

# UNDERSTANDING THE ROLE OF SOCIAL NETWORKING SITES IN THE SUBJECTIVE WELL-BEING OF USERS: A DIARY STUDY

## Abstract

Given the rising popularity of social networking sites (SNSs), the influence of these platforms on the subjective well-being (SWB) of their users is an emerging topic in Information Systems research. Building on the norm of reciprocity and the social functional approach to positive emotions, we posit that targeted reciprocity-evoking forms of SNS activities are best suited to promote users' positive emotions. The favorable potential of these activities is likely to be particularly pronounced among adolescents who pay special attention to social acceptance, which can be channeled with the help of reciprocal communication. Therefore, we conducted a quantitative 7-day diary study of 162 adolescent Facebook users attending German schools, looking at the impact of their daily SNS activities on their SWB. Based on a linear mixed model analysis, our results confirm a positive link between targeted reciprocity-evoking activities – such as chatting, giving and receiving feedback – and adolescents' positive emotions. Our findings provide a reassuring perspective on the implications of the sociotechnical design of SNS communication channels. Specifically, by encouraging targeted activities, providers, users, and other stakeholders can ensure the beneficial impact of this technology on users' SWB.

*Keywords: Social Networking Sites, Targeted vs. Non-Targeted SNS Activities, Sociotechnical Characteristics, Norm of Reciprocity, Social Functional Approach to Positive Emotions, Adolescents, Subjective Well-Being.*

## **Introduction**

Given the rising popularity of social networking sites (SNSs) like Facebook (FB), Snapchat, and Instagram, the influence of these platforms on the subjective well-being (SWB) of their users is an emerging topic in Information Systems (IS) research and public discourse (e.g., Sampasa-Kanyinga & Lewis, 2015). Defined as a desired mental state that individuals strive to achieve (Angner, 2010; Kesebir & Diener, 2008), the concept of subjective well-being (SWB) is increasingly used in psychological and economic research, serving as an important indicator of individual and social development (OECD, 2013). Experiential in nature, the composite view of subjective well-being (SWB) integrates an array of affective and cognitive reactions to life circumstances and events (Angner, 2010), which over time contribute to a more global experience of one's life as a whole (Andrews & Withey, 2012; Veenhoven, 2013; Diener, 1994).

Early studies have provided encouraging evidence on the role of SNSs in users' subjective well-being, with social SNS activities playing a key role in these processes (Wang, Jackson, Gaskin, & Wang, 2014). Specifically, SNSs have been shown to help users strengthen social ties (Boyd & Ellison, 2007), build social capital (Koroleva, Krasnova, Veltri, & Günther, 2011), and self-enhance (Krasnova, Spiekermann, Koroleva, & Hildebrand, 2010), thereby contributing to users' overall well-being (e.g., Ellison, Steinfield, & Lampe, 2007; Valenzuela, Park, & Kee, 2009; Valkenburg, Peter, & Schouten, 2006). However, emerging research has drawn a different picture of SNS influence on users' well-being. Specifically, recent studies increasingly stress an undesirable link between time spent on SNSs and greater perceptions of loneliness (Lenhart, 2012), anxiety (Labrague, 2014), depression (Labrague, 2014; Pantic, 2014), bipolar mania, narcissism, antisocial, compulsive, and histrionic personality disorders (Rosen, Whaling, Rab, Carrier, & Cheever, 2013), co-rumination (Davila, Hershenberg, Feinstein, Gorman, Bhatia, & Starr, 2012), and lower performance on cognitive tasks (e.g., Brooks, 2015). Frequent users of SNSs are also at a greater risk of developing addictive behavior patterns, which further lead to an array of emotional, relational, and health-related problems (Andreassen, 2015). The link between SNS usage and privacy problems is also well-documented (e.g., Ku, Chen, & Zhang, 2013; Shin, 2010), with frequent posters often experiencing regret in the aftermath of their activities (Xie & Kang, 2015).

While research evidence on the negative influence of SNSs on users' SWB is mounting, recent studies suggest that the ultimate impact of SNSs is a function of the activities a user engages in (e.g., Krasnova, Widjaja, Buxmann, Wenninger, & Benbasat, 2015; Matook, Cummings, & Bala, 2015). As such, these activities are the consequence of the design of communication features offered on the platform (e.g., Burke, Marlow, & Lento, 2010). In Table 1, see the column titled "Characteristics" for an overview of SNS features that have been investigated. Summarized in Table 1, limited preliminary findings suggest that reciprocity-evoking activities (also referred to as targeted activities), such as chatting, might have a favorable impact on users' SWB, as opposed to non-reciprocity-evoking activities (also referred to as non-targeted activities), such as browsing (Frison & Eggermont, 2016). This is because focused on a

particular receiver, targeted forms of communication may be better suited to convey the relational value of the social connections (Karimi, Ramenzoni, & Holme, 2014). Indeed, extensive research from the offline context shows that perceived reciprocity in social relationship is linked to happiness (Van Yperen & Buunk, 1990), better health, and improved well-being outcomes (Buunk & Schaufeli, 1999).

The positive potential of targeted activities is likely to be particularly pronounced for adolescents (Laurson & Hartup, 2002), since their relationships with peers play a critical role in their perceptions of self and their social standing (Sullivan, 1953; Lenhart & Page, 2015). Moreover, teenage years are characterized by greater sensitivity to social acceptance, which can be channeled with the help of reciprocal communication (Somerville, 2013; Hartup, 1989; Ang, Talib, Tan, Tan, & Yaacob, 2015; Selfhout, Branje, Delsing, Ter Bogt, & Meeus, 2009). Hence, it is possible that adolescents in particular may benefit from participation on SNSs contingent on their activities. However, as Table 1 (column “Age”) shows, adolescents have seldom been the focus of research that investigated the effects of specific SNS activities on their SWB (with two exceptions, Frison & Eggermont, 2016 and Valkenburg et al., 2006).

Against this background, in this study we build on the theoretical foundation of *norm of reciprocity* (Gouldner, 1960) to examine the role of reciprocity-evoking activities in positive emotions of adolescent SNS users. Additionally, insights of positive psychology research, in particular the *social functional approach* to positive emotions (Shiota, Campos, Keltner, & Hertenstein, 2004) are used to complement our theory-building efforts. Indicative of SWB, *positive emotions* are defined as a positive “evaluative response [...] that typically includes some combination of psychological arousal, subjective experience and behavioral or emotional expression” (Burton, Westen, & Kowalski, 2009, p.392, in Gregor, Lin, Gedeon, Riaz, & Zhu, 2014). They represent the core of human flourishing connoting “an optimal range of human functioning” (Fredrickson, 2006; Fredrickson & Losada, 2005), and play an important role for the success in various life domains including health, income (Lyubomirsky, King, & Diener, 2005), and friendships (Shiota et al., 2004). Positive emotions are particularly sensitive to social peer interactions throughout the lifetime and especially during the adolescent development phase (Klimes-Dougan, Brand, Zahn-Waxler, Usher, Hastings, Kendziora, & Garside, 2007; Larson & Richards, 1991), and hence are likely to be responsive to social interactions on SNSs. In spite of this, they have been a rather neglected outcome variable in the SNS context (see Table 1, column “SWB Marker”). Therefore, we choose to focus on positive emotions as our dependent variable of interest in our study.

**Table 1. Overview of Insights from Studies Linking SNS Activity with Markers of SWB**

Source Author(s) (year)	Adolescent Sample	Type of SNS*	SNS Activity	Characteristics		SWB Marker (dependent variable)	Effect on SWB	
Frison & Eggermont (2016)	yes	FB	chatting	contr.& rec.	targeted / reciprocity-evoking	private	depressive mood (-)	Favorable
Jin (2013)	no	FB	giving feedback	contr.		public	loneliness** (-)	Favorable
Matook et al. (2015)	no	SNS					loneliness**	n.s.
Burke & Kraut (2016)	no	FB	receiving feedback	receiving			well-being (+) <sup>1</sup>	Favorable <sup>2</sup>
Valkenburg et al. (2006)	yes	CU2					life satisfaction (+)	Favorable
Frison & Eggermont (2016)	yes	FB	broad-casting	contributing			depressive mood (+)	Unfavorable
große Deters & Mehl (2013)	no	FB					happiness	n.s.
							depression	n.s.
Ding et al. (2017)	no	SNS	browsing	receiving			well-being (-) <sup>2</sup>	Unfavorable
Frison & Eggermont (2016)	yes	FB					depressive mood (+)	Unfavorable
Chen et al. (2016)	no	SNS			well-being (-) <sup>2</sup>		Unfavorable	
Lin & Utz (2015)	no	FB			negative emo's (+)	Unfavorable		
					happiness (+)	Favorable		
Burke & Kraut (2016)	no	FB			well-being <sup>1</sup>	n.s.		
Verduyn et al. (2015)	no	FB			life satisfaction	n.s.		

n.s.=not significant; contr.=contributing; rec.=receiving;  
 \* CU2=Dutch SNS, FB=Facebook, SNS=Social Networking Sites in general were investigated;  
 \*\* Studies of loneliness are generally out of the scope for this overview table. However, due to a lack of studies on contributing targeted SNS activities these two studies have been also listed in the table.  
<sup>1</sup> Measured as social support, depression, loneliness, positive and negative affect, and stress.  
<sup>2</sup> Measured as life satisfaction, positive and negative affect.

On the theoretical level, our study closes the gap of limited empirical evidence regarding the role of certain SNS activities in the well-being (specifically, positive emotions) of adolescent

SNS members, as well as provides a theoretical rationale for the importance of reciprocity as a mechanism underlying these processes. By doing so, we contribute to a better understanding of how information communication technologies (ICTs) in general and social media in particular can be used to provide benefits to users' well-being – a key vision of the Bright ICT Initiative launched by the Association of Information Systems in 2014, which is concerned with research contributing to an ICT-enabled Bright Society (Lee, 2015; Fedorowicz, Agarwal, Lee, Lee, Watson, & Zhang, 2015). Indeed, while the use of social media has been increasingly associated with “dark sides” (Lee, 2016), our study provides evidence for the “bright” potential of social media to enrich user's lives, contingent on the participation patterns they adopt.

On the practical level, as studies of users' mental health draw an increasingly gloomy picture (Knight, 2016), policy-makers, educators, and parents are searching for viable solutions to address these issues. Against this background, our insights deliver actionable guidelines regarding which SNS activities should be fostered to improve users' SWB. Furthermore, spearheaded by Facebook, SNS providers increasingly show themselves responsible for the well-being of their members (e.g., anonymous reporting tool for self-harm by Instagram; Clark, 2016). Here, our results might help SNS providers in further developing their welcomed initiatives. Moreover, since young people represent a large share of SNS audiences across all major SNS platforms – e.g., 14.5% of the Facebook audience in the US are between 12 and 17 (eMarketer, 2017) and 71% of all US teenagers use Facebook (Lenhart & Page, 2015) – participation and satisfaction of this user segment is a major concern for all SNS providers. Finally, younger users hold a major trendsetting potential (Green, 2015), which further emphasizes the importance of understanding this audience for providers.

The remainder of this paper is structured as follows. In the next section, we build on the norm of reciprocity (Gouldner, 1960) and the social functional approach to positive emotions (Shiota et al., 2004) to develop a theoretical basis for our study. We then derive the hypotheses concerning the relationship between targeted activities and positive emotions of adolescent SNS users. Later, we present the empirical findings of our diary study with 162 adolescents. Afterwards, we reveal the theoretical and managerial implications of our study. We also discuss the limitations of this study together with related avenues for future research. Finally, we finish the paper with a brief conclusion.

## **Theoretical Background**

So far, a number of theories – including social exchange theory (Matook et al., 2015), uses and gratifications theory (Bonds-Raacke & Raacke, 2010; Brandtzæg & Heim, 2009; Bumgarner, 2007; Joinson, 2008; Hew, 2011), as well as social capital theory (Koroleva et al., 2011; Lee, Lee & Kwon, 2011; Ellison et al., 2007) – have been applied to study the positive outcomes of SNS use. The usage of social capital theory has been dominant in this research discourse (Nahapiet & Ghoshal, 1998), as it helps to explain the role of the network – the central asset of SNS platforms – in individual benefits (Helliwell & Putnam, 2004; Coleman, 1988; Putnam, 2000). Social capital theory has been primarily used to theorize the role of network size (Burke

et al., 2010). It has also been used to distinguish between different types of ties in terms of their nature and quality to explain their differential impact on the SWB of SNS users (Lee et al., 2011; Kim & Lee, 2011; Ali-Hassan, Nevo, & Wade, 2015). While these studies mainly focus on the properties of the underlying network, our goal is to investigate the role of SNS activities per se, including the underlying mechanics of these effects. Here, social capital theory offers an important starting point because it emphasizes the norm of reciprocity as a critical property of social interactions underlying creation and accrual of social capital benefits (Gouldner, 1960; Granovetter, 1973; Putnam, 2000). Indeed, anticipation of reciprocal actions strengthens interpersonal relationships, enhances trust, and leads to greater well-being both at the individual as well as at the community level (Bourdieu, 2001; Vitak, Ellison, & Steinfield; 2011).

Hence, to better understand which aspects of social activities on SNSs may promote positive emotions of SNS users, we use the norm of reciprocity (Gouldner, 1960) as our focal theoretical lens. Some SNS activities are better positioned to induce reciprocity, which may work as a mechanism promoting well-being of SNS users (Helliwell & Putnam, 2004). Additionally, insights of positive psychology research, namely the social functional approach to positive emotions (Shiota et al., 2004) helps us theorize the relationship between social activities that take place on SNSs and users' positive emotional states. Studies investigating positive emotions represent a relatively recent research stream in psychology (Fredrickson, 1998), with previous research focusing more on mental illness, negative emotional states, and maladaptive behavior and thinking (e.g., Nolen-Hoeksema, Morrow, & Fredrickson, 1993; Forgas, 2008). Moreover, studies focusing on positive emotions have been underrepresented in SNS research (see Table 1). However, negative and positive emotions appear to be rather independent of one another and hence, have to be treated differently (Isen, 1987; Larsen, McGraw, & Cacioppo, 2001).

### **The Role of Reciprocity in Offline and Computer-Mediated Contexts**

According to the *norm of reciprocity*, human beings feel a strong obligation to give back what they have received (Gouldner, 1960). Defined as the repayment of received benefits (Gouldner, 1960), reciprocity is an important driver in the evolution of human species (Buunk & Schaufeli, 1999). Indeed, human survival and reproductive success have been largely dependent on the norms of reciprocation in the past (Trivers, 1985).

In a broader social context, reciprocity is said to be one of the most pervasive social forces in human culture and is deeply ingrained in early socialization (Cialdini & Goldstein, 2004). Reciprocity functions as a mechanism that supports the initiation as well as the maintenance of social interactions (Gouldner, 1960). Indeed, giving and receiving social cues creates an urge to continue with the interaction and structures the social relation between interaction partners (Shumaker & Brownell, 1984). Therefore, it comes as no surprise that interpersonal relationships are heavily guided by individual reciprocity concerns (Buunk & Schaufeli, 1999), with reciprocity representing a central element in the development of friendships (Hartup & Stevens, 1997).

Consequently, reciprocity is also at the core of positive emotions experienced in social situations. The social functional approach to positive emotions highlights their social function, linking positive emotions to social interactions and interpersonal relationships (Shiota et al., 2004). Already in childhood, reciprocal and synchronous social exchange between a child and a parent represents the basis of their relationship (Tronick, 1989; Shiota et al., 2004). The infant's social smile is a powerful mechanism that evokes reciprocal positive reactions in parents, thereby fostering frequent social contact and, as a consequence, enduring attachment (Bower, 1977). In more specific terms, the social functional approach to positive emotions suggests that when people reflect on social affiliation cues they receive, they may experience a sense of indebtedness to reciprocate the benefits they received. This mechanism ensures continuous engagement in mutually nurturing relationships (Gonzaga, Keltner, Londahl & Smith, 2001; Shumaker & Brownell, 1984), which represent an important source of positive emotions (Shiota et al., 2004). Thus, giving as well as receiving in social interactions are enablers of positive emotional states (Lyubomirsky et al., 2005).

Indeed, ample research evidence shows that social connections that are based on reciprocity are among the strongest predictors of SWB (Helliwell & Putnam, 2004). For example, reciprocal social relationships and interactions have been linked to greater perceptions of happiness (Van Yperen & Buunk, 1990), increases in positive affect (e.g., Lyubomirsky et al., 2005), and better health outcomes (Buunk & Schaufeli, 1999) in both private (Hartup & Stevens, 1997) as well as organizational contexts (Schaufeli, Dierendonck, & Gorp, 1996). While these effects appear to be consistent across all age groups (Ramsey & Gentzler, 2015), they are particularly pronounced for adolescents, who exhibit heightened levels of positive emotions in reaction to relevant social encounters (e.g., the neurological study by Guyer, Choate, Pine, & Nelson, 2012), including communication with peers and others outside of the family circle (Ainsworth, 1989).

Importantly, the positive role of reciprocity has been increasingly recognized in the IS research (Wasko & Faraj, 2005; Kankanhalli, Tan, & Wei, 2005), including studies on computer-mediated social environments (Hancock, 2007), such as SNSs (Posey, Lowry, Roberts, & Ellis, 2010; Valenzuela et al., 2009). For example, in the context of content sharing platforms like Flickr or Twitter, reciprocal user pairs have been found to be responsible for a large share of favorites and retweets, respectively (Lee, Antoniadis, & Salamatian, 2010). The act of giving back could thereby be interpreted as a symbol of gratitude and a stimulus to further communication (Musembwa & Paul, 2012). Moreover, bloggers who fail to reciprocate readership are sanctioned with lower numbers of readers than their activity would otherwise warrant (Gaudeul & Peroni, 2010). Reciprocal exchanges and disclosures on SNSs have also been found to play a positive role, as they help to reduce uncertainty (Sheldon, 2009), and signal the value of the relationship. This way reciprocity contributes to the enhancements in social contact and quality of friendships (Posey et al., 2010). Furthermore, first evidence suggests that reciprocal communication is favorable for the SWB of SNS users (Frison & Eggermont, 2016; Jin, 2013).

Taken together, while empirical research investigating the impact of reciprocal behavioral patterns on users' SWB in the SNS context is scarce, the reciprocity-evoking nature of certain SNS activities could be a missing link in explaining users' positive emotions on SNSs. Building on the norm of reciprocity (Gouldner, 1960) and the social functional approach to positive emotions (Shiota et al., 2004), we argue that social interactions that are based on reciprocal norms are associated with positive emotions of SNS users.

### **Differential Role of SNS Activities in Promoting Users' Positive Emotions**

SNSs provide users with tools to facilitate engagement in social interactions (e.g., Yu, Hu, & Cheng, 2015). Since various social activities exhibit a unique set of sociotechnical characteristics – which reflect their capacity to communicate specific content to specific audiences in a particular way – they are likely to exert a differential impact on the quality of resulting relationships and users' positive states (Bazarova, 2012). Consequently, some SNS activities would be better positioned to tap into norms of reciprocity and thereby promote positive emotions as outlined above.

Beyond a natural differentiation between contributing and receiving behaviors (Zeng & Wei, 2013; Ghose & Han, 2011; Krasnova, Wenninger, Widjaja, & Buxmann, 2013), a critical distinction between targeted (reciprocity-evoking) and non-targeted (non-reciprocity-evoking) modes of interaction should be made (Bazarova, Choi, Schwanda Sosik, Cosley, & Whitlock, 2015) (see Table 2). Concerned with “the selection of that particular receiver as a worthy beneficiary in the face of opportunities to select other targets or other actions” (Jones & Davis, 1965, p. 247 in Bazarova, 2012), targeted activities – such as chatting, ‘liking’ and commenting – are more likely to trigger a response. This is because an interaction has to be targeted to a particular person to trigger an obligation inherent in reciprocity (Gouldner, 1960). Preliminary evidence suggests that targeted activities are indeed positively linked to the SWB of SNS users: for example, chatting activity has been shown to mitigate depressive moods (Frison & Eggermont, 2016), and receiving feedback boosted users' life satisfaction (Valkenburg et al., 2006).

Indeed, signaling the special status of the recipient who merits such ‘costly’ personalized actions (Burke, Kraut, & Marlow, 2011; Bazarova, 2012), these targeted gestures of attention on SNSs are likely to be more effective in generating and transporting relational bonds on a deeper level, creating a special connection between the sender and the recipient. For example, the study of Barasch and Berger (2014) has shown that targeted forms of communication are more likely to force users to narrowcast their self-disclosure by accommodating the perspective of others into their communication and thereby providing more useful content that better fits their communication partner.

These effects are likely to be particularly pronounced for adolescents, who continuously scan their social environment in search of affiliative cues and testimonials of their social acceptance by peers (Somerville, 2013). Tapping into sensitized socio-affective circuits of the adolescent



brain, availability of reciprocal social cues is likely to trigger positive emotional reactions (Somerville, 2013; Guyer et al., 2012). Against this background, it is not surprising that teens readily engage in targeted activities online. For example, over 30% of 13-14 and 15-17 year-olds use messaging apps, with a typical teen sending and receiving 30 texts daily (Lenhart & Page, 2015). Moreover, 37% of young SNS users comment on SNS posts of others at least once a day (Hampton, Goulet, Rainie, & Purcell, 2011).

<b>Table 2. Overview of Common SNS Social Activities and their Characteristics</b>				
		Contributing	Receiving	Reciprocity-evoking
Private	Targeted	Chatting (including messaging)		<b>Yes</b>
Public		Giving Feedback	Receiving Feedback	<b>Yes</b>
Public	Non-targeted	Broadcasting	Browsing	<b>No</b>

*Note:* Targeted social activities within the focus of this study are highlighted within a bold frame; Importantly, SNSs support a number of targeted activities that focus on social interaction. The activities of chatting (chatting, messaging), giving feedback (commenting, “liking”), and receiving feedback (receiving comments and “likes”) listed in Table 2 are included in our study because they are the most common on popular SNSs (e.g., Facebook) (Dunne et al., 2010, Hampton et al., 2012). Other functional affordances like sending friend requests, “poking”, or “tagging” are outside the scope of this paper.

In contrast, non-targeted activities, like broadcasting or browsing, are not focused on a particular recipient, but serve the purpose of efficient communication with a larger network of others (Bazarova, 2012). This one-sided character implies lower reciprocal value of these activities (Chiou, Chen, & Liao, 2014; Barasch & Berger, 2014). Hence, social bonds are not mutually strengthened and resulting feelings of connectedness are weaker (Chiou et al., 2014; Barasch & Berger, 2014). Moreover, browsing through the content of others – one of the most common non-targeted activities on SNSs – may even create a feeling of disconnectedness, loneliness, and perceptions of being excluded (Doster, 2013).

Taken together, while users readily engage in both non-targeted and targeted activities on SNSs, we argue that it is the targeted activities that drive positive emotions of SNS members. To explore this phenomenon, in this study we develop and test hypotheses that link a set of targeted activities with positive emotions of adolescent SNS users. Corresponding to Table 2, the targeted activities we focus on include chatting, giving feedback, and receiving feedback. Additionally, we control for the influence of non-targeted activities – broadcasting and browsing.

Importantly, this study is based on the assumption that social interactions on SNSs are at least non-negative. While such undesirable communication patterns as cyberbullying or hate speech have been observed in the context of SNSs (e.g., Brody & Vangelisti, 2016; Neubaum &

Krämer, 2016), available evidence suggests that most interactions that take place on SNSs are positive in nature (e.g., Oh, Ozkaya, & Larose, 2014; Utz, 2015; Lenhart, Madden, Smith, Purcell, Kathryn, & Rainie, 2011). Indeed, positive feedback is common on SNSs (e.g., Barasch & Berger, 2014; Bernstein, Bakshy, Burke, & Karrer, 2013), with users striving to make each other feel good by expressing appreciation and care (Sas, Dix, Hart, & Su, 2009). In line with this, the ‘face with tears of joy’ tops the list of most shared emojis on Facebook (Cohen, 2017). Furthermore, when asked about their experiences with Social Media, an overwhelming majority of young respondents ‘totally or somewhat agree’ to such positive experiences as ‘feelings of joy or happiness’ (93.5%), ‘support and achievement’ (73.67%), and ‘sense of social cohesion’ (77.51%); while 93.73% disagree with the statement ‘I have bullied others’ (Statista, 2016). Moreover, according to self-esteem theories, individuals strive to protect and support their self-esteem (Rosenberg, Schooler, & Schoenbach, 1989). Hence, empowered by numerous functional features that help limit one’s audience and control information flows on SNSs, adolescents are likely to focus on positive connections in their communication, while at the same time eliminating or minimizing interactions that threaten their social standing and well-being (Valkenburg et al., 2006). Our study’s focus on at least non-negative communication may be one of its limitations; this is further elaborated in the Discussion section of our paper.

### **Hypotheses Development: The Role of Targeted Activities on SNSs**

In this study, we focus on investigating the role of targeted activities in the positive emotions of adolescent SNS users.

**Chatting.** Being one of the most popular targeted activities on SNSs, chatting (consolidated with messaging for many SNSs) should be particularly helpful in maintaining and enhancing social relationships. This is because the private and reciprocal nature of chatting allows for communication partners to engage in deeper and more meaningful exchanges in which both parties are more likely to focus on the needs of one another, letting each other partake in their daily events, share ongoing concerns and express support (Burke et al., 2011). This positive dynamic of reciprocity is likely to give rise to “positive feedback loops of social, emotional and physical well-being” benefiting both parties (Seppälä, 2014; Seppälä, 2016). Furthermore, since chatting is typically synchronous, communication partners have fewer opportunities for selective self-presentation, which makes communication more authentic (Sheldon, Gunz, & Schachtman, 2012; Reinecke & Trepte, 2014). These positive effects may be particularly pronounced for adolescents, who seek to strengthen their social interactions with peers, gain acceptance and obtain socially-relevant feedback (Quan-Haase & Young, 2010). Already now, 49% of adolescents point out messaging as their preferred means of online communication (Lenhart, Smith, Anderson, Duggan, & Perrin, 2015). Taken together, the reciprocal nature of chatting may contribute to users’ positive emotions (Oh et al., 2014; Shiota et al., 2004). Therefore, we hypothesize that:

**Hypothesis 1 (H1):** Higher level of *chatting* is associated with a greater level of *positive emotions* for adolescent SNS users.

**Giving Feedback.** This is a targeted activity that takes place in a public space, and is typically expressed in the form of ‘likes’ and comments given to others on the network (Burke et al., 2010). Importance of ‘giving’ (as opposed to only ‘receiving’) has been increasingly stressed in offline studies that link provision of emotional and instrumental support to others with lower levels of individual distress (Cialdini, Darby, & Vincent, 1973), better health outcomes (Schwartz & Sendor, 1999), and even higher longevity (Brown, Nesse, Vinokur, & Smith, 2003). In this literature, positive outcomes of giving are linked to evolutionary advantages, since “human reproductive success was contingent upon the ability to give resources to relationship partners” (Brown et al., 2003, p. 320).

In the SNS context, the act of giving feedback can be seen as a tribute of attention expressed towards the other party, since it emphasizes the social relevance of the sender in a web of social relationships. Additionally, users may anticipate the appreciation of the recipient (Wohn, Carr, & Hayes, 2016), which may reciprocally stimulate positive emotions in the sender (Midlarsky & Kahana, 2007; Shiota et al., 2004). This way, giving feedback plays an essential role in strengthening social connections, and is innately rewarding in nature (Baumeister, Wotman, & Stillwell, 1993). Moreover, reciprocating a ‘like’ from a friend predicts getting another ‘like’ from this person. Thereby, reciprocal messaging emerges as an efficient way to engage in mutually beneficial social exchange on an SNS (Surma, 2016). Especially adolescents may strive towards these experiences, considering the heightened role of social acceptance and social status during teenage years (Sullivan, 1953; Lenhart & Page, 2015). Hence, it is not surprising that supported by easy-to-use functionality, engagement in commenting and ‘liking’ is common for adolescents on Social Media (Statista, 2015). We hypothesize that:

**Hypothesis 2 (H2):** Higher level of *giving feedback* is associated with a greater level of *positive emotions* for adolescent SNS users.

**Receiving Feedback.** Based on the reciprocity approach, receiving feedback has the potential to promote long-term participation for SNS newcomers (Burke et al., 2010) and stronger bonds between communication partners (Bazarova, 2012). This is because the feedback users receive on SNSs is overwhelmingly positive (Lenhart et al., 2011), which is intentionally encouraged by the platform design (e.g., the ‘likes’ and the majority of newly introduced emoticons on Facebook expressing positive sentiment).

As a result, this personalized feedback transports regard towards the recipient and appreciation of his or her content, working to promote social interactions and feelings of social inclusion (Gosling & Mason, 2015; Spiliotopoulos, Karnik, Oakley, Venkatanathan, & Nisi, 2013), social support (Wohn et al., 2016; Oh et al., 2014), and social capital (Liu & Brown, 2014). Particularly for adolescents, receiving encouraging feedback in a public space may serve as a cue of their social acceptance (Somerville, 2013), which has been shown to promote social self-esteem (Valkenburg et al., 2006) as well as to boost positive emotions in adolescent brains (Guyer et al., 2012). Given this background, we hypothesize that:

**Hypothesis 3 (H3):** Higher level of *received feedback* is associated with a greater level of *positive emotions* for adolescent SNS users.

### **Controls, Including Non-Targeted Activities**

To ensure completeness of our analysis, we control for user engagement in two most common non-targeted activities: broadcasting (Hampton, Goulet, Marlow, & Rainie, 2012) and browsing (Constine, 2012). Typically expressed as the number of public posts (e.g., status updates, photos) a user has shared, the role of *broadcasting* in the SWB of adult population remains ambiguous (see Table 1; e.g., Yang & Brown, 2013; Ryan & Xenos, 2011), with some studies finding no link to users' happiness, depression (große Deters & Mehl, 2013), and life satisfaction (Krasnova et al., 2015). Similarly, reflected in the time users spend *browsing* their News Feed or public profiles of their SNS connections, the reported effects of browsing on users are unclear (Burke & Kraut, 2016; Lin & Utz, 2015; Matook et al., 2015; Verduyn, Lee, Park, Shablack, Orvell, Bayer, Ybarra, Jonides, & Kross, 2015; Vigil & Wu, 2015). While we expect an inferior role of these activities in promoting positive emotions, we account for the engagement in these activities in our study.

Furthermore, beyond control variables typical for SNS-related studies – like *age*, *gender*, and *number of SNS friends* – we also control for users' *self-esteem*. Numerous studies view self-esteem as a strong determinant of SWB (Diener & Diener, 1995) and a prerequisite of positive emotions (Lin & Utz, 2015). Additionally, *daily offline events* (both positive and negative) are controlled for, since offline events may interfere with the emotional well-being of the adolescents in our sample.

## **Empirical Study**

### **Study Design, Procedure, and Sample**

The overwhelming majority of schoolchildren in Germany attend one of the following types of schools: *Gymnasium*, which provides preparation for higher education; *Realschule*, which is intended for intermediate students; *Hauptschule*, which prepares for vocational education; or *Gesamtschule*, which combines the latter two or all three types. Our study was conducted between July 2013 and February 2014 in five German schools and includes adolescents from each school type with a slightly overrepresentation of schoolchildren from *Gymnasium* and *Realschule*. Prior to starting the study, permissions from the school authority and principals as well as written consent from parents of participating adolescents were obtained. We advertised our study to seventh through tenth graders who are in their adolescent years (Curtis, 2015; Steinberg, 2008), and informed them about the survey procedure. To avoid bias, the research was presented in general terms as a study on 'teenagers on Facebook'. Facebook was chosen as the target platform because of its popularity in Germany among adolescents (Statista, 2014). For the remainder of this paper, Facebook is referred to as 'SNS'.

To test our hypotheses, we conducted a diary study. Diary method is less vulnerable to retrospective bias, since respondents are more likely to remember their experience on the same day than when asked to report on it later (Ohly, Sonnentag, Niessen, & Zapf, 2010). Research focusing on SWB underlines “the importance of studying dispositions in dynamic terms - that is, as a reaction to circumstances - rather than as static” (Reis, Sheldon, Gable, Roscoe, & Ryan, 2000, pp.431-432), suggesting that a diary method is particularly suitable for our context. Furthermore, with few exceptions (e.g., Kross, Verduyn, Demiralp, Park, Lee, Lin, Shablack, Jonides, & Ybarra, 2013; Arampatzi, Burger, & Novik, 2016; Burke & Kraut, 2016), research exploring the link between SNS participation and users’ SWB has been dominated by cross-sectional studies that focus on individual differences between study participants. However, the experience of using SNSs may differ from day to day; while on some days users may experience a high level of positive emotions following their SNS activities, on other days their perceptions may be different. Diary studies account for these fluctuations (Reis & Gable, 2000; Ohly et al., 2010).

The study design involved two stages. On the first day, adolescents filled out a general online survey capturing their demographic data and level of self-esteem as a control variable. Next, respondents were asked to complete the same version of the online survey over seven consecutive days. Here, participants had to report, among other things, their SNS usage patterns and positive emotions on a daily basis. To ensure that reported results covered the whole span of daily activities, adolescents were instructed to complete daily surveys shortly before going to bed (Sonnentag, 2001). Analysis of the field data has confirmed that participants generally complied with this requirement, with the earliest access across the study period taking place at 5:00 p.m., and the latest at 1:20 a.m. on a weekday night, and at 4:40 a.m. on a weekend night (median access time throughout the week was 9:06 p.m.). To remind participants to fill out the daily survey, teenagers were asked to send a friend request to the study lead, who then sent them a daily reminder message in the evening. This connection was also intended to serve as reinforcement for participants to report accurate measures of their SNS behavior. To link measurements of one person throughout the course of the study week while simultaneously assuring confidentiality, every respondent was assigned a personal code at the beginning of the study. Teenagers who participated for at least six days received a €15 gift card as a reward.

Initially, 217 teenagers took part in the study. In further analyses, however, only 162 adolescents who used SNS for at least three days during the period of investigation were included. Respondents were aged between 11 and 17 years (mean=14.9; median=15; SD=1.0). Female users were slightly overrepresented, as 57.4% of all study participants. SNS use ranged from three to seven days (mean=5.4; median=5.0; SD=1.5) during a study week. Number of SNS friends was between 10 and 1000 (mean=256.4; median=220; SD=183.7).

## **Measures**

Our study included instruments to assess SNS social activities (our predictor variables; see Table 3) and positive emotions (our dependent variable; commonly operationalized as positive

affect, Fredrickson & Losada, 2005), as well as control variables (self-esteem, daily positive and negative events, as well as demographics). All questions were initially formulated in English. Where available, a pre-tested translation into German was used (for positive affect scale). When pre-tested translations were not available, the items were carefully translated into German. We took great care during the translation process to ensure equivalence of English-language and German-language formulations.

**Measures of SNS social activities.** As one item of chatting, participants were daily asked: “On Facebook, how much time did you spend today on chatting?” Similarly, to assess browsing (control variable), participants were daily asked the following: “On Facebook, how much time did you spend today on browsing the News Feed and looking through the profiles of other users?” Answers had to be stated in hours and minutes. Broadcasting (control variable), giving feedback (predictor variable), and chatting behavior (predictor variable) were measured daily using the following questions: “How many (photo posts | status updates) | (comments | ‘likes’) | (chat messages) did you make today?” Furthermore, respondents were asked daily whether they had received any type of feedback from others (receiving feedback; predictor variable), as well as responses to their chat messages: “How many (likes | comments) | (chat messages) did you receive today?” To control for the valence of the feedback, those who received any comments from others were asked to rate the following statement: “Overall, the sentiment of feedback I received was...” Their answer options ranged from 1=*very friendly*, 2=*friendly*, 3=*neither friendly nor unfriendly*, 4=*unfriendly*, to 5=*very unfriendly*. In line with findings of previous research (Lenhart et al., 2011), our respondents reported receiving overwhelmingly positive or neutral feedback (mean=1.6; SD=0.1), with only one exception; one participant received a rather unfriendly comment. To ensure consistency, all observations on this respective day from this participant were eliminated from the dataset.

**Measures of psychological concepts.** Positive emotions – our dependent variable – was operationalized as *positive affect* (Fredrickson & Losada, 2005; Watson & Clark, 1999) and measured on a daily basis. Reflecting “one’s current level of pleasure and enthusiasm” (Watson & Clark, 1994, p. 91), positive affect is typically used to measure the positive emotional side of SWB (Fredrickson & Losada, 2005). Being particularly sensitive to social experiences (Watson & Clark, 1994), positive affect represents a sound proxy of positive emotions for the purposes of our study. For operationalization, an adapted version of Watson and Clark’s (1999) PANAS-X joviality scale – an important sub-dimension of positive affect (German translation based on Roecke & Gruehn, 2003) – was used. To keep the scale short, the following four items measured on a 5-point Likert scale (1=*not at all* to 5=*extremely*) were chosen: *happy*, *delighted*, *popular*, and *valued*. While the items *happy* and *delighted* are based on Watson & Clark (1999), two additional items *popular* and *valued* were added to reflect the unique context of adolescent SNS use. Indeed, feeling valued and popular are especially relevant for adolescents in general (McElhaney, Antonishak, & Allen, 2008; Allen, Hauser, Bell, & O’Connor, 1994) and in the SNS environment in particular (e.g., Manago & Vaughn, 2015; Utz, Tanis, & Vermeulen, 2012).

Table 3. Operationalization of Variables Capturing SNS Social Activities								
Survey Operationalization	Variable	Mean	SD	Median	Min	Max	# of non-users / users	
How many photo comments / "likes" / messages did you make today?	<i>Label</i>	Number of... <b>per day and person</b> (measured on a daily basis):						
	Giving feedback	Comments given	0.6	3.3	0	0	50	87 / 75
		"Likes" given	2.7	6.4	0	0	70	30 / 132
How much time did you spend on chatting today?	Chatting	Messages given	4.9	5.9	0	0	90	33 / 129
		Time spent <b>per day and person</b> (in minutes) (measured on a daily basis):						
How many comments   "likes"   messages did you receive today?	Chatting	... chatting on SNS	30.5	57.4	10	0	600	15 / 147
		Number of... <b>per day and person</b> (measured on a daily basis):						
	Receiving feedback	Messages received	5.5	8.0	1	0	70	32 / 130
		Comments received	0.8	4.1	0	0	200	101 / 61
		"Likes" received	1.6	5.7	0	0	150	99 / 63
<b>Control Variables</b>								
Survey Operationalization	<i>Label</i>	Mean	SD	Median	Min	Max	# of non-users / users	
How much time did you spend on browsing today?	Browsing	Time spent <b>per day and person</b> (in minutes) (measured on a daily basis):						
		... on the News Feed	26.8	27.6	15	0	300	4 / 158
How many photo posts / status update messages did you make today?	Broadcasting	Number of... <b>per day and person</b> (measured on a daily basis):						
		Photo posts	0.1	0.5	0	0	10	156 / 6
		Status updates	0.1	0.4	0	0	10	126 / 36
<i>Note:</i> For mean and standard deviation (SD), an individual average was calculated first; then a sample average was derived. Values are computed for the whole sample (not only for users of these activities). Median, minimum, and maximum values were not averaged.								

*Self-esteem* – a control variable – was assessed on the first day of the survey using a shortened Rosenberg’s instrument (1965) and measured on a 5-point Likert scale (1=*strongly disagree* to 5=*strongly agree*). An example of an item used to measure self-esteem is: “I feel that I have a number of good qualities”. The mean across construct items for self-esteem reached 3.6 (median=3.7; SD=0.9). Cronbach’s alpha for self-esteem and positive emotions constructs were 0.76 and 0.83 respectively, suggesting internal consistency of our used scales (Nunnally, 1978). In the next step, items across constructs were combined into respective mean scores for further analysis. Descriptive statistics are displayed in Table A.1 in Appendix A.

**Measures of demographic variables and daily offline events.** Additionally, we controlled for gender, age, number of SNS friends at the beginning of the study, as well as positive offline events and negative offline events on a daily basis. Descriptive statistics are displayed in Table A.1 in Appendix A.

## Data Preparation

For each respondent in our sample, data was available on two levels: ‘day-level’ and ‘person-level’. SNS activities, daily positive emotions, and daily events were captured at the ‘day-level’, while self-esteem and demographics were collected at the ‘person-level’. Data on the ‘day-level’ was nested within person. Considering the suitability of mixed models for analyzing data sets in which points in time are nested within participants, we used linear mixed models to explore the association between SNS social activities and positive emotions of adolescent respondents (Bryk & Raudenbush, 1992). In this methodological approach, both within-person and between-person variance are accounted for (Snijders & Bosker, 1999). For data analysis, SPSS (version 22) linear mixed model procedure with an estimation of maximum likelihood was used (Peugh & Enders, 2005).

To fit the requirements of mixed models required several steps. First, the data was prepared. To control for the skewness of the data that captured SNS activities, log-transformations for all SNS social activity variables were performed (base 2, after adding a start value of 1) (see Burke et al., 2010).

Second, ‘day-level’ variables (positive emotions, daily SNS social activities, as well as daily positive and negative offline events) were person-mean centered (Raudenbush & Bryk, 2002). Specifically, we subtracted the person-specific mean from each individual’s time-specific value (Curran & Bauer, 2011). This implies that variance resulting from between-person effects was removed. Third, we centered all ‘person-level’ variables around the grand mean (by subtracting the overall mean from each person’s value). For interpretability reasons, descriptive statistics are reported for non-transformed variables in Table 3.

Subsequently, we combined the variables of posted photos and status updates into the broadcasting scale through the creation of factor scores (control variable). In addition, providing comments and ‘likes’ formed the *giving feedback* scale. The number of received comments and ‘likes’ were integrated into a scale called *receiving feedback*. Time spent chatting and the number of messages written and messages received were combined into one factor scale labelled *chatting*. A confirmatory factor analysis (CFA) was performed to confirm that these theoretically derived categories of SNS social activities (chatting, giving feedback, receiving feedback, broadcasting, and browsing) are legitimately distinct (see Table B.1 in Appendix B). Overall, three models were tested and different fit metrics were compared (see Table B.2 in Appendix B). The suggested five-factor solution exhibits the best fit for all tested indices: Chi-square was 115.7 for a five-factor solution, 344.1 for a three-factor solution (private and targeted, public and targeted, public and non-targeted), and 874.6 for a one-factor solution, with a lower value indicating a better fit. The GFI (goodness-of-fit index) and the CFI (comparative fit index) both exceeded the threshold of 0.90 with 0.98 and 0.96 respectively (e.g., Marsh, Hau, & Wen, 2004). The RMSEA (root mean square error of approximation) was below the required threshold with a value of 0.05 indicating a good fit of the model (e.g., Hu & Bentler, 1999).



Table 4 summarizes zero-order correlations between the study variables. ‘Day-level’ and ‘person-level’ correlations are reported where appropriate.

<b>Table 4. Zero-order Correlations Between the Study Variables</b>											
	Chat	Gfeed	Rfeed	Brod	Brow	POff	NOff	PE	Age	Ge	SE
Chatting (Chat)	---										
Giving feedback (Gfeed)	.31**	---									
Receiving feedback (Rfeed)	.08*	.25**	---								
Broadcasting (Brod)	.09**	.33**	.36**	---							
Browsing (Brow)	.08*	.16**	.01	.08*	---						
Positive offline event (POff)	.04	.11**	.07	.09**	.01	---					
Negative offline event (NOff)	.00	.05	.06	.10*	-.01	.10**	---				
Positive emotions (PE)	.12**	.13**	.05*	.04	.02	.12**	.02	---			
Age	.17*	.03	.03	.02	-.10	-.04	.05	-.21**	---		
Gender <sup>a</sup> (Ge)	-.01	-.02	.01	-.00	.01	.02	.05	.12	-.05	---	
Self-esteem (SE)	.04	-.04	-.06	.00	.04	.05	-.08	.19*	.07	.18*	---
Number of SNS friends	.10	.03	.10	.06	-.05	.08	.15	.14*	.23*	-.08	.09
<i>Note:</i> Below the bold line are ‘person-level’ correlations (N = 162); SNS activities and positive emotions measures were averaged across the number of observed days. Above the bold line are ‘day-level’ correlations (N = 838-870); * <i>p</i> < .05 and ** <i>p</i> < .01; <sup>a</sup> 1 = Female; 2 = Male.											

### Analysis

For the main analysis, two models were formulated (Curran & Bauer, 2011): level 1 model and level 2 model. Then both models were combined for a final mixed model.

The model for level 1 regression (day-level) presents each participant’s positive emotions as a function of his or her involvement in the five SNS activities investigated in our study (three targeted activities and two non-targeted activities used as controls) and whether participants had encountered a positive and/or negative offline event or not. The level 1 model (day-level) is formulated as:

$$\text{Positive emotions}_{ii} = \beta_{0i} + \beta_{1i} (\text{positive event offline})_{ii} + \beta_{2i} (\text{negative event offline})_{ii} + \beta_{3i} (\text{broadcasting})_{ii} + \beta_{4i} (\text{browsing})_{ii} + \beta_{5i} (\text{chatting})_{ii} + \beta_{6i} (\text{giving feedback})_{ii} + \beta_{7i} (\text{receiving feedback})_{ii} + r_{ii}$$

where  $\beta_{0i}$  refers to the intercept (an adolescent’s positive emotions on an average day);  $\beta_{1i}$  to  $\beta_{6i}$  represent slopes between positive emotions and the independent ‘person-level’ variables;  $r_{ii}$  represents an error term; and  $t$  refers to Day  $t$  and  $i$  to Person  $i$ .

The level 2 model (person-level) is formulated as:

$$\beta_{0i} = \gamma_{00} + \gamma_{01} (\text{gender})_{1i} + \gamma_{02} (\text{age})_{2i} + \gamma_{03} (\text{no. of SNS friends})_{3i} + \gamma_{04} (\text{self-esteem})_{4i} + u_{0i}$$

with  $\beta_{1i} = \gamma_{10}$ ,  $\beta_{2i} = \gamma_{20}$ ,  $\beta_{3i} = \gamma_{30}$ ,  $\beta_{4i} = \gamma_{40}$ ,  $\beta_{5i} = \gamma_{50}$ ,  $\beta_{6i} = \gamma_{60}$ ,  $\beta_{7i} = \gamma_{70}$ .

where  $\gamma_{00}$  is the overall mean intercept adjusted for the day capturing the fixed effects. The random effect of the model is captured by  $u_{01}$  and represents the residual variance of the intercept. A random intercept was chosen to control for dependencies between participants (Twisk, 2006).

Combining both equations results in the final mixed model:

$$\begin{aligned} \text{Positive emotions}_{ti} = & \gamma_{00} + \gamma_{01} (\text{gender})_{1i} + \gamma_{02} (\text{age})_{2i} + \gamma_{03} (\text{no. of SNS friends})_{3i} + \\ & \gamma_{04} (\text{self-esteem})_{4i} + \gamma_{10} (\text{positive event offline})_{10i} + \\ & \gamma_{20} (\text{negative event offline})_{20i} + \gamma_{30} (\text{broadcasting})_{30i} + \gamma_{40} (\text{browsing})_{40i} + \\ & \gamma_{50} (\text{chatting})_{50i} + \gamma_{60} (\text{giving feedback})_{60i} + \gamma_{60} (\text{receiving feedback})_{60i} + u_{01} + r_{ti} \end{aligned}$$

Table 5 shows the results of the analyses.

Variable	Null model			Model 1			Model 2		
	Estimate	SE	T	Estimate	SE	T	Estimate	SE	T
Intercept	2.32	0.07	35.11**	2.24	0.08	27.39**	2.22	0.08	26.82 **
<b>Controls</b>									
Gender				0.15	0.13	1.19	0.16	0.13	1.25
Age				-0.22	0.07	-3.37**	-0.24	0.07	-3.63 **
No. of SNS friends				0.00	0.00	2.42*	0.00	0.00	2.39 *
Self-esteem				0.20	0.07	2.84*	0.21	0.07	2.94 *
Positive offline event				0.33	0.06	5.27**	0.32	0.06	5.21 **
Negative offline event				0.02	0.08	0.20	-0.02	0.08	-0.31
Broadcasting				0.03	0.02	1.67	-0.03	0.03	-1.36
Browsing				0.01	0.02	0.57	-0.02	0.02	-1.03
<b>Targeted reciprocity-evoking SNS activities</b>									
Chatting (H1)							0.09	0.02	4.25 **
Giving feedback (H2)							0.08	0.02	3.26 **
Receiving feedback (H3)							0.07	0.03	2.07 *
Deviance			2057.11			1995.43			1863.47
Deviance difference						61.68**			131.96**
Df						8			3
Level 1 intercept (SE)			0.415 (0.022)			0.398 (0.021)			0.363 (0.020)
Level 2 intercept (SE)			0.625 (0.080)			0.530 (0.069)			0.541 (0.070)

SE = Standard error, † p< .10, \* p< .05, \*\* p<.005.

In the null model, the intercept is the only predictor. It acts as a benchmark for the following models. In model 1, all control variables are included, which are ‘person-level’ variables (gender, age, number of SNS friends, and self-esteem) and ‘day-level’ variables (positive offline event, negative offline event, broadcasting, and browsing). In the final combined model (model 2), targeted activities (‘day-level’) are entered, which serve as predictor variables. To test the improvement of each model over the previous one (i.e., model fit), the differences of the respective likelihood ratios are computed (Peugh, 2010). Our results reveal that model 1,

which only includes control variables, exhibits a significant improvement over the null model (deviance difference = 44.69,  $df = 5$ ,  $p < .00$ ). Age, number of SNS friends, self-esteem, and positive offline events are significant predictors in this model. Model 2, in which SNS social activities are entered, shows an even better fit (deviance difference = 137.94,  $df = 5$ ,  $p < .00$ ) than Model 1. This indicates that variables measuring SNS social activities contribute significantly to the prediction of positive emotions.

Differences between adolescents account for 60.1% of the total variance in positive emotions (interclass correlation coefficient (ICC) =  $0.625 / (0.625+0.415) = 0.601$ ). Social investigations with a repeated measurement design commonly exceed ICC values of 40% (Peugh, 2010). The control variables entered into model 1 explain 15.2% of the variance at ‘person-level’ ( $0.625-0.530 / 0.625 = 0.152$ ) and 4.1% at ‘day-level’ ( $0.415-0.398 / 0.415 = 0.041$ ). The predictor variables entered into model 2 explain 12.5% of the variance at ‘day-level’ ( $0.415-0.363 / 0.415 = 0.125$ ). Inspection of signs of regression coefficients reveals that chatting, giving feedback to others, and receiving (non-negative) feedback have a positive relationship with positive emotions of adolescent SNS users – indicated that H1, H2, and H3 are supported. In other words, the higher the individual engagement in targeted activities on SNSs, the greater the positive emotional well-being. Importantly, the effects of these SNS uses exist beyond the influence of demographics and self-esteem. At the same time, the non-targeted activities included as controls – broadcasting as well as time spent on browsing – appear to have no impact on the positive emotions of adolescent members. Overall, we observe that targeted communication on SNSs has a significant positive association with adolescents’ positive emotions; whereas non-targeted activities like broadcasting and browsing appear to have no influence on this type of emotions. Table 6 presents an overview of our hypotheses testing.

Table 6. Summary of Final Results			
Relationship between SNS activities and positive emotions		Empirical Result	
H1	Higher level of <i>chatting</i> is associated with a greater level of positive emotions for adolescent SNS users.	supported	Targeted (reciprocity-evoking) SNS activities are associated with positive emotions for adolescent SNS users.
H2	Higher level of <i>giving feedback</i> is associated with a greater level of positive emotions for adolescent SNS users.	supported	
H3	Higher level of <i>received feedback</i> is associated with a greater level of positive emotions for adolescent SNS users.	supported	
Control	Relationship between <i>broadcasting</i> and positive emotions of adolescent SNS users.	not significant	Non-targeted SNS activities have no effect on adolescents’ positive emotions.
Control	Relationship between <i>browsing</i> and positive emotions of adolescent SNS users.	not significant	

Additionally, to get a better understanding of the relationship context behind adolescent communication on SNSs, study participants were daily asked a follow-up question regarding their latest interaction partner on the network. If a respondent stated that he or she had chatted, commented, or ‘liked’ something, a filter was activated and a question on their latest interaction partner was presented. The answer options included the following: close friend, friend, family

member, acquaintance, stranger, and other. Regarding their latest chat partners, we received 489 observations (from 141 participants). The majority of these chat interactions (76.5%) took place with someone who was a strong tie (36.6% with a close friend; 39.9% with a friend; only 4.1% with family members). Interactions with weak ties were relatively rare (11.7% with acquaintances and 1.2% with strangers). We observe a similar distribution in their latest comment partners and their latest ‘like’ partners. Out of 153 comments (from 45 participants) referred to by respondents, 69.9% were targeted at strong ties (39.2% close friends; 30.7% friends; only 3.3% targeted posts of family members) and 11.8% of comments were targeted at weak ties (9.8% at acquaintances and 2% at strangers). Similarly, out of 276 ‘likes’ (from 54 participants) reported by respondents, 48.9% targeted the content of strong ties (22.8% close friends, 22.1% friends, only 4.0% family members) and 21.0% were aimed at weak ties (12.7% at acquaintances; 8.3% at strangers). The remaining percentage falls into the “others” category.

In a nutshell, our descriptive analysis shows that the usage of SNS-enabled targeted activities is largely directed towards strong ties that are not part of the family circle. From the perspective of social capital theory, this suggests that developing *bonding social capital* – relationships with “close peers who might be in a position to provide emotional support or access to scarce resources” (Ellison et al., 2007, p. 1147), as opposed to *bridging social capital* – relationships with friends of friends who represent a broader and looser circle, is of primary concern for adolescents in our sample (Putnam, 2000; Nahapiet & Ghoshal, 1998). This is also in line with the developmental psychology research, which emphasizes the role of peer connections over family ties during adolescence (Fuligni & Eccles, 1993; Somerville, 2013; Sullivan, 1953).

## Discussion

### The Role of Targeted SNS Activities

In this study, we find that the ultimate effect of SNS use is a function of the activities users engage in (see Table 2). Using the norm of reciprocity (Gouldner, 1960) and the social functional approach to positive emotions (Shiota et al., 2004) as our focal theoretical lenses, we see that targeted (reciprocity-evoking) as opposed to non-targeted (non-reciprocity-evoking) activities have the potential to exert a favorable effect on the positive emotions of SNS users, since they tap into the basic mechanism of human bonding and healthy socialization (Karimi et al., 2014; Gouldner, 1960). Adolescents especially should benefit from the positive effects of these activities. Since the adolescent development phase is hallmarked by an extreme susceptibility to social evaluations from peers (Somerville, 2013), reciprocal social interactions are useful in playing a protective role and fueling positive emotions at this life stage (e.g., La Greca & Harrison, 2005; Inderbitzen, Walters, & Bukowski, 1997).

Based on the results of a diary study with 162 adolescent Facebook users, we find that chatting is associated with the enhancement of positive emotions for adolescents (therefore supporting hypothesis H1). This private mode of reciprocal interaction with primarily strong ties appears to be satisfying in nature, driving positive emotions. Furthermore, we observe that giving (H2)

as well as receiving feedback (H3), in the form of comments or ‘likes’, also have a favorable association with adolescent users’ positive emotional state, as these activities cater to the reciprocity aspect of the relationship. In sum, by promoting social activities on both the giving and the receiving ends, targeted public feedback emerges as a powerful mechanism promoting positive emotions among adolescents in the network.

By controlling for non-targeted activities, we find that broadcasting fails to genuinely promote positive emotions among adolescent respondents. While studies in offline contexts underscore the intrinsically satisfying nature of sharing about oneself (e.g., Tamir & Mitchell, 2012), our findings show that sharing activity is not particularly rewarding in terms of driving positive emotions of adolescent SNS users. However, browsing the content of others on an SNS does not appear to negatively influence adolescents’ positive emotions. As such, this outcome produces optimism in the light of recent findings on the unfavorable potential of this activity in triggering envy and reducing life satisfaction (Krasnova et al., 2015; Lin & Utz, 2015; Verduyn et al., 2015; see Table 1).

### **Theoretical Implications**

Our theoretical contributions are fivefold. First, our study highlights that the impact of SNSs on users’ SWB is a function of their SNS activities. While numerous past studies have measured SNS use as an aggregate variable (e.g., time spent on an SNS) (Kross et al., 2013), our study underscores the value of taking a more refined approach to measuring SNS use. Specifically, our reliance on the norm of reciprocity (Gouldner, 1960) as a theoretical perspective allows us to systematically differentiate between activities that have (and do not have) potential to produce favorable changes in SNS users’ positive emotional states. Based on our findings, we conclude that it is not the use of social media platforms per se, but rather the sociotechnical design features inherent in specific SNS uses – in our case the propensity of certain SNS activities to trigger reciprocity – that are responsible for users’ positive emotions.

Second, so far, studies linking certain SNS activities with the well-being of their members have been largely focused on student and adult samples, while research on adolescents remained scarce (see Table 1, column “Age”). However, adolescents exhibit significant differences to the adult population, which questions the generalizability of existing findings for this unique user group. Indeed, transitioning from childhood to adulthood, adolescents undergo a series of changes in the brain regions responsible for emotional processing (e.g., Winslow & Insel, 2004), and which prepare them for future separateness from their immediate family (Spear, 2000). As a result, the importance of social stimuli increases, with adolescents exhibiting heightened attention to feedback from peers and other signals relevant in social interactions (Somerville, 2013). Therefore, the effects of social activities are more pronounced for adolescents in comparison to adults (Somerville, 2013; Harter, 1999). Against the background of these developmental particularities, our study contributes to existing SNS research by taking a closer look at the role of social SNS activities in the positive emotions of adolescent SNS

users. Our findings highlight the protective role of reciprocal social interactions with peers for adolescents on these platforms.

Third, our findings enrich a developing, but still widely neglected, stream of research on positive emotions (Fredrickson, 1998; see Table 1, column “SWB Marker”). While previous studies have often merged markers of cognitive (e.g., life satisfaction) and emotional (e.g., affect) well-being by combining them to one overall SWB scale (e.g., Burke & Kraut, 2016; Lee et al., 2011), our study indicates that differentiating between distinct markers of SWB is useful. This is because the influence of SNS use could be different depending on the SWB variable in focus. For example, while broadcasting activity is associated with greater life satisfaction (Wenninger, Krasnova, & Buxmann, 2014), improved general self-esteem (Gentile, Twenge, Freeman, & Campbell, 2012), and lower loneliness (große Deters & Mehl, 2013), it is not automatically well-suited to enhance positive emotional outcomes of SNS users, as our study highlights.

Fourth, our study adds to a growing body of research on the consequences of social media adoption from a socio-psychological perspective (e.g., Davila et al., 2012; Labrague, 2014; Matook et al., 2015). Indeed, while emerging research is increasingly drawing a grim picture of the negative consequences of SNS use – linking it to envy (Krasnova et al., 2015), depressive symptoms (e.g., Frison & Eggermont, 2016), and loneliness (Burke et al., 2010) among others – our findings suggest that generalisation of these fears is not entirely warranted. Specifically, positive emotions can be promoted by using SNSs, especially in the case of adolescents, contingent on the activities users adopt.

Finally, our results advance the goals of the Bright ICT Initiative. Specifically, our study addresses a recent call for more research that focuses on how emerging technologies change individuals’ emotions, perceptions, behaviors, interpersonal relationships, and social processes (Tarafdar, Gupta, & Turel, 2015; Aggarwal, Hajer, & Vogel, 2015). In this context, our findings contribute to the ongoing debate about the impact of SNSs on users’ mental health and especially on the SWB of a highly engaged but vulnerable user group – adolescents.

### **Managerial Implications**

Our findings draw an encouraging picture for stakeholders who are interested in promoting beneficial uses of social technologies. Indeed, an increasing number of platform providers prioritize user experience over marketing gains, to ensure platform sustainability and user participation (Peterson, 2016). Here, users’ SWB on the platform is seen as a metric of success. For example, Instagram has introduced tools to support people with mental health issues on its platform, recognizing the responsibility of platform providers for the SWB of their users. Moreover, supporting participation of adolescents is seen as particularly critical considering their role as technology trend-setters, whose usage dynamics anticipates the rise or fall of an online social platform (Green, 2015).

Parents and policy-makers are equally interested in understanding the consequences of SNS use, considering rising levels of social media participation (Towner & Muñoz, 2011; Britland, 2012), as well as increasing rates of mental strains among adolescents (American Psychological Association, 2016). Since it is very difficult to stop the usage of SNSs, advice about the most beneficial usage of SNSs is more pragmatic and helpful. Specifically, invested stakeholders are advised to incentivize targeted activities on SNSs among adolescents, including chatting and giving targeted public feedback, because they are associated with positive emotions. Moreover, since chatting takes place in private, this activity is also more privacy-preserving in nature.

At the same time, lengthy browsing sessions should be discouraged to minimize exposure to potential risks. Our study suggests that browsing does not contribute to adolescents' positive emotions. Moreover, past research has linked time-intensive browsing sessions to a number of detrimental consequences, including reduced time spent on studying (Junco, 2012; Espinoza & Juvonen, 2011) as well as lower grades (measured by grade point average (GPA) scores) at school (Kirschner & Karpinski, 2010). Furthermore, already limited time spent with parents may further decrease (Lee, 2009). Additionally, overzealous browsing may grow into an addiction, which can be socially harmful and produce conflict with other ongoing tasks (e.g., Floros & Siomos, 2013; Turel, Serenko, & Giles, 2011).

Similarly, users should be advised to engage in broadcasting activities with caution. On the one hand, broadcasting may increase users' positive self-perception (Gentile et al., 2012). On the other hand, broadcasting may result in the unintentional loss of privacy and related damaging consequences. Moreover, most recent research suggests that public sharing might be an awkward activity, with users experiencing information overload as they decide whether or not certain information should be shared (Ouardi, Goyal, Graf-Vlachy, Mammen, König, & Saunders, 2016). Corroborating this logic, we witness a decrease in original sharing of personal stories on SNSs particularly among the younger segment of users (Passary, 2016; Frier, 2016).

Taken together, our results call for a balanced use of SNSs – one that emphasizes more targeted forms of communication over one-to-many forms of interaction. Already now, applications that emphasize targeted activities, like Snapchat and WhatsApp, are rapidly gaining popularity and threatening the sustainability of more traditional social media platforms, like Facebook. For that reason, SNS providers are advised to further enhance their targeted channels of interaction to prevent users from moving.

Finally, as today's adolescents start entering the workforce, our insights may be also relevant for the future design of enterprise social networks. Following our results, enabling the use of targeted communication channels on corporate social networking sites may potentially have a positive effect on work climate, cooperative behaviors, and collaboration in the organizational context.

## **Limitations and Future Research**

This study has several limitations. First, although the diary design used in this study is strong in comparison to pure cross-sectional methods by allowing for a disaggregation of between-person and within-person effects in repeated measures (Curran & Bauer, 2011), causality of the relationships we established should be confirmed using experimental set-ups. Second, though mitigated through the daily assessment of SNS activities, recall bias cannot be fully eliminated with our approach to data collection. Reliance on server log data offers a fruitful approach to overcome this shortcoming in future studies. Third, this study is based on the assumption that social interactions on SNSs are non-negative. While available evidence (e.g., Oh et al., 2014, for research publication; e.g., Statista, 2016, for representative Social Media statistics) and the data we collected mainly corroborate this view, adolescent communication can involve negative elements as well (Underwood, Rosen, More, Ehrenreich, & Gentsch, 2012), even though these cases are rare (Lenhart et al., 2011). Therefore, accounting for different types of content shared and consumed on the network could be a valuable extension of our research design. In this context, it is especially critical to observe and register concentrated hotbeds of cyberbullying among adolescents, since adolescents learn from each other and one incident leads to others' imitation (Hinduja & Patchin, 2013). Fourth, in this work, we focus solely on one dimension of SWB, positive emotions, since they are closely linked to social interactions. Because negative and positive emotions appear to be not opposite ends of a continuum (Isen, 1987; Larsen et al., 2001), including negative emotions as an outcome variable may offer new insights into the interplay of different SWB markers. Fifth, generalizability of our findings is somewhat restricted: our results are purely based on Facebook use, and therefore should still be validated across other platforms; furthermore, our sample consists only of German adolescents, which calls for more studies with users of other cultural backgrounds.

## **Concluding Remarks**

Combining the norm of reciprocity (Gouldner, 1960) and the social function approach of positive emotions (Shiota et al., 2004) as a theoretical foundation, we argue that targeted reciprocity-evoking forms of SNS activities are better suited to promote adolescent users' positive emotions. To test this assumption, we conducted a 7-day quantitative diary study with 162 German adolescent Facebook members to investigate the relationship between various targeted activities users can engage in on SNSs and their perceptions of positive emotions. Using linear mixed model analysis and controlling for non-targeted uses, such as broadcasting and browsing, we find that all targeted activities – chatting, giving feedback, and receiving feedback – have the potential to enhance adolescents' positive emotional state. Our study contributes to the growing body of IS research that investigates the socio-psychological consequences of IT adoption. On the practical side, our insights may serve as a guideline for SNS providers and other stakeholders who have significant interest in understanding the beneficial patterns of SNS use.



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## Appendix A

<b>Table A.1 Descriptive Statistics of Demographic Variables and Psychological Measures</b>			
<b>Item</b>	<b>Mean</b>	<b>SD</b>	<b>CA*</b>
Age	14.9	1.0	NA
Number of SNS friends	256.4	183.7	NA
Gender (female)	57.4%		
<b>Self-esteem</b> (based on Rosenberg, 1965); <i>Scale: 1=strongly disagree, 5=strongly agree</i>			
To what extent do you agree with the following statements?			
I feel that I have a number of good qualities.	3.22	1.16	0.76
I am able to do things as well as most other people.	3.86	1.14	
I feel that I'm a person of worth, at least on an equal plane with others.	3.76	1.03	
<b>Positive emotions</b> (based on the positive affect scale, i.e., joviality scale, from Watson and Clark, 1999); <i>Scale: 1=not at all, 5=extremely</i>			
How did you feel today after using Facebook? Which feelings did you have? I felt...			
...happy	2.89	1.23	0.83
...delighted	2.71	1.25	
...popular	1.80	1.07	
...valued	2.02	1.16	
Did you experience a special event today?			
Percentage of responses answering "yes, a positive one"	22.2%		
Percentage of responses answering "yes, a negative one"	12.3%		
<i>Note: SD=standard deviation; CA=Cronbach's Alpha</i>			

## Appendix B

To assess the reliability and the validity of the five-factor SNS activity structure, a confirmatory factor analysis was conducted. Maximum likelihood estimation was used in AMOS 23.0.0.

<b>Table B.1 Confirmatory Factor Analysis</b>		
<b>Factor</b>	<b>Variable</b>	<b>Factor loading</b>
Giving feedback	“Likes” given (number)	0.50
	Comments written (number)	0.66
Receiving feedback	“Likes” received (number)	0.68
	Comments received (number)	0.78
Chatting	Chatting and writing messages (time)	0.63
	Messages written (number)	0.69
	Messages received (number)	0.68
Broadcasting	Photos posted (number)	0.88
	Status updates posted (number)	0.66
Browsing <sup>Note</sup>	Browsing through profiles and the News Feed (time)	0.33
	Browsing through profiles (number)	0.75
<b>Covariances</b>		
	<b>Estimate</b>	<b>SE</b>
Broadcasting < - - > Giving feedback	0.50	0.003**
Broadcasting < - - > Receiving feedback	0.57	0.004**
Broadcasting < - - > Chatting	0.17	0.006**
Broadcasting < - - > Browsing	0.14	0.003 *
Giving feedback < - - > Receiving feedback	0.60	0.012**
Giving feedback < - - > Chatting	0.49	0.025**
Giving feedback < - - > Browsing	0.45	0.021**
Receiving feedback < - - > Chatting	0.17	0.021 *
Receiving feedback < - - > Browsing	0.16	0.013 *
Chatting < - - > Browsing	0.37	0.044**
<i>Note:</i> Due to a very low factor loading, only one item was used for <i>browsing</i> and subsequent model testing. Significance: ** $p < 0.001$ ; * $p < 0.05$ .		

Model Chi-square = 115.7  
 Goodness-of-fit index = 0.98  
 RMSEA index = 0.05  
 Bentler CFI = 0.96

<b>Table B.2 Goodness-of-fit metrics for alternative models</b>			
<b>Fit metric</b>	<b>Model with one factor</b>	<b>Model with three factors</b> (private and targeted, public and targeted, as well as, public and non-targeted)	<b>Model with five factors</b> (chatting, giving feedback, receiving feedback, broadcasting, browsing)
Chi-Square	874.6	344.1	115.7
GFI	0.82	0.92	0.98
CFI	0.55	0.84	0.96
RMSEA	0.15	0.09	0.05
<i>Note:</i> The goodness-of-fit metrics indicate that a five-factor solution fits the data best and outperforms the one- and also the three-factor solution. Generally, GFI and CFI values greater than 0.90 indicate good model fit (e.g., Marsh et al., 2004).			