ACTIVITY MATTERS: INVESTIGATING THE INFLUENCE OF FACEBOOK ON LIFE SATISFACTION OF TEENAGE USERS

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Abstract

As Facebook has become an integral part of a daily routine for many, the impact of its participation on users' lives is of growing interest. Nonetheless, extant research does not offer a clear answer on the directionality of the link between Facebook use and markers of subjective well-being. These issues are particularly critical for the vulnerable segment of teenage users. Suggesting both negative and positive outcomes, existing studies are plagued by recall bias, with available findings often undermined by the reliance on aggregated measures of Facebook use. To close these gaps and address unique dynamics of the teen segment, in this study we adopt a diary approach to reliably capture different indicators of FB participation by young adolescents. This method allows us to arrive at more concrete conclusions regarding the counter-acting forces at work when it comes to the influence of Facebook. Based on our analysis, we show that the type of activity matters. Specifically, while such active uses of FB as posting and chatting are positively associated with life satisfaction in young adolescents, passive following has an adverse effect. Theoretically, our findings help getting a more holistic picture of the consequences of SNS use by teens.

Keywords: Facebook, Life Satisfaction, Subjective Well-Being, Usage Patterns.

Motivation

Since the emergence of Social Networking Sites (SNSs), like Facebook (FB) and MySpace, the use of these platforms by young adolescents has been in the focus of scholarly attention. This is not surprising, since teenagers are among the busy users of Social Media applications and the "always on" aspect of these technologies is very distinctive for them (e.g. Davies, 2012). Indeed, a whopping 93% of teens in the age of 12-17 have an account on FB, with 64% of 12-13 year olds using FB in the U.S. (Lenhart et al., 2011).

The fact that using SNSs is an integral part of most young adolescents' lives is a valuable reason on its own to investigate the outcomes of this technology use. Teenagers are also a group in society in need of protection due to their state of being underage and their lack of experience. As a result, an array of stakeholders, including parents, educators and politicians, call for better understanding of the consequences of SNS use. In addition, providers themselves exhibit an unprecedented level of concern

directed at supporting the interest of this audience – and this despite a rather low share of this user segment in the overall demographic structure of the FB audience: Only 13% of FB users are under 18 in Germany (statista.com, 2013). The reason for this is rooted in the trendsetting potential of the growing "iPhone" generation, whose key relevance has been recently demonstrated by the media frenzy around the newly reported findings that Twitter is replacing FB as the most important SNS for young adolescents (Bosker, 2013). As a result of this dissatisfying outcome, FB has relaxed its privacy regulations for its 13- to 17 year old user segment, allowing teens to have more freedom with regard to the audience they would like to reach with their status updates, photos and comments.

In response to this ubiquitous interest, significant body of research has been accumulated studying various aspects of SNS use by teenagers. On the positive side, studies underline the benefits of social connectedness and social capital as teens seek for advice and emotional support from friends and relatives on SNSs (Notley, 2008). Teens are also shown to enhance their relationships both at school as well as online by using SNSs, which facilitates the creation of bridging social capital (Ahn, 2012). In addition, SNSs have the potential to enhance the learning experience of adolescents, as they facilitate knowledge sharing and building (Ahn, 2011; Itō et al., 2009; Notley, 2008) and also provide basis for the development of transferable technical skills (Livingstone and Brake, 2010).

On the negative side, the link between SNS usage and privacy problems is well-documented (e.g. Ku et al., 2013; Shin, 2010) including risks arising from extensive self-disclosure on a SNS (Krasnova et al., 2010). However, despite the worrisome nature of these findings, a number of recent studies signal that teen users have elaborated their privacy-protecting practices (Patchin and Hinduja, 2010) exhibiting greater reliance on privacy settings and a more selective approach to friending - practices that at times are even superior to those of adults (O'Brien et al., 2011). For example, a whopping 76.3% of teens have set their profiles to private (Taraszow et al., 2010). Other downsides include cyberbullying (Schneider et al., 2013) and sexual solicitation (Ybarra and Mitchell, 2008), just to name a few. These issues are no isolated cases, but apply to many teenagers using SNSs (Schneider et al., 2013). Negative consequences regarding the offline live of the younger generation contain a weaker school performance (Espinoza and Juvonen, 2011) and less time spent with parents (Lee, 2009). Moreover, frequent SNS use may also grow into a "bad habit" or even addiction, which can be socially harmful and produce conflict with ongoing tasks (e.g. Floros et al., 2013; Turel and Serenko, 2012).

Taken together, extant research provides an array of findings concerning a multitude of different aspects of SNS use, with studies generally showing significant agreement with regard to the above-mentioned benefits and dangers for teens. Nonetheless, despite the unquestionable value of these insights, the *global picture on the consequences of SNS participation* is still missing and is plagued by considerable controversy. In particular, we still lack full understanding of the ultimate impact of SNSs on younger users' (as well as adults') subjective well-being (SWB) – a "*measure of the quality of life of an individual and of societies*" (Diener et al., 2003, p. 405) and a subject of significant public interest. So far, some studies focussing on teens suggest that social capital can be one reason for increased well-being in teenagers (Ahn, 2011), with SNSs helping to reduce loneliness in adolescents and thereby enhance life satisfaction (Apaolaza et al., 2013). In contrast, a number of most recent findings mainly using student samples provide evidence for the detrimental effects of SNS use, linking it to depression (Pantic et al., 2012), increased anxiety (Farahani et al., 2011), reduction in life satisfaction (Krasnova et al., 2013), and even possible substance abuse and self-destructive behaviours (O'Keeffe and Clarke-Pearson, 2011). If, indeed, despite all the potential benefits, SNSs do endanger well-being of the growing generation, interested stakeholders should be urged to reconsider its ubiquitous promotion and use. Conversely, if young adolescents may sustainably enhance their quality of life by participating on SNSs, its use should generally be encouraged.

In the light of these controversies and recognizing the significant social importance of a given issue, the goal of this study is to investigate the impact of FB participation on users' SWB. In contrast to the

majority of studies in this area, in this study we take distance from traditional recall-based measures of FB participation, as we adopt a diary approach to capture different indicators of FB use by teens. This way, we build on more reliable and granular measures of FB use, which allow us to arrive at more concrete conclusions regarding the counter-acting forces at work when it comes to the influence of FB on users' well-being. Our results promise to help parents, policy-makers and educators in their efforts to single out and promote beneficial and limit harmful uses of SNSs. From the theoretical perspective, we contribute to the emerging discourse regarding the global effect of Social Media applications on the indices of users' well-being.

1 Understanding the Impact of SNS Use on Subjective Well-Being

1.1 Overview of Past Research

Considering the role of SWB in the overall quality of life, determinants of SWB have long been in the focus of various disciplines, including psychology, sociology and mental health studies. Reflecting "*how people evaluate their lives*", in these studies SWB has been operationalized in a variety of ways, covering *both* affective as well as cognitive components of this multi-faceted construct (Diener et al., 2003, p. 404). Specifically, dealing with the affective side of SWB, researchers measured respondents' feelings and emotional reactions, level of happiness, affect, or moods, thereby typically capturing frequencies of individual reactions to occurrences in one's life as they take place. In the cognitive domain, SWB has been usually derived using global measures of life satisfaction, with some authors taking a more granular look at the "*fulfillment in various life domains such as marriage, work, and leisure*" (Diener, 1994; Diener et al., 2003, p. 405). Defined as a "*a global summary of one's life as a whole*" (Diener, 1994, p. p. 107, p. 107) and rooted in "*the perceived discrepancy between aspiration and achievement*" (Campbell et al., 1976, p. 8), life satisfaction occupies a prominent place in these discussions, being in some contrast to the fleeting nature of affective experiences.

With the spread and ubiquitous use of technologies, including Social Media applications*, Information Systems* researchers have also started to make advancements in the critical area of SWB (e.g. Krasnova et al., 2013). Indeed, with the overwhelming majority of teens (and adults) visiting SNSs daily or at least several times a week (Schneider et al., 2013), it will not be a surprise that the affordances provided by these emerging technologies are likely to bear an effect on the indices of life satisfaction and its affective counterparts. Summarized in Tables 1 (indices of affective SWB) and Table 2 (life satisfaction as a measure of cognitive SWB), however, state-of-the-art research has not yet arrived at the definitive conclusion regarding the directionality of the link between the use of SNSs and indices of SWB, with studies reporting both negative (e.g. Krasnova et al., 2013), positive (Apaolaza et al., 2013) and non-existing (Jelenchick et al., 2013) relationships.

Remarkably, most of these studies have been performed on the data collected from students, who might have different emotional and cognitive responses than teenagers, as they approach or undergo their puberty (see column "Mean Age" in Tables 1 and 2). A notable exception is the study by Apaolaza et al. (2013) who find that daily time spent on Tuenti may have a favorable impact on teens' life satisfaction, as it helps to boost self-esteem and reduces loneliness. Furthermore, Valkenburg et al. (2006) find that teens' life satisfaction can be enhanced as a result of a chain of causal reactions, involving CU2 use, subsequent tone of reactions and subsequent enhancement in social self-esteem. Nonetheless, while these studies may instill hope in the ultimate positive outcomes of SNS use among younger adolescents, a large number of studies with students question these findings. For example, Krasnova et al. (2013) find that FB use threatens one's self-esteem as it breeds envy, thereby undermining one's life satisfaction. Moreover, reliance on local Tuenti (Apaolaza et al., 2013) and CU2 (Valkenburg et al., 2006) networks as a basis for data collection put limits of the generalizability of these findings, when compared to such populated networks as FB or Twitter.

Source	Mean Age	Activity on SNS	Measured Activity on SNS	Outcome (Depend. Variable)	Direction of the Effect
Muise et al. (2009)	18.7	General	Time spent	SNS Jealousy	unfavorable
Utz and Beukeboom (2011)	22		Login frequency	SNS Jealousy	n.s.
				SNS Rel-p Happiness	mixed
Jelenchick et al. (2013)	18.9		Time spent	Depression	n.s.
Farahani et al. (2011)	21		Use	Anxiety	unfavorable
				Stress	unfavorable
Kross et al. (2013)	19.5		Time spent	Affect	unfavorable
Lee et al. (2011)	21.3		Time spent	Affective Balance	n.s.
Pantic et al. (2012)	18.0		Time spent	Depression	unfavorable
Rosen et al. (2013)	30.7		FB general use	Major Depression	n.s.
Davila et al. (2012)	20.2		Login frequency	Depressive Sympt-s	n.s.
			Time spent	Depressive Sympt-s	n.s.
	19.4	Tone	Positivity in interactions	Depressive Sympt-s	favorable
			Negativity of interactions	Depressive Sympt-s	unfavorable
Haferkamp and Kraemer (2011)	22.5	Passive	Exposure to attractive profile pictures	Less positive emotions	unfavorable
			Exposure to successful profile vitae	Less positive emotions	unfavorable
Utz and Beukeboom (2011)	22	Active	SNS grooming	SNS Jealousy	mixed
				SNS Rel-p Happiness	mixed
			Self-presentation	SNS Jealousy	n.s.
				SNS Rel-p Happiness	n.s.
Kim and Lee (2011)	19.6		Positive self-presentation	Subj.Happiness	favorable
			Honest self-presentation	Subj. Happiness (via Social Support)	n.s. (favorable)
Kim et al. (2013)	< 30		Self-disclosure	Happiness and Satisfaction	favorable
Davila et al. (2012)	19.4		Time interacting	Depressive Sympt-s	n.s.
Lee et al. (2011)	21.3		Self-disclosure.	Affective Balance	favorable
Locatelli et al. (2012)	18.7		Frequency of neg. posts	Depression	unfavorable
			Frequency of pos. posts	Depression	n.s.

Table 1.   Linking SNS measures to affective well-being: Overview of past research.

Overall, significant discrepancies in the conflicting outcomes reported by studies linking SNS use to indices of affective and cognitive well-being (as summarized in Table 1 and 2) can be possibly traced back to the *measurement problems* to correctly capture different markers of SNS use. First, a dominant majority of studies in this area involve recall-based self-report measures of SNS participation that can be significantly threatened by memory distortions, with respondents often being asked about the "*average daily time spent on social networking sites*" (Pantic et al., 2012, p. 91) or "*weekly SNSs usage time*" (Lee et al., 2011, p. 152). While the bias of recalling events and experiences over longer time periods can be healed through the use of the diary method (Almeida, 2005), this procedure is hardly used in SNS research, with the study by Kross et al. (2013) being a notable exception.

Source	Mean Age	Activity on SNS	Measured Activity on SNS	Outcome (Depend. Variable)	Direction of the Effect
Valenzuela et al. (2009)	20.7	General	Intensity of Use	Life Satisfaction	favorable
Kross et al. (2013)	19.5		Time spent	Life Satisfaction	unfavorable
Lee et al. (2011)	21.3		Time spent	Life Satisfaction	n.s.
Apaolaza et al. (2013)	12-17		Daily time spent	Life Satisfaction (via ↑Self-Esteem and ↓ Loneliness)	favorable
Wang (2013)	ca. 24	Active	Sharing	Life Satisfaction	favorable
Lee et al. (2011)	21.3		Self-disclosure	Life Satisfaction	favorable
Locatelli et al. (2012)	18.7		Frequency of neg. posts	Life Satisfaction	unfavorable
			Frequency of pos. posts	Life Satisfaction	n.s.
Lee et al. (2013)	26.8		Self-disclosure	Life Satisfaction (via Social Support)	n.s. (favorable)
Valkenburg et al. (2006)	14.8	Tone	Tone of feedback	Life Satisfaction (via Social Self-Esteem)	favorable
Krasnova et al. (2013)	24.3	Passive	Passive Following	Life Satisfaction	unfavorable

Table 2.   Linking SNS measures to life satisfaction: Overview of past research.

Second, as can be derived from Tables 1 and 2, a large share of studies look at the general indices of SNS participation (Jelenchick et al., 2013; Pantic et al., 2012) – thereby possibly "mixing apples with oranges": It is not unusual to measure SNS participation by asking respondents about their overall time spent using a SNS (e. g. Kross et al., 2013; Muise et al., 2009; Pantic et al., 2012), login frequency (e.g. Davila et al., 2012) or rely on general scale-based measures of intensity of FB use borrowed from Ellison et al. (2007) (e.g. Utz and Beukeboom, 2011; Valenzuela et al., 2009). Recognizing problematic consequences of aggregated measures, an array of studies attempt to cure the problem of confounded measures by singling out and testing the impact of more specific usage patterns, with studies concentrating on markers of *active* (e.g. sharing content and communicating) and *passive* participation (e.g. following information on SNS), as well as *tonality of the feedback* received on a SNS (see column "Activity on SNS" from Tables 1 and 2). While these attempts do shed light on the intricate web of links between different SNS uses and resulting consequences, most of these studies do not make an exhaustive differentiation between specific usage patterns (e.g. chatting vs. gaming on FB, reading News Feed, sharing, or commenting), but rather concentrate on a subset of these activities (e.g. Lee et al., 2011). Hence, measures for the whole range of possible FB uses do not get accounted for. Possibly as a result of these shortcomings, reported relationships and outcomes are contradictory, preventing an interested readership from building a complete picture of the influence of SNS use on indices of SWB. For example, while Kross et al. (2013) show a negative link between overall time spent on FB and users' life satisfaction, Lee et al. (2011) find this link to be insignificant.

Against this background, this study aims to close the gaps identified in previous research. Specifically, we aim to investigate the impact of the *whole range of markers* of FB participation on the global measure of SWB - *life satisfaction* - for *teen* users. FB is chosen as a focal network to enhance generalizability of our findings. Recall-based bias is minimized by relying on a diary method as an approach to data collection.

1.2   Linking Facebook Use to Users' Subjective Well-Being

While SNSs in general and FB in particular offer significant opportunities for users to engage with the platform, the functional means to do so are still limited. Overall, recent statistics suggests that users invest significant time looking at homepage / News Feed, photos and profiles of others, spending there

27%, 17% and 21% of their overall SNS time respectively. 10% of time is spent on apps and other tools offered on FB (Keath, 2012). Contributing to this data, 49% of surveyed U.S. adults have indicated "posting on the walls" as the FB activity they spent most time on, with 45% choosing News Feed and only 17% referring to games (statista.com, 2011). Furthermore, "liking" is particularly popular on FB, with a third of users using this function at least once a week according to (Barash et al., 2010).

Insights on adult use of SNSs are further complemented by teen-specific data on usage collected by (Lenhart et al., 2011), which suggests that chatting represents a major activity for teens on FB, with 88% engaging in it. Posting comments, status updates and photos / videos are next in importance, as over 80% of teen users engage in any of these behaviors. Contrary to the stereotypical notion that all teens are addicted to FB games, 50% of teens indicated to play games on Social Media Sites according to (Lenhart et al., 2011).

Building on the available data, in this study we concentrate on the dominant uses of FB by teens, as these activities have the potential to impact users' subjective well-being. On the *active* side, posting, commenting and "liking" content are chosen as markers of *public active* participation; and chatting as a measure of *private active* communication. We refrain from measuring engagement with private messages, since FB has recently merged this functionality into one "chatting" function. On the *passive* side, we measure time spent on following News Feed and information of others - *passive following*, separately capturing *tonality of feedback* users receive. Finally, time spent on *gaming* is also integrated into our study to account for this common use of SNSs by teenagers.

1.2.1   Posting and commenting

Public status updates (in the form of text or photos) and comments represent salient ways of active participation on FB, as they imply interaction to or with other community members. Extant studies suggest a positive (or at least a non-negative) relationship between indices of active participation and SWB. For example, self-disclosure was found to have a positive impact on one's level of happiness (Kim and Lee, 2011; Kim et al., 2013), affective balance (Lee et al., 2011), and life satisfaction (Lee et al., 2011; Wang, 2013). This relationship is supported by a large body of related research linking active sharing and communication with increases in emotional support, social connectedness and social capital (e.g. Kalpidou et al., 2011; Koroleva et al., 2011), which may act as mediators in the relationship between active SNS use and SWB. Beneficial effects of sharing have been confirmed also in clinical research that has demonstrated that talking about oneself results in the activation of certain brain regions that respond to intrinsically rewarding experiences (Tamir and Mitchell, 2012). This is in line with Kim and Lee (2011) who find that positive self-presentation on FB enhances perceptions of subjective happiness.Taken together, these insights hint at a positive link between SWB and such markers of active participation as posting and commenting. Hence, the following hypotheses (*H*) are proposed: *Higher levels of <u>sharing</u> (posting status updates, photos etc.) and <u>commenting</u> are associated with a greater level of <u>SWB</u> (H1 | H2).*

1.2.2   "Liking"

In contrast to public status updates and comments, "likes" represent a mixture of active participation and passive following. Indeed, even though "liking" requires an active action, giving "likes" demands significantly less involvement on behalf of the user (Koroleva et al., 2011, p., p. 9). Originally intended as a "sign of appreciation" of the content itself (Spiliotopoulos et al., 2013), "likes" steadily transform themselves into confirmations of "*I have read it*" (Bosch, 2013). For example, Barash et al. (2010) found that while FB users differentiate between entertaining and boring posts when they engage in commenting, "likes" do not depend on the type of posts. Nonetheless, despite their effortless nature, "likes" are a scarce resource, with users more likely to be "liked" than to "like" themselves (Hampton et al., 2012). "Likes" appear to be selective, with users "liking" content to support relationships with a receiver as he or she is likely to interpret them as a sign of personal predisposition

and attention. As a result, "likes" are likely to induce positive feelings in the recipient, and hence help to reinforce a positive relationship between both parties involved - an outcome which is often seen as a foundation for personal life satisfaction and happiness (Cotten, 2008). Considering these effects, we hypothesize that: *Higher level of <u>liking</u> is associated with a greater level of <u>SWB</u> (H3).*

1.2.3 Chatting

Chatting is another salient component of active participation, even though a non-public one. Motivated to kill boredom and follow the latest trend (Lenhart et al., 2013), teens readily use a chatting function, which has been recently merged with private messages functionality on FB. Considering significant time investments this activity requires, it comes as no surprise that chatting on FB was found to be a negative predictor of preparation for class for university students (Junco, 2012).

While evidence from the FB context is scarce, research on instant messaging (IM) offers a large plethora of insights, which, however, remain mixed. On the negative side, IM has been linked to social anxiety and loneliness in school (Gross et al., 2002), as well as cause addiction and decrement in academic performance (Huang and Leung, 2009). On the positive side, chatting was found to help distressed teenagers to release emotionally (Dolev-Cohen and Barak, 2012), lead to better quality of adolescents' friendships (Valkenburg and Peter, 2009), enhance mattering (Cotten, 2008) and facilitating relationship maintenance and development (Quan-Haase and Young (2010) - factors that may work to enhance one's sense of well-being (Dolev-Cohen and Barak, 2012). Overall, recognizing a mixed nature of existing research, we tentatively hypothesize that: *Higher level of <u>chatting</u> is associated with a greater level of <u>SWB</u> (H4).*

1.2.4 Passive Following

In contrast to active participation, research provides a mixed picture on the outcomes of passive following, reflected in the time users spend reading their News Feed or browsing profiles of others. On the one hand, studies single out passive following as a source of pleasurable experiences (Wise et al., 2010), informational and networking benefits with users having an opportunity to broaden their horizons (Koroleva et al., 2011), build a desired sense of connectedness and social trust (Valenzuela et al., 2009). On the other hand, research directly linking passive following with markers of SWB tells a different story. Haferkamp and Kraemer (2011) find that exposure to attractive profile pictures and successful profile vitae of others produce negative reactions, as unfavourable social comparison may cause feelings of inferiority and envy, which have been shown to have a strong negative effect on users' life satisfaction on FB (Krasnova et al., 2013). Further, jealousy feelings resulting from being able to monitor one's romantic partner on a continuous basis have been reported (Muise et al., 2009; Utz and Beukeboom, 2011). Recognizing the mixed nature of existing findings, in this study we lean towards the second stream of research and tentatively hypothesize that: *Higher level of <u>passive following</u> is associated with a lower level of <u>SWB</u> (H5).*

1.2.5 Tone of Feedback

In addition to investigating the impact of objective measures of passive following, some studies have concentrated on the tonality of feedback SNS users receive, which typically takes the form of friends' comments, wall posts, or direct chatting. This factor may be particularly salient in teenagers' environment, with a recent study revealing SNSs as a central crime scene for cyberbullying, with 16.6% of adolescents having been threatened, blackmailed, offended, teased, or humiliated online (Schneider et al., 2013). As a result of this negative feedback, episodes of depression may be triggered (Davila et al., 2012). Conversely, positive feedback appears to lead to better outcomes in terms of life satisfaction and social self-esteem, particularly for younger adolescents (Valkenburg et al., 2006). Moreover, positive attention may predispose a user to develop a stronger sense of social connectedness, which was found to be associated with lower depression and anxiety (Grieve et al.,

2013). Taken together, we hypothesize that: *Greater <u>positivity of feedback</u> is associated with a greater level of <u>SWB</u> (H6).*

1.2.6 Gaming

Finally, SNS gaming represents a separate domain of SNS participation, with scarce research reporting mixed results. Building on the affordances to leverage one's social network, many games involve a social component, which may ultimately have a positive impact on SWB. For example, research on Farmville – one of the most successful FB apps – reveals that experience of self-efficacy may follow its participation. Further, social relationships can be maintained as users group around common activities (Kinder, 2012). Nonetheless, traditional research on online gaming attributes this activity to problematic Internet use, linking it with social anxiety, decreased interpersonal relationships (Lo et al., 2005), aggression (Ko et al., 2009), depressive tendencies, lower self-esteem (Stetina et al., 2011) and decreased mattering (Cotten, 2008). In the FB context, (Junco, 2012) finds that playing games has a negative impact on engagement for students. Relying on the latter stream of research, we tentatively hypothesize that: *Greater <u>engagement in SNS gaming</u> is associated with a lower level of <u>SWB</u> (H7).*

1.2.7 Controls

Beyond control variables typical for FB studies, such as *age*, *gender* and *number of FB friends*, we additionally control for users' *self-esteem*. Indeed, numerous studies view self-esteem as one of the strongest determinants of life satisfaction, with high self-esteem having a favorable influence on individual perceptions of subjective well-being (Diener and Diener, 1995). Furthermore, the *time* users spend on the *Internet besides FB* is also controlled for, to account for other uses of the Web, such as information collection, surfing, and other activities.

2 Study Design and Analysis

2.1 Method

2.1.1 Study Design, Procedure and Sample

The study was conducted in two German schools in July 2013. Prior to the start of the study, permissions from the principals and written consent from parents of participating teenagers were obtained. To avoid bias, the study was titled in general terms: "Teenagers on Facebook". The whole study involved three stages. *First*, an initial survey was conducted in which demographic variables and level of self-esteem were elicited. In the *second* step, teenagers participated in a 7-day diary study (starting day: Monday), during which they had to report, among others, their FB and Internet usage patterns on a daily basis. To accurately capture FB and other online activities on a given day, respondents were instructed to take part in the online questionnaire shortly before going to bed. Analysis of the field data has confirmed that teens have generally complied with this requirement, with the earliest access across the study period taking place at 5:02 p.m., and the latest at 11:46 p.m. on the weekday, and at 4:45 a.m. on the weekend (median access time throughout the week equaled 9 p.m.). To link measurements of one person throughout the course of the study week while simultaneously assuring confidentiality, every respondent was assigned a personal code in the beginning of the study. At the end of the 7-day period, respondents were asked to take part in the concluding survey, where measures of life satisfaction were captured. Teenagers who participated for at least six days received a €15 gift coupon as a reward for their efforts. 94 teenagers initially took part in the study. In further analyses, however, only 80 adolescents who used FB for at least three days during the period of investigation were included. Teenagers in our net sample were aged between 13 and 16 years (mean=14.9, median=15, SD=0.7). Female FB users were overrepresented with 62.5% of all participants. FB use ranged from three to seven days (mean=6.0, median=6.5, SD=1.2) during a study week. Number of FB friends was between 10 and 833 (mean=193.5, median=190, SD=131.0).

2.1.2   Measures

The study included three types of instruments assessing (1) overall and granular measures of FB use as well as the overall Internet use (see Table 3), (2) psychological constructs of emotional evaluation of one's self-esteem and well-being as well as (3) demographic variables. All questions were initially formulated in English and then carefully translated into German. When available, pre-tested translation was used.

Specifically, to assess the *passive component* of FB use, 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*. Time spent *chatting* on FB, FB *gaming* as well as *overall time spent on FB* were assessed in the same way. As a control variable overall *time spent on the Internet* apart from FB was also elicited. Evidently, participation measurements gained in that way is far more reliable than the typical recall-based questions on how much time was spend on a SNS in general or over the last weeks. *Posting*, *commenting* and "*liking*" behavior was measured daily with one question for each activity: "*How many posts / comments / likes did you make today?*" Further, respondents were daily asked whether they obtained any feedback from others, and if so, *tone of feedback* was elicited with the following question: "*Overall, the sentiment of feedback I received was...*" with answer options ranging from *1=very unfriendly; 2=unfriendly, 3=neither friendly nor unfriendly, 4=friendly* and *5=very friendly.*

Self-esteem was measured on the first day of the survey using a well-known measure from Rosenberg (1965) with a 5-point Likert scale. An exemplary item was: "*I feel that I have a number of good qualities.*" A revised German version from von Collani and Herzberg (2003) was used for translation. Cronbach's alpha was appropriate reaching .75 (Nunnally, 1978). Mean across construct items reached 3.1 (median=3.3; SD=0.7). To capture SWB, *Satisfaction with Life* was measured on the last day of the study with the well-established scale from Diener et al. (1985) on a 5-point Likert scale. An exemplary item is: "*In most ways, my life is close to my ideal.*" Satisfaction with Life as a dependent variable was chosen above affect-based measures of SWB, since it reflects "*a global summary of one's life as a whole*" (Diener, 1994, p. p. 107, p. 107), and hence represents a more comprehensive measure of this construct. Cronbach's alpha reached .86, which is above the required threshold of 0.7 recommended by Nunnally (1978). Mean across construct items reached 3.5 (median=3.5; SD=0.9).

2.2   Results

2.2.1   Descriptive Analysis

Descriptive analysis for variables measuring FB and Internet use is presented in Table 3. We find that users rarely resort to such active uses of FB as posting and commenting. Thus, only 55% and 25% of respondents commented or posted something in the course of the study respectively. Among those who did, the frequency of these activities was not high with 50.2% and 60% leaving at most two comments and posts respectively in the week of the study. In contrast, "liking" is common among teenagers in our sample, with teens giving 2.3 "likes" per day on average. Overall, an overwhelming majority of teens did "like" something in the course of the study, with only 9 teens not engaging in this activity. Moreover, 45% of "likers" left 10 or more "likes" in the course of the week. This is in sharp contrast to posts and comments, with only 20 and 44 users engaging in these activities at least once respectively (see column "*# of non-users / users*" in Table 3). While public active participation was relatively rare, private communication using the chat functionality was ubiquitous, with most time on FB spent on it: Specifically, 42.7 minutes per day on average was invested into this activity. The magnitude of time spent on chatting was followed by time spent on browsing the News Feed and profiles of others – *passive following,* with an average time of 27.0 minutes per day. FB *gaming* was extremely rare, and was subsequently excluded from the regression model, since a very low share of respondents joined gaming applications in the course of the study (just 13.7%), in most cases investing little time into this activity. Only 2 respondents were "heavy" gamers, each spending 120 and 340

minutes on FB games during the whole week. This is in line with Nazir et al. (2008) and Lenhart el el. (2011) who argue that a limited fraction of FB users account for this activity. In terms of *tone of feedback* received, 35% of respondents described the feedback they obtained in the course of the study as *neither friendly nor unfriendly*, *friendly* or *very friendly*, with only 6 respondents selecting a *neither friendly nor unfriendly* category. Interestingly, none of the respondents indicated receiving unfriendly comments or Wall posts, suggesting that feedback teens receive is overwhelmingly positive. Besides FB, participating teens were using the Internet for 46.5 minutes per day on average.

Measure	Variable	Mean	Median	SD	Min	Max	# of non-users / users	Variable group
How many posts/comments /likes did you make today?	Number of… **per week** (measured on a daily basis)							
	Posts	0.7	0.0	1.6	0	8	60 / 20	FB activity (model 1)
	Comments	3.6	1.0	7.8	0	45	36 / 44	
	"Likes"	15.8	7.0	32.9	0	254	9 / 71	
How much time did you spent on … today (on FB)?	Time spent per day: (in minutes ¦ 7 days as a basis) (measured on a daily basis)							
	… chatting on FB	42.7	17.1	82.6	0	570.0	3 / 77	
	… on the FB News Feed	27.0	16.1	30.9	0	177.9	3 / 77	
	… gaming on FB	1.1	0	5.9	0	48.6	69 / 11	
	…on the Internet	46.5	29.3	51.4	0	199.3	5 / 75	Control
How much time did you spent today on FB?	Time spent **per day**: (in minutes 7 days as a basis) (measured on a daily basis)							
	Time spent on FB	88.8	48.9	130.8	1.0	351.4	0 / 80	FB use (ad hoc model 2)

Table 3.   Descriptive statistics for FB and Internet use variables.

2.2.2   Hypothesis Testing

For the subsequent analysis, overall time in *minutes* for the whole week was calculated for every participant for *chatting*, *passive following* and *time spent on the Internet* variables. Considering a low number of *posts* and *comments* per person, these variables were entered as dummies into the regression model (0=no posts/comments made throughout the week; 1=at least one post/comment made). Since *"likes"* were more common, their absolute values per week (sum across all days) were entered. Further, since respondents reported receiving only positive or neutral feedback, the scores for the *tone of feedback* were recoded into a new variable *positivity of feedback*, with 0=*no feedback*; 1=*neither unfriendly nor friendly*, 2=*friendly*, 3=*very friendly* feedback. 11 times respondents indicated to have received feedback (comments or Wall posts from others), but did not provide assessment of its sentiment. Such responses were assigned into the "0" category. Finally, mean values for items were calculated and aggregated at a construct level to derive scores for *self-esteem* and *life satisfaction*.

A two-step hierarchical multiple regression model was used to test the hypotheses: H1-H6, with *life satisfaction (SWB)* as a dependent variable. In the first step, control variables *age*, *gender*, *number of FB friends*, *self-esteem* scores and average *time spent on the Internet (besides FB)* were entered into the model for factoring out their effects. In the second step, the predictor variables were added simultaneously including *posting*, *commenting*, *liking*, *chatting*, *passive following* and *positive feedback*. Absence of multicollinearity among independent variables was assured, since the maximum variance inflation factor (VIF) was 1.96, which is below the threshold of 2 (Miles and Shevlin, 2001). Table 4 presents the regression results for hypotheses H1 to H6 (in column labeled *model 1*). Significant beta weights are highlighted in bold and asterisked.

Step	Predictors	Model 1[1]			H	Result	Ad Hoc Model 2	
		ß	t value	VIF			ß	t value
1	Age	0.03	0.27	1.12				
	Gender	-0.04	-0.32	1.12				
	# FB friends	-0.09	-0.86	1.11				
	Self-esteem	**0.48**	**4.51****	1.11				
	Time spent on Internet	-0.09	-0.88	1.11				
		F = 4.99**						
		adjusted R² = 20.2%						
2	Age	0.08	0.70	1.32			0.03	0.24
	Gender	-0.05	-0.42	1.38			-0.02	-0.16
	# FB friends	-0.16	-1.50	1.29			-0.08	-0.29
	Self-esteem	**0.45**	**4.30****	1.20			**0.48**	**4.48****
	Time spent on Internet	-0.13	-1.12	1.46			-0.12	-1.05
	Posting (dummy)	**0.25**	**2.25***	1.30	H1	supported	-	-
	Commenting (dummy)	-0.03	-0.23	1.28	H2	rejected	-	-
	Liking	0.14	1.21	1.38	H3	rejected	-	-
	Chatting	**0.30**	**2.25***	1.96	H4	supported	-	-
	Passive Following	**-0.27**	**-2.21***	1.58	H5	supported	-	-
	Positivity of Feedback	-0.14	-1.16	1.68	H6	rejected	-	-
	Time spent on FB	-	-	1.22			0.09	0.83
		F = 3.77**					F = 4.25**	
		R² change = 7.6%					R² change = -0.4%	
		adj. R² = 27.8%					adj. R² = 19.8%	

Table 4.   Results of Hierarchical Regressions with Life Satisfaction (SWB) as Dependent Variable. *p<0.05   ** p <0.01.

In line with past research (Diener and Diener, 1995), *self-esteem* turned out to be the only control variable leading to a significant increase in *life satisfaction (SWB)* (ß = 0.48, p<0.01). This relationship is confirmed in multiple studies for Western societies as feeling good about oneself is an integral property in individualistic cultures (e.g. Campbell, 1981; Diener and Diener, 1995). With the only significant predictor, the model in step 1 explains 20.2 % of variance (F (5,74) = 4.99, p<0.01) in *life satisfaction*, confirming *self-esteem* as a salient determinant of *SWB* (Campbell, 1981).

Following results of step 2, we find that such *active* forms of SNS participation as *posting* (ß = 0.25, p<0.05) and *chatting* (ß = 0.30, p <0.05) may work to enhance *life satisfaction (SWB)*, which supports hypotheses H1 and H4. However, activities such as *commenting* (ß = -0.03, p>0.05) and *liking* (ß = 0.14, p>0.05) exert no significant impact, leading us to reject hypotheses H2 and H3.

Our data confirm a negative impact of *passive following* on users' *life satisfaction* (SWB) (H5: ß = -0.27, p<0.05). This result is particularly intriguing in the absence of the significant effect of *time spent on the Internet* (ß = -0.09, p>0.05) – an activity that is also often of passive nature (e.g. reading news, searching for information). Together, these findings suggest that users do distinguish between social and non-social information, as they have a differential impact on their well-being. In an attempt to explain this phenomenon, past research has linked properties of social information to such unfavorable outcomes as envy (Krasnova et al., 2013), social overload (Maier et al., 2012) or jealousy (Muise et al., 2009), which may possibly provide rationale for these disparate effects.

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1 Since FB gaming was dropped from the analysis, hypothesis 7 (H7) could not be tested within this study.

Interestingly, greater *positivity of feedback* was not associated with a greater level of *life satisfaction (SWB)* (ß = -0.14, p>0.05). A possible explanation for this surprising result could be the low frequency of comments respondents receive as well as the absence of negative comments. It seems that teen users do not attribute such great relevancy to this type of feedback, as long as it stays positive.

Together, FB variables added 7.6% of unique variance to the model beyond the predictive power of *self-esteem* leading to an overall adjusted R^2 of 27.8% (F (11,68) = 3.77, p<0.01).

2.2.3   Testing the Impact of General Facebook Use: Ad Hoc Model 2

To compare our model to more "traditional" measurement methods, we additionally evaluated an *ad hoc model 2* (see Table 4). Specifically, in the second step we added just one variable aggregating FB use - the overall *time spent on FB*. Interestingly, the predictor variable did not show any significant effect (ß = 0.09, p>0.05) on *life satisfaction (SWB)*. Summarizing such different activities as posting content on FB, chatting with friends as well as browsing the News Feed within one variable possibly equilibrated the positive effects of active participation and negative impact of passive following found in our study. This result provides explanation for the frequently non-significant link reported in previous studies (Tables 1 and 2) and calls for caution when measuring Social Media use using general measures. This call is supported by the study of Koroleva et al. (2011) who advocate the differential treatment of participation variable to better understand the causal structure of the resulting outcomes.

3   Discussion

The purpose of this study was to gain a better understanding into the impact of FB use on teenagers' well-being. To obtain a more concrete picture and address weaknesses of prior research, different uses of FB were considered and captured using a diary method to minimize the recall bias. This procedure is hardly used in SNS research certainly forming an advantage of our study. Differentiating between specific uses of FB has helped us to avoid the "aggregation" bias, while simultaneously disentangling the crisscrossing effects of various activities on users' life satisfaction.

Based on our analysis, we show that the type of FB activity does matter. Specifically, we confirm that such active uses of FB as *posting* and *chatting* are positively associated with subjective well-being in young adolescents. Thus, following the logic of our hypotheses we are able to show that just talking about oneself to a large audience of FB friends can help users advance their life satisfaction (Tamir and Mitchell, 2012). Simultaneously, easy access to instant communication via a *chatting* function promotes teens' well-being as it may help them release stress and obtain emotional support (Quan-Haase and Young, 2010; Valkenburg and Peter, 2009).

To our surprise, *commenting* is not associated with increases in individual life satisfaction. In contrast to *posting*, which is often self-promoting and narcissistic in nature (Hum et al., 2011; Peluchette and Karl, 2009), *commenting* is typically less self-centered, with a commenter often expressing his or her opinion on a given subject of discussion. As a result, the self-promoting element of communication - often associated with a positive affect (Gonzales and Hancock, 2011) - is missing. Moreover, *commenting* is in most cases asynchronous, with network participants rarely engaging in a simultaneous dialogue with each other. Hence, possibilities for immediate emotional support and problem-solving are limited. Just as *commenting*, "*liking*" was also found to exert no significant effect on individual well-being. This outcome indirectly corroborates the view that "*liking*" is rather located between a passive and an active uses of FB, increasingly signifying "*I hear you*" (Bosch, 2013), rather than a sincere desire to initiate a meaningful dialogue.

Corroborating previous research efforts (e.g. Haferkamp and Kraemer, 2011; Krasnova et al., 2013), we find that *passive following* of the News Feed as well as looking through the profiles of others decreases teenagers' life satisfaction. So far, extant research provides a number of competing explanations for this outcome. Krasnova et al. (2013) suggest that particular qualities of the FB

context promote narcissistic nature of sharing, which in turn triggers social comparison and envy. Maier et al. (2012) demonstrate that continuous requests for help coming from FB "friends" may promote the feelings of social overload leading to emotional exhaustion. An alternative explanation is offered by Koroleva et al. (2010), who find that information overload on the News Feed may induce irritation and frustration with SNSs. Further, jealousy feelings should not be disregarded in the SNS context, as romantic partners are able to intentionally or unintentionally monitor each other on the network (Muise et al., 2009; Utz and Beukeboom, 2011). Finally, since *passive following* is time-consuming, users may later regret this activity as they possibly face worse performance in school (Ahn, 2011). Overall, since browsing the News Feed and looking through the profiles of others is one of the favorite pastime activities of teenage users on FB, capturing nearly half of the overall time spent on FB in our sample, this result should be alarming for all stakeholders involved.

Astonishingly, *positivity of feedback* did not have any effect on the well-being of teens in our sample. Generally, respondents received feedback from others relatively rarely (since posting and commenting are by themselves rare activities among teens), which may provide an explanation for the absence of the link between receiving a positive feedback and life satisfaction. Overall, however, the absence of negative comments in teens' communication is encouraging, suggesting that public efforts to fight cyberbullying and prevent problematic social media use might bear their fruits – at least in our sample.

Taken together, our results shed light on the contentious findings of past research by showing the effects of SNS usage patterns on participants' well-being. We find that activity matters, with the possibility of both, harmful and positive outcomes. Investigating diverse SNS activities within one study and examining their influence on users' life satisfaction contributes to a better understanding of the "Facebook" phenomenon capturing the majority of the young population in the Western world.

Implications for SNS providers are complex. On the one hand, motivating their younger customers to active participation not only enriches user-generated content, but also favorably affects their lives. On the other hand, blindly advising adolescents, parents and policy-makers to encourage (particularly public) active SNS use would truly be a grave faux pas considering manifold threats to users' privacy prevalent in an SNS environment. Indeed, in the current situation, users have to carefully weigh benefits of active participation against the potential risks to their privacy. Considering the complex nature of this calculus, it is no surprise that many teens are leaving FB to engage with alternative platforms, such as Snapchat (Bosker 2013), that have a similar potential to promote their well-being, while providing protection to their identity. In the view of these challenges, FB, as a major SNS, is urged to lobby international laws protecting privacy of users' information, assuring individual control over personal data as well as clear rules for all stakeholders. These measures are desperately required to stabilize the market share of SNSs among a survival-critical teen user segment in a crowded social environment.

This study has several limitations, which, however, provide fruitful venues for future research endeavors. First, our study has a limited sample size. However, by ruling out serious recall problems using a diary method, data quality is reliable. Due to the low use of *FB gaming* in the sample, we were not able to test our respective hypothesis leaving the answer for future investigation. Furthermore, subjective well-being was operationalized using the life satisfaction scale by Diener et al. (1985). We leave the assessment of the relationship between Facebook usage patterns and affective components of SWB for future research. Additionally, follow-up research should also investigate the role of possible mediators to enrich our basic model. Finally, qualitative approaches can be used to gain richer findings into the underlying dynamics.

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