelegte Arbeit selbständig verfasst habe. Andere als die angegebenen Hilfsmittel habe ich nicht verwendet. Die Arbeit ist in keinem früheren Promotionsverfahren angenommen oder abgelehnt worden.

Berlin, September 2015

Fenne große Deters