Computers in Human Behavior 55 (2016) 888–897

Contents lists available at ScienceDirect

Computers in Human Behavior

journal homepage: www.elsevier.com/locate/comphumbeh

Full length article

Need fulfillment and experiences on social media: A case on Facebook and WhatsApp

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ARTICLE INFO

Article history:
Received 23 February 2015
Received in revised form
13 October 2015
Accepted 15 October 2015
Available online xxx

Keywords:
Human needs
User experience
Facebook
WhatsApp

ABSTRACT

With an increasing inflow and outflow of users from social media, understanding the factors the drive their adoption becomes even more pressing. This paper reports on a study with 494 users of *Facebook* and *WhatsApp*. Different from traditional uses & gratifications studies that probe into typical uses of social media, we sampled users' single *recent*, *outstanding* (either satisfying or unsatisfying) experiences, based on a contemporary theoretical and methodological framework of 10 universal human needs. Using quantitative and qualitative analyses, we found WhatsApp to unlock new opportunities for intimate communications, Facebook to be characterized by primarily non-social uses, and both media to be powerful lifelogging tools. Unsatisfying experiences were primarily rooted in the tools' breach of offline social norms, as well in content fatigue and exposure to undesirable content in the case of Facebook. We discuss the implications of the findings for the design of social media.

1. Introduction

As social media have diffused widely in society, with estimates of nearly one in four people worldwide using them (eMarketer, 2013), researchers have opted to understand the human experiences they mediate, and the factors that drive their widespread use (*e.g.*, Burke, Marlow, & Lento, 2010; Ellison, Steinfield, & Lampe, 2007; Hart, Ridley, Taher, Sas, & Dix, 2008; Joinson, 2008).

This is increasingly important as we witness users' migrating across communities while we lack a clear understanding of the reasons that drive those transitions. Facebook, ranked as the most successful online community, and the 2nd most visited website[1] globally (consulted in January 2014), has recently seen an outflow of users with increasing reports of negative experiences resulting from its use, especially among teenagers (Rainie, Smith, & Duggan, 2013; Time, 2004). At the same time new social media, such as *WhatsApp*, have seen a dramatic growth, with reports suggesting an increase of up to 1 million users per day, reaching a number of 600 million users in 2014 with a daily engagement higher than the industry standard (Forbes, 2014).

Facebook and WhatsApp do not necessarily compete, and in fact, researchers have argued that users adopt a wide range of tools on a daily basis (Quan-Haase & Young, 2010). Yet, while they offer very similar functionality – with Facebook, for instance adopting rich instant messaging features present in WhatsApp – anecdotal evidence, and as our findings confirm, the two tools afford different social practices, which then lead to different user experiences with the same functionality. For instance, Facebook's better support for multitasking affords asynchronous communication practices, while in WhatsApp's restricted environment users experience a heightened sense of presence in the communication. Through the study of these two similar, yet different social media, we aim to shed some light into how the use and experience with social media is co-constructed by the functionality the tools offer and the social practices users establish.

Prior work has found Facebook to satisfy a wide range of needs, from keeping up with old and making new friends (Ellison et al., 2007; Joinson, 2008; Raacke & Bonds-Raacke, 2008), to acquiring information about events or individuals through surveillance and social browsing (Dunne, Lawlor, & Rowley, 2010; Joinson, 2008; Urista, Dong, & Day, 2009) and leveraging individuals' self-esteem through the portrayal of their ideal image (Dunne et al., 2010). Recent work on WhatsApp and other instant messaging applications has found such services to support a more intimate and private way for members to communicate with friends, better fulfilling the fundamental need for *relatedness*. The majority of this research has taken a 'uses and gratifications' approach (U&G, see

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[1] www.alexa.com web information service (traffic ratings).

http://dx.doi.org/10.1016/j.chb.2015.10.015
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Joinson, 2008) where individuals are surveyed about their typical uses and reflect on the needs these uses address. Qualitative content analyses then identify the most salient needs users seek to satisfy through their use of the particular media.

In this paper we take an alternative approach to the study of the needs that social media satisfy, relying on a theoretical framework and methodological approach proposed by Sheldon, Elliot, Kim, and Kasser (2001). This makes our study different from U&G studies in two ways.

First, rather than deducing needs from participants' qualitative accounts, we employ a validated framework of 10 universal human needs, such as the need for *relatedness*, *competence* and *popularity* (Sheldon et al., 2001). This enables the quantitative study of need fulfillment in users' experiences with social media and the impact this has on individuals' behaviors – in terms of their intensity of use.

Second, rather that focusing on typical use, Sheldon et al. (2001) approach asks from participants to focus on a *single recent memorable (positive or negative) experience*. This has a number of implications. First, it minimizes recall and selection biases as, when people recall recent concrete episodes, they are more likely to tap into episodic memories and introspect on the "felt experience" (McCarthy & Wright, 2004) rather than report on what is considered to be a typical use of social media (see Schwarz et al., 2009 for a review of affective memory). Second, by focusing on the memorable rather than the typical, it samples a distinct aspect of our experience with social media. While much of our attitude towards social media may be shaped by our day-to-day use, outstanding, memorable experiences may as well be shaping our attitudes in ways we haven't yet understood. Focusing on such outstanding experiences may provide a new perspective to the inquiry of users' experiences with and need fulfillment through social media.

All in all, this paper makes two contributions to the study of social media. First, through taking a novel methodological approach, it asks what makes for *memorable*, rather than typical, experiences with social media. Second, through inquiring into the differences in the adoption and use of similar functionality offered by Facebook and WhatsApp, it sheds some light into how subtle differences in the design of social media features, afford the creation of different social practices by users, which in turn results to different communication experiences.

2. Background

Need theories have been a long-standing topic in psychology and have also recently played a central role in understanding users' experiences with technology. In this section we review prior work on two theories: 1) uses & gratification, a communication theory that has recently been employed in understanding users' experiences with social media, and 2) a model of 10 universal human needs that is used as a methodological lens in our study.

2.1. Uses and gratifications theory

Uses & Gratification Theory (U&G) is an approach to understanding why and how people actively seek out specific media to satisfy specific needs (Severin & Tankard, 1997). U&G studies typically ask participants to self-report on their typical uses of the media and the gratifications they derive from them.

2.1.1. Facebook studies

U&G theory has been applied across a wide range of media. More recently, researchers have successfully employed the U&G theory in their attempt to understand the gratifications users derive from their use of Facebook. Typical benefits users acquire from Facebook tap to their needs for relatedness and social interactions, through supporting relationship maintenance and "staying connected" (Dunne et al., 2010), as well as making new connections (Raacke & Bonds-Raacke, 2008). Next to social needs, Facebook has been found to provide content gratification and is commonly used as a source of information either to search and learn about events (Dunne et al., 2010; Raacke & Bonds-Raacke, 2008), or even to acquire and track information on members through surveillance and social surfing (Joinson, 2008; Urista et al., 2009). Other studies have highlighted a wider range of gratification, tapping to individuals need for pleasure, escapism and the alleviation of boredom (Dunne et al., 2010) as well as to satisfy their self-esteem trough the portrayal of their ideal image. (Dunne et al., 2010; Urista et al., 2009).

2.1.2. Instant messaging studies

Using the same perspective, Quan-Haase and Young (2010) compared Facebook to Instant Message (IM) applications with respect to the extent to which they fulfill different user needs. Their study suggests a similar gratification profile for both media with similar uses and fulfilling similar communication, sociability and pleasure/stimulation needs. Yet, they noted that the key distinctions between Facebook and IM were brought by from their use. For instance, while IM requires social interaction among its users to acquire social information, Facebook broadcasts such information to its entire network. Furthermore, IM's near-synchronous and private communication channels provides their users the ability to engage in more intimate communication, emulating in-person conversations, allowing for intimacy and a sense of connection, whereas Facebook tends to support the exchange of short messages.

Church and de Oliveira (2013) further studied the factors that influence the acceptance, usage and growing popularity of WhatsApp. Similar to Quan-Haase and Young (2010), they found social influence to be one of the main reasons for the adoption of WhatsApp, and remarked that the nature and the intent of WhatsApp supports social, informal and conversational communications which lead to high frequency of use.

2.2. Sheldon's framework of human needs

Sheldon et al. (2001) aimed at deriving a list of universal human needs. Starting from Ryan and Deci (2000) Self-Determination Theory and the "big three": autonomy, relatedness and competence, they elaborated to a more fine grained list and proposed a list of 10 universal human needs, using two criteria. First, needs should be salient within individuals' most satisfying experiences. Second, their fulfillment should promote psychological thriving, as measured through the experiencing of positive affect.

The 10 needs they derived were: *autonomy,* or feeling like one is the cause of her own actions rather than feeling that external forces or pressure are the cause of her action, *competence,* or feeling that one is very capable and effective in her own actions rather than feeling incompetent or ineffective, *relatedness,* or feeling that one has regular intimate contact with people who cares about her rather than feeling lonely and uncared of, *self-esteem,* feeling that one is a worthy person who is as good as anyone else rather than feeling like a 'loser', *self-actualized meaning,* or feeling that one is developing her best potentials and making life meaningful rather than feeling stagnant and that life does not have much meaning, *physical thriving,* or feeling that one's body is healthy and well-taken care of rather than feeling out of shape and unhealthy, *pleasure-stimulation,* getting plenty of enjoyment and pleasure rather than feeling bored and understimulated by life, *security*, or feeling safe and in control of one's life rather than feeling uncertain

and threatened by her circumstance, *popularity*, or feeling that one is liked, respected, and has influence over others rather than feeling like a person whose advice or opinion nobody is interested in, and *money-luxury*, or feeling that one has plenty of money to buy most of what one wants rather than feeling like a poor person who has no nice possessions.

Along with the theory, Sheldon et al. (2001) propose a methodological framework that asks participants to recall and narrate a *recent*, *outstanding* experience, *satisfying* or *unsatisfying*, and employs a validated questionnaire that measures need fulfillment for each of the 10 needs, during this recalled experience. Sheldon et al. (2001) theory has recently been used within HCI. For instance, Hassenzahl, Diefenbach, and Göritz (2010) posited that users' experiences with technology can be understood based on the primary needs they fulfill. Using Sheldon's human needs framework, they convincingly showed that need fulfillment is linked with positive experiences with technology and correlates with users' perceptions and evaluative judgments on interactive products. Later work has further expanded these insights and understanding. For instance, Tuch, Trusell, and Hornbæk (2013) analyzed the content of users' positive and negative experiences with technology as a function of need fulfillment and deprivation, while Karapanos, Gouveia, Hassenzahl, and Forlizzi (2015) employed Sheldon's framework in understanding users' positive experiences with physical activity trackers, devices that measure people's physical activity and attempt to empower them in order to walk or exercise more. Other work has further expanded to other constructs, such as the context of use (*e.g.*, Partala, T., & Kallinen, 2012) or new technology domains and user populations (Saarinen, Partala, & Väänänen-Vainio-Mattila, 2013).

3. Study

The current study aimed to understand users' behaviors and experiences on social media. We selected Facebook and WhatsApp due to their widespread use and partly overlapping functionality, yet different character, thus making it likely to uncover different social practices and need fulfillment profiles among the two media.

3.1. Recruitment

Participants were recruited to an online survey through Amazon Mechanical Turk and offered $1.5USD for their effort. Participants were randomly assigned to *Facebook* or *WhatsApp* and to one of two conditions – reporting either a *satisfying* or *unsatisfying* experience.

While Mechanical Turk allowed us to efficiently target a large and diverse audience, thus sampling heterogeneous experiences with social media, it posed challenges regarding the validity of elicited data (see Kittur, Chi, & Suh, 2008). The nature of our survey, however, asking for rich and personal accounts on the use of social media, allowed the easy detection of fake responses. Responses that made little sense, were too brief, or were repeated in our dataset were removed, leaving a total of 494 responses.

3.2. Participants

A total of 494 participants completed successfully the study (*Facebook*: N = 240, 129 male, 111 female, Median age = 30 y, WhatsApp: N = 254, 166 male, 88 female, Median age = 27 y). The majority of participants (64%) reporting on Facebook had used the tool for over four years, while most reporting on WhatsApp had used the tool for less than two years (74%). Over 60% of our participants had a US nationality, 30% Indian, and less than 10% had a nationality of a third country.

3.3. Reporting a memorable experience

Following Sheldon et al. (2001) methodology (see also Hassenzahl et al., 2010) for an application within HCI), we asked participants to recall and narrate a recent outstanding experience they had with the tool (satisfying or unsatisfying), and to describe its context (i.e., how and when this happened, how they felt and what made this event particularly satisfying or unsatisfying for them). Participants were instructed to "take a couple minutes to be sure to come up with a personal meaningful experience and retell the event as accurately and detailed as [they] remember".

3.4. Need fulfillment

For each reported experience, we asked participants to rate the experienced fulfillment of six needs (competence, relatedness, pleasure, security, self-esteem and popularity) using a questionnaire we adapted from Sheldon et al. (2001). Physical thriving was excluded due to its low relevance to the context. Luxury was excluded due to its marginal significance even in the studies of Sheldon et al. (2001); autonomy and meaning were excluded as they could be understood rather as an outcome of need fulfillment than a need in itself. Each need was captured with three items (18 in total). Participants responded on five-point scales: "very slightly or not at all", "a little", "moderately", "quite a bit", and "extremely". Internal reliability for all scales was satisfactory (see Table 1, diagonal). Table 1 further shows the interscale correlations. While in many cases substantial (average interscale correlation = 0.41), they are always below the internal consistency.

3.5. Intensity of use

Participants' intensity of use of Facebook and WhatsApp was measured through a reduced version of Ellison et al. (2007) Facebook Intensity Scale, using the following four items: "X is part of my everyday activity", "I am proud to tell people I'm on X", "X has become part of my daily routine", and "I would be very sorry if X shut down". The remaining items of the original scale were excluded as they did not apply or might lead to different interpretations on Facebook and WhatsApp. Internal reliability of the adapted scale was good for Facebook (Cronbach's $\alpha = .87$) and excellent for WhatsApp ($\alpha = .92$).

4. Data analysis

Participants submitted a total of 494 experience narratives (each participant submitting one narrative) with an average length of 70 words (median = 69, SD = 33). We submitted those narratives to a traditional qualitative content analysis using open and axial coding techniques (Adams, Lunt, & Cairns, 2008), with the goal of understanding the social practices (Reckwitz, 2002) that surrounded the use of the two social media tools and the experiences these practices mediated on users.

All in all, the analysis resulted to a total of 120 code categories, 69 of which referred to social practices established around the two tools, such as the *collective recording of an unfolding event*, *content crafting with the goal of inducing a desired experience on the recipient*, or *the sharing of a stream of memos to make others feel present in an event*, 20 referred to features of the tools that afforded certain social practices, such as *voice messages* that enabled rich, emotional or evocative communications, or the environment of the tool that afforded *single or multi-tasking*, 20 referred to the resulting user experiences, such as the feeling of being there, feeling of group belonging, feeling of connectedness or emotional spontaneity, and 14 referring to the context of communication or use of social media

Table 1
The six need categories used from Sheldon et al. (2001) along with their description, interscale correlations and internal reliability (diagonal).

Need	Description	Com.	Rel.	Plea.	Sec.	Self.	Pop.
Competence	Feeling that you are very capable and effective in your actions rather than feeling incompetent or ineffective	(0.84)					
Relatedness	Feeling that you have regular intimate contact with people who care about you rather than feeling lonely and uncared of	0.29	(0.91)				
Pleasure	Feeling that you get plenty of enjoyment and pleasure rather than feeling bored and understimulated by life	0.47	0.44	(0.87)			
Security	Feeling safe and in control of your life rather than feeling uncertain and threatened by your circumstance	0.28	0.37	0.33	(0.81)		
Self-esteem	Feeling that you are a worthy person who is as good as anyone else rather than feeling like a "loser"	0.36	0.13	0.35	0.50	(0.93)	
Popularity	Feeling that you are liked, respected, and have influence over others rather than feeling like a person whose advice or opinion nobody is interested in	0.30	0.71	0.37	0.54	0.40	(0.89)

such as a *significant life event*, *being abroad or at a hospital*, and *coordination within dual-income families*.

In the course of this analysis, we created a total of 120 memos where we elaborated on our interpretations of the data. In addition, we examined participants' ratings for each reported experience with respect to the saliency of each of the six needs. Themes of experiences, social practices and social media features emerged in the course of the analysis in an iterative fashion, which were later summarized into four categories of satisfying for WhatsApp (loosing track of time with intimate communications, crafting communication experiences, being there, and lifelogging), five categories of satisfying experiences with (a stage for self-expression, social surveillance, to find and to be found, social capital and interactions with like-minded people, and lifelogging), four categories of unsatisfying experiences with WhatsApp (changing the norms in real-time communications, exposing personal content to wrong addressee, unsolicited group participation, and monitoring other people) and four categories of unsatisfying experiences with Facebook (content fatigue, surveillance, unfriending, and untagging).

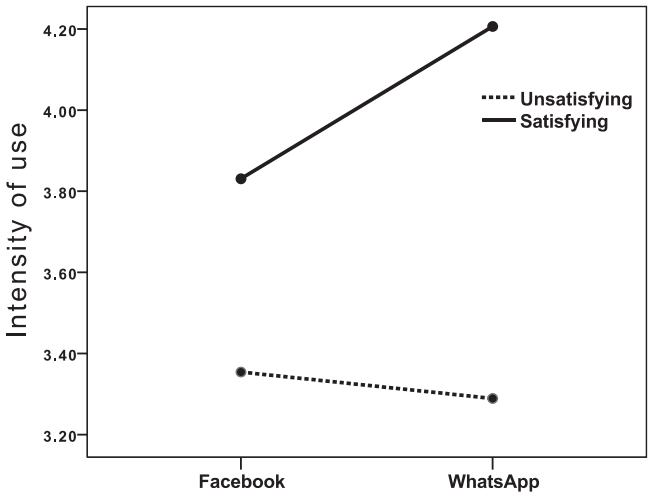

Fig. 1. Self-reported intensity of use for Facebook and WhatsApp, for the two conditions of the study.

5. Findings

A one-way ANOVA with *intensity of use* as the dependent variable and *tool* (Facebook vs WhatsApp) and *condition* (reporting on satisfying versus unsatisfying experiences) revealed no significant main effect for tool, $F(1,478) = 3.0$, $p = .08$, $h_p^2 = .11$, but a significant effect for condition, $F(1,478) = 60$, $p < .001$, $h_p^2 = .11$, and a significant interaction between condition and tool, $F(1,478) = 6$, $p < .01$, $h_p^2 = .01$.

Overall, while a significant difference was found in the self-reported intensity of use of WhatsApp and Facebook for people reporting satisfying experiences, with WhatsApp users' reporting higher intensity of use, no significant difference was found in the intensity of use of the two tools amongst people reporting unsatisfying experiences (see Fig. 1). In the next sections we analyze satisfying and unsatisfying experiences separately and attempt to understand the needs these the two tools fulfill.

5.1. Satisfying experiences

Fig. 2 displays the experienced need fulfillment in participants' reported satisfying experiences. While both Facebook and WhatsApp exhibit a similar profile with relatedness and self-esteem being the most fulfilled needs, significant differences are found between the two tools with respect to two needs: *relatedness*, WA: mean = 4.3, SD = 0.8, FB: mean = 4.0, SD = 1.0, $t(246) = 2.2$, $p < .05$, and *popularity*, WA: mean = 3.5, SD = 1.1, FB: mean = 3.2, SD = 1.2, $t(246) = 2.3$, $p < .05$.

Multiple regression analyses were used to test which, if any, of the needs significantly predicted participants' self-reported intensity of use. For WhatsApp, *relatedness* was the single significant predictor of intensity of use (β=.56, $p < .001$), explaining 11% of the variance ($R^2 = .15$, $F(6,121) = 3.7$, $p < .01$). For Facebook, *self-esteem* was the single significant predictor of intensity of use (β=.31, $p < .001$), explaining 12% of the variance ($R^2 = .17$, $F(6,110) = 3.7$, $p < .01$).

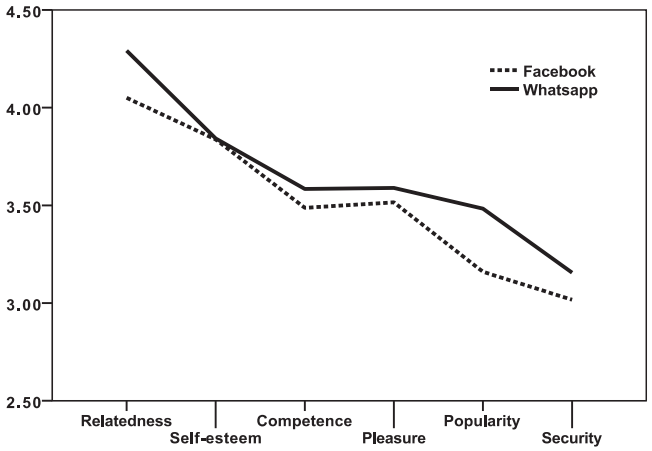

Fig. 2. Need fulfillment for Facebook and WhatsApp among participants reporting satisfying experiences.

These results highlight the different nature and social needs Facebook and WhatsApp fulfill. In the next two sections we perform a qualitative analysis of participants' experience reports with the goal of understanding the social practices that surround the use of these tools and the experiences these mediate.

5.2. Satisfying experiences with WhatsApp

Overall we found users' satisfying experiences with WhatsApp to tap to its ability to afford *intimate synchronous communications*, to support them in *crafting desired experiences on recipients*, in making distant individuals *feeling present* in a significant life event, as well to support them in collective *lifelogging* practices.

5.2.1. Loosing track of time with intimate communications

In agreement with prior work we found WhatsApp' to better afford intimate communications than Facebook (Hu, Wood, Smith, & Westbrook, 2004; Quan-Haase & Young, 2010). While both tools allowed for synchronous communication, Facebook provided better ability for multitasking, which in turn afforded asynchronous communication practices. On the contrary, in WhatsApp's restricted environment users experienced a heightened sense of presence in the communication, due to their building of anticipation as they waited for the other party's response, but also due to their ability to express their emotions and experiences through smileys, images and voice memos, *e.g.*:

> *"I was friends with this one girl …. I told her I'd download it [WhatsApp] … For whatever reason, we got into a really heavy conversation about our lives, goals, dreams, all the big issues. It was really nice to be able to have that kind of deep, meaningful conversation with her and I learned a lot about her."*

5.2.2. Crafting communication experiences

Next, we found some of WhatsApp's features, such as its voice memo feature, to provide users with the ability to craft a desired experience on the recipient, through crafting the *content* or the *timing* of a communication. A powerful example was the one of a father, whose daughter went on her first trip with friends from college. As she left, he sent her a voice memo reflecting on her childhood and her affairs. The ability to craft the message and its timing on WhatsApp allowed the father to express his emotions, without the interruptions and the uncomfortable feeling that might occur in a face to face or other synchronous communication, while enabling him to iterate on the content creation till the optimal result is achieved for his daughter. At the same time, this relieved his daughter from the anxiety relating to her response, that would exist in a synchronous communication, thus allowing her to focus on the voice message and thus providing a more vivid experience.

A wealth of similar satisfying experiences were reported both from senders and recipients, relating to WhatsApp ability to craft the content (*e.g.*, through pausing or reshooting the voice message) as well as the timing of the message (*e.g.*, friends sending a voice memo or photos for birthday wishes right after 12 pm, or parents sending a supporting message to their kid right before she or he opens a university acceptance letter):

> *"(…) for my last birthday I was out (…) surprisingly sharp 12 o'clock I received a video (…) I felt very happy after seeing that video. All my friends celebrated my birthday by cutting cake, and sending wishes (…) That birthday was very special to me forever".*

5.2.3. Being there

An interesting practice that emerged from our data was the one of *near-real-time sharing* of an event as it unfolds, through rich media such as photos, videos and voice memos, to make someone separated by distance feel present in the event, *e.g.*:

> *"The single most satisfying moment was sharing my aunt's 90th birthday party as it was happening. It was lovely to be there, although only in a virtual way. It felt real. We cried and laughed and it was lovely". "My sister was planning a wedding … my great uncle got sick and couldn't travel. He's always been like a father to us, and everyone wanted him to be there … I sent him a combination of photos and videos almost every 2 minutes. And created a family message for him. I used it throughout the entire event, and the reception too. It meant so much that he was able to be there, and enjoy it with us. Even though he couldn't travel."*

In other contexts, WhatsApp was used as an awareness technology, providing reassurance to distant family members (Brown et al., 2007), when for example one of the members of the family was undergoing a risky operation:

> *"My mother had to undergo a very risky operation. I was on edge the entire day. I could not focus in any of my classes … I felt awful that I could not be with my family as they waited for the results and when I got the all clear through WhatsApp I felt as if the weight of the entire world was lifted off of my shoulders."*

5.2.4. Lifelogging

Interestingly, we found participants to use *WhatsApp*, not only as a communication tool, but also as a lifelogging tool (see Sellen & Whittaker, 2010; Van den Hoven, Sas, & Whittaker, 2012; Gouveia & Karapanos, 2013). A common practice was the creation of a family group where important life events, such as the first words of a baby or moments of a wedding, were shared among all family members, *e.g.*:

> *"Most cherished moment is when my cousin started to speak … he was looking so cute and his voice so heart touching … I still have this video in my phone; whenever I remember him I just watch those videos again & again."*

This form of lifelogging displays a number of interesting properties. First, rather than being personal, it is a shared corpus, with input coming from different members. Second, its content entails purpose and authorship as it is captured from someone, directed to someone, and shared with a particular purpose (*e.g.*, making one's family feel present in her life). Third, the resulting social interactions that take place around the lifelogs further augment the experience of revisiting the lifelogs and increase one's motivation for doing so.

Interestingly, such lifelogging practices took place even among co-located individuals, attending the same event. This practice denoted not only a form of *collective lifelogging*, but also a form of participation to a second thread of the event, unfolding in the online space.

5.3. Satisfying experiences with Facebook

Contrarily to WhatsApp that afforded intimate social interactions, users' most satisfying experiences with Facebook mainly stemmed from its support for expressing one's self, and from supporting their interactions with weaker ties. We also found Facebook to afford *life-logging* practices along with the added value that the accrued metadata brought to them (Odom, Zimmerman, & Forlizzi, 2011).

5.3.1. A stage for self-expression

Similar to prior work (Dunne et al., 2010; Urista et al., 2009), we

found a significant part of users' most memorable, satisfying experiences with Facebook to relate to its support for expressing one's self, such as her beliefs, actions, accomplishments and skills (*e.g.,* paintings), and the associated signs of social acceptance and popularity that they received from these acts, *e.g.*:

> *"(…) I decided to make my 'announcement' on Facebook that I'd be accepting the offer - this came with a lot of 'likes' and congratulatory messages. It was a pleasing experience!", "One time I posted a new picture of me. (…) I was dressed very nice. (…) I got over 60 likes. It was the most likes I got from any picture. It was a personal record. It was a great feeling."*

5.3.2. Social surveillance

Interestingly, even though our survey asked for outstanding, memorable events, a significant part of users' experience narratives related to what is often depicted as a mundane daily use practice on Facebook: *social surveillance* - the act of tracking the actions, beliefs and interests of one's acquaintances (Lampe, Ellison, & Steinfield, 2006). Social surveillance would often serve to keep up with life changes in one's friends, to learn new information from shared posts, or even to stalk on people and compare the life development to those of their acquaintances, *e.g.*:

> "*A good friend of mine studied abroad (…) It was hard for us to stay in touch (…) I smiled when I saw her looking happy and beautiful, (…) It made me realize how much she had changed, and I felt proud of her and glad I could witness it.*", "*(…) She had the most amazing photographs (…) she is the only real reason I am motivated to check on Facebook. Seeing where she is and what she is doing in her updates is fun since we no longer live in the same city."*

5.3.3. To find and to be found

One of the most gratifying experiences on Facebook, which is not supported by WhatsApp, is the ability to look up for and revive lost connections. Similarly to Hart et al. (2008), this was often associated with highly emotional, serendipitous encounters, and often provided a sense of belonging, when individuals were able to reconnect with schoolmates and others groups from the past, *e.g.*:

> "*My friend moved away from my town when we were 10 years old (…) Through mutual friends on Facebook, she stumbled upon my Facebook page and added me. We were able to catch up and become close again after being separated. Without Facebook, I do not think that would have ever happened"*

5.3.4. Social capital and interactions with like-minded people

Next, users' memorable, satisfying events related to Facebook's support for interaction with like-minded people. This manifested in a number of ways, such as *social browsing* - the development of new relationships sometimes with the aim of meeting offline (Lampe et al., 2006), *e.g.*: "*(…) It sounds silly, but Facebook has really changed my life. It led me to meeting the girl of my dreams who was always right in front of me. (…) Who knew a website would end up changing our lives forever?",* or supporting social interactions among like-minded people while leveraging the social capital, both online and offline, through the participation in online communities, looking for social support as in health-related communities, technical how-know (*e.g.*, a community relating to farming techniques), or purely an interaction with like-minded individuals (*e.g.*, in a dog lovers community), or, through the organization of offline events around activities they share the same passion with (*e.g.*, nature hiking).

5.3.5. Lifelogging

Last, lifelogging practices were often reported as a source for memorable satisfying experiences with Facebook. Similar to WhatsApp, we found the value of Facebook as a lifelogging tool to stem from the accrued, over time, metadata on the source material, such as likes, tags, locations and comments (Odom et al., 2011). Different from WhatsApp, though, Facebook supports broadcasting and interacting with a larger audience, while media is structured (*e.g.,* in albums and dashboards) and organized chronologically (i.e., timeline) on user's profiles which provides easy access and revisiting of the material. The revisiting of such material was often of high emotional value as in the case of a mother who lost her son and revisited photos of him and others' comments about him: "*My son passed away, and I had an outpouring of support from family members, friends and people that I didn't even know on my Facebook page. I have his pictures saved there and whenever I think about him I usually go to my page and pull them up and look at the comments about him on there. It makes me feel better and reminds of him and how much he is and we are loved."*

5.4. Unsatisfying experiences

Fig. 3 displays the experienced need deprivation in participants' reported unsatisfying experiences. While both social media display a similar profile, with relatedness being the most deprived need, significant differences were found among the tools with respect to *competence*, WA: mean = 2.5, SD = 1.2, FB: mean = 2.0, SD = 1.0, $t(222) = -3.7$, $p < .001$, *relatedness*, WA: mean = 3.0, SD = 1.2, FB: mean = 2.6, SD = 1.2, $t(222) = -2.2$, $p < .05$, and *security*, WA: mean = 2.6, SD = 1.2, FB: mean = 2.2, SD = 1.0, $t(222) = -2.3$, $p < .05$.

Next, multiple regression analyses were used to test which, if any, of the needs significantly predicted participants' self-reported intensity of use. For WhatsApp, *competence* ($\beta = 0.34$, $p < .01$) and *pleasure* ($\beta = -.40$, $p < .05$) were the two significant predictors of intensity of use, explaining 10% of the variance ($R^2 = .15$, $F(6,112) = 3.3$, $p < .01$). For Facebook, none of the needs predicted users' self-reported intensity of use. Overall these results suggest that while for Facebook no clear root cause of reduced intensity of use is identified, reduced intensity of use in WhatsApp is linked to deprivation of users' need to feel competence. At the same, pleasure was positively associated with reduced intensity of use, likely indicating users' initial exploratory, non-goal-oriented, interactions with the tool. Finally, users' unsatisfying experiences with WhatsApp were significantly more deprived with respect to competence, relatedness and security, in comparison to those with Facebook.

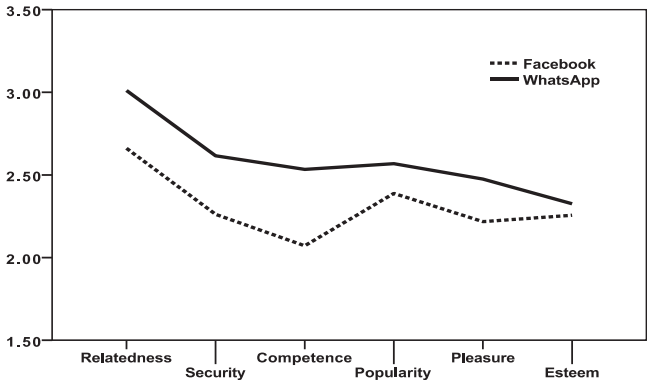

Fig. 3. Need deprivation for Facebook and WhatsApp among participants reporting unsatisfying experiences.

5.5. Unsatisfying experiences with WhatsApp

Overall, despite the strongly satisfying experiences participants reported with WhatsApp, we found the use of the tool, and the social practices it affords, to often lead to social exposure, embarrassment and conflicts among its users. The root cause of these negative experiences was often WhatsApp's misfit to the social norms of communication. We describe below some of the most remarkable instances.

5.5.1. Changing the norms in real-time communications

We found the strength of WhatsApp in affording real time communications to also be a source of unsatisfying experiences. While WhatsApp altered the norm of availability, it provided limited cues regarding one's availability to respond, often leading to incorrect inferences and conflicts among users, *e.g.*: *"Once I was having an argument (…) and ignoring all other conversations. I was getting lots of notifications from this girl (…) she could see me online and assumed I was ignoring her (…) I replied angrily and she blocked me. I hated WhatsApp for showing me online even though I wasn't available to talk to anyone else."*

5.5.2. Exposing personal content to wrong addressee

Usability problems some times lead users to expose private content, such as sending a personal photo to a wrong addressee, selecting a different than the intended video to be shared, or confusing communications during simultaneous chatting. Not only doesn't WhatsApp allow a user to reverse these errors, it also leaves her unaware of them, *e.g.*: "*When I first signed up (…) I was given the option of having WhatsApp find contacts I may know (…) there was an entry with my boyfriend's first name. I simply assumed it was him and I started sending him lovey-dovey messages. He never responded to a single one of them, which had me a little irritated. After a few days I realized that the person with my boyfriend's first name was not in fact my boyfriend at all. I have no idea who I messaged and I'm afraid it may have been someone else I knew. I feel like I may have embarrassed myself."*

5.5.3. Unsolicited group participation

Supporting group discussions was one of the frequent sources of satisfying experiences with WhatsApp. At the same time, however, unsatisfying experiences occurred when participants were joined into group discussions without soliciting their approval, or when the system exposed them when leaving a group discussion by letting everyone else know about that, *e.g.*:*"(…) once one of my friends added me in a group conversation with other people that I don't want to talk to, and then they started asking me why I am not replying to the group conversation. It was quite irritating that WhatsApp let them get me in the group without asking me first."*

5.5.4. Monitoring other people

Last, unsatisfying experiences were frequently rooted monitoring practices and the conflicts these induced. WhatsApp features of notifying the other party if one is online and when a message is read, along with the lack of support for plausible deniability (Lederer, Hong, Dey, & Landay, 2004) often led to conflicts and were remarked by participants as undesirable features. For instance, providing assertive time information regarding the last time one was seen online, enabled the monitoring of one's activities by her contacts, *e.g.*: "*I got into this big time argument with my girlfriend because I was online at 4 am and she confronted me on the chat asking me why I was online at that hour. IT was quite frustrating because she kept assuming I was holding some sort of secret from her."*

5.6. Unsatisfying experiences with Facebook

We found users' unsatisfying experiences with Facebook to be primarily rooted in content fatigue and exposure to undesirable content through surveillance, as well as, similarly to WhatsApp, Facebook's breach of offline social norms regarding the dissolution of relationships and the exposure of others' identities.

5.6.1. Content fatigue

One of the frequent sources of unsatisfying experiences with Facebook stemmed from content fatigue (Cnet, 2013), for instance, when heated debates took place prior to political elections, *e.g.*, "*The Presidential election campaign is the most unsatisfying event I have had with Facebook (…) For months, the newsfeed was full of negative political arguments. I made many 'friends' invisible. Seriously toxic climate.*", or when individuals were seen as portraying idealized self-identities, *e.g.*: *"(…) watching people post things that in a sense seem fake. It seems people post things to make their lives look perfect and basically brag about the things they do. But in a sense it makes others feel like they're not keeping up with life. I try to avoid reading very much on Facebook for this reason … mainly just keep up with the people I'm closest to.... else it will just bring me down.*

Similar to prior work, we found instances of individuals comparing their life accomplishments to those of their contacts (Chou & Edge, 2012), some times leading to diminished life satisfaction and self-esteem (Kross et al., 2013), *e.g.*: *(…) I also became Facebook friends with another former roommate. He is now a VP of a big tech company and when he posts it is usually from an exotic and/or luxurious hotel in a far away location. I end up feeling down about my life and how it has gone.*

5.6.2. Surveillance

As in prior work (Debatin, Lovejoy, Horn, & Hughes, 2009; Muise, Christofides, & Desmarais, 2009) users' practices of surveillance were often cited as a cause for unsatisfying experiences when individuals witnessed undesired social information by chance, as in the case of a participant who discovered he had been lied to by his employee, *e.g.*: "*I was unsatisfied when an employee called in sick, then posted on her Facebook about an event that she had gone to that same day - a concert. Obviously she wasn't sick. This made me pretty upset with the individual (…)".*

5.6.3. Unfriending

The dissolution of friendships, although a common behavior in Facebook (Madden, 2012), was often a source for unsatisfying experiences and diminishing self-esteem, *e.g.*, "*I felt like a loser that she unfriended me and made me feel sad".* Similar to Sibona an Walczak (2011) we found changes in offline relationships to be the primary reason for the online dissolution of a relationship. However, different from offline where the dissolution takes place naturally, on Facebook this required an explicit and definitive act (Bevan, Pfyl, & Barclay, 2012), *e.g.*:" *(…) I had to see post pictures of the two of them together. It was like a punch in the gut. I removed her from my friends list (…) Fortunately she wasn't a close friend so I doubt she noticed".*

5.6.4. Untagging

Last, a frequent source of unsatisfying experience related to Facebook's lack of a-priori control of one's self-identity. For instance, through tags, mentions and group photo posting, users could breach others' privacy and expose their identities without prior acceptance (Besmer & Richter Lipford, 2010). This practice often led to feelings of embarrassment and humiliation, *e.g.*: *"Once my friend posted a pic of me sleeping with a baby cap on my head. There was lot of comments and I was humiliated a lot as a result of it".*

6. Discussion

6.1. WhatsApp affording intimate communications

Turkle (2012) argues that we "turn to technology to make us feel connected in ways we can control". Tools such as Twitter, Facebook and instant messaging, provide us the control over what and how we communicate. But this has an enormous cost: we loose our capacity to communicate in f2f where this control no longer exists.

While we agree with Turkle (2012), we found Whatsapp to unlock new opportunities for intimate communications that are not present in f2f and other synchronous communication channels. For instance, WhatsApp supported individuals in crafting highly emotional personal messages (as in the case of the father's message to his daughter), not only removing the social anxiety present in f2f (Valkenburg & Peter, 2011), but also supporting them in crafting an optimal as well as archival communication experience. Next, established social practices such as the near-real-time sharing of an event with rich media enabled separated individuals to feel present in important life events, as in the case of the participant's virtual participation in her aunt's birthday, which she characterized as 'feeling real'. In the same vein, despite the absence of non-verbal cues, we found users to experience a heightened sense of presence in communications, likely due to WhatsApp's restricted environment that afforded single-tasking as well as its capacity for rich emotional expression through smileys, images and voice memos.

6.2. Social media as lifelogging tools

Next we found WhatsApp and Facebook to be used as lifelogging tools. Contrary to users' emerging photo-taking practices and recent research with the *Sensecam* prototype, that has lead to significant challenges with respect to the access and revisiting of the ever-increasing photo collection (Doherty et al., 2012, Sellen & Whittaker, 2010, Reckwitz, 2002), we found the two social media to effectively support users in storing, revisiting and reminiscing about past events (see Karapanos, Zimmerman, Forlizzi, & Martens, 2009; for a similar discussion on the adoption of the iPhone). Different from traditional lifelogging practices, lifelogging practices on Facebook and WhatsApp entailed a purpose and authorship, and the resulting social interactions around the lifelogs, through commentaries, likes and tags, would further augment the experience and users' motivation of revisiting the lifelogs. These accrued, over time, metadata, were often a significant part of the experience to be reminisced. Interestingly, we found WhatsApp to afford a practice of *collective lifelogging*, whereas collocated individuals would capture and share their own perspective of the unfolding event, thus making their contribution to a shared repository but also participating to a second thread of the event, that was unfolding in the online space.

6.3. Facebook is not that social after all

Contrary to WhatsApp, we found users' most satisfying experiences with Facebook to relate to practices that were not social in nature, and WhatsApp overall provided significantly higher levels of need fulfillment with respect to *relatedness*. Yet, while Facebook may have better afforded information gratification through social surveillance, as found in earlier studies (*e.g.*, Lampe et al., 2006), one would expect this to lead to heightened fulfillment of *pleasure-stimulation* in comparison to WhatsApp; this did not happen. Rather, stimulation was one of the least satisfied needs in both media. One potential reason for this is the gradual wear off of the novelty of Facebook, with our study taking place almost ten years after the one from Lampe et al., (2006), as well as the frequent use of the two media, with much of the usage to be rooted in *checking habits* (Gouveia, Karapanos, & Hassenzahl, 2015; Oulasvirta, Rattenbury, Ma, & Raita, 2012) rather than purposeful engagements with the media.

Similarly, one would expect Facebook to provide a stronger sense of self-esteem and popularity through supporting self-expression and leveraging individuals access to social capital (Burke et al., 2010; Ellison et al., 2007). To our surprise, our data suggest that the use of WhatsApp leads to a significantly higher sense of popularity than the use of Facebook. One possible interpretation might be that people spend much of their online time looking up at other people's lives, that are often reframed and portrayed through a positive lens (Barasch & Berger, 2014). Such practices have been found to lead to constant or reduced self-esteem and wellbeing (Chou & Edge, 2012; Kross et al., 2013).

6.4. Unsatisfying experiences with social media

We found a large part of Facebook's unsatisfying experience to relate to content fatigue and exposure to undesirable content, while unsatisfying experiences on WhatApp primarily stemmed from its breach of offline social norms, such as broadcasting users' context while failing to support *plausible deniability* (Lederer et al., 2004). This features also in our quantitative results with relatedness, but also popularity, being the most deprived needs in users' unsatisfying experiences with the media. Features that increased others' awareness of the time of one's last logon, or whether a message has been read, while conveying a sense of presence and supporting asynchronous communications, also led to incorrect inferences about one's context as well as the monitoring of individuals' behaviors by others. In the same line, users' requested more control when WhatsApp added them to group discussions without their prior approval, or when exposing them when leaving a group discussion. Interestingly, alternative instant message applications do not share such limitations as they often provide control over one's broadcasted context (Grinter & Palen, 2002; Nardi, Whittaker, & Bradner, 2000).

One should note, however, that unsatisfying experiences were overall weaker that satisfying ones, despite the strong psychological consequences they had on users, as in cases of public exposure and conflicts the tools induced. For instance, users' self-reported overall need deprivation was low (i.e., three or lower on 5-point intensity scale) and the self-reported intensity of use was relatively high (three or higher on a 5-point likert scale). One possible interpretation for this might relate to the repeating habitual patterns of use that typically characterize users' interactions with these two social media, and that shape an overall positive attitude towards the media (Church & de Oliveira, 2013; see also Karapanos et al., 2009 and Zhang et al., 2014), thus leading to the experiencing of *cognitive dissonance* (Festinger, 1962) when individuals encounter unsatisfying experiences with the tool. This, if being true, might hint at a second power of habit-forming technologies (Karapanos, 2015; Oulasvirta et al., 2012) and may provide a better understanding of the pervasive nature social media such as Facebook.

7. Conclusion

This paper reported on a study of the experiences of 240 Facebook users and 254 WhatsApp users. With a focus on recent, memorable events, rather than typical use, which is the focus of uses & gratification studies, we were able to uncover rich and new facets in users' experiences with Facebook and WhatsApp.

Most interestingly, we found WhatsApp to unlock new

opportunities for intimate communication, to enable the creation of micro-communities, and to richly support social practices such as collective lifelogging and reminiscing, contrasting the popular view of WhatsApp as a mere instant messaging tool. Users' memorable experiences with Facebook, on the other hand, were characterized primarily by non-social uses, pertaining to users' need for information gratification, as well as self-oriented experiences such as acts of self-expression.

These results showed up in the quantitative analyses as well with *relatedness* being the single significant predictor of intensity of use for WhatsApp, while *self-esteem* was the single predictor of usage in the case of Facebook. Yet, both media exhibited similar overall need fulfillment profiles, with *relatedness*, *self-esteem* and *competence*, being the three most salient needs, yet manifesting in different ways and through different social practices, while *relatedness* and *popularity* being the most deprived needs in users' unsatisfying experiences, primarily rooted in the tools' breach of offline social norms, as well in content fatigue and exposure to undesirable content in the case of Facebook.

These findings draw a number of implications for the design of social media. First, they tell us that while these new forms of communication hardwire our norms and practices of communication, possibly leading to detrimental effects in our ability to communicate in f2f (Turkle, 2012), at the same time they address some of the limitations of f2f communication, as in the case of a participant crafting a memorable and archival experience for his daughter through WhatsApp. Second, they remind us that value is constructed in use rather than during the design of social media. Our findings revealed two rather identical rich instant messaging features, offered by WhatsApp and Facebook, to afford different social practices and consequently to result to different user experiences. Crafting a desired communication experience requires a deep understanding of the behavioral practices that surround the use of the tool, and an iterative intervention process that affects these behavioral practices.

The methodological approach we adopted enabled us to look at significant memorable events rather than typical use with social media, which proved successful at cueing participant's memories and eliciting rich stories of use with high personal significance. The quantitative data enabled us to establish the need fulfillment profiles of the two social media and contrast them with respect to their capacity to address different psychological needs of their users. Future work should further examine the interaction between social practices and need fulfillment, and the outcomes of established social practices, such as the amount of bridging or bonding social capital individuals have access to (*e.g.*, Liu, Venkatanathan, Goncalves, Karapanos, & Kostakos, 2014), or the psychological implications of social media use (*e.g.*, Kross et al., 2013).

Acknowledgments

This work was supported by FCT, under the grant PEst-OE/EEI/LA0009/2015.

References

cnet.com. (2013). *Study: Facebook fatigue – it's real.* http://www.cnet.com/news/study-facebook-fatigue-its-real/. last Accessed on 22.09.14.

eMarketer.com. (2013). *Social networking reaches nearly one in four around the world.* http://www.emarketer.com/Article/Social-Networking-Reaches-Nearly-One-Four-Around-World/1009976. last Accessed on 22.09.14.

forbes.com. (2014). *WhatsApp hits 600 million active users.* Founder Says http://www.forbes.com/sites/parmyolson/2014/08/25/whatsapp-hits-600-million-active-users-founder-says/. last Accessed on 22.09.14.

Adams, A., Lunt, P., & Cairns, P. (2008). A qualitative approach to HCI research. In C. Paul, & C. Anna (Eds.), *Research methods for human-computer interaction* (pp. 138–157). Cambridge, UK: Cambridge University Press.

Barasch, A., & Berger, J. (2014). Broadcasting and narrowcasting: how audience size affects what people share. *Journal of Marketing Research, 51*(3), 286–299.

Besmer, A., & Richter Lipford, H. (2010). Moving beyond untagging: photo privacy in a tagged world. In *Proceedings of the SIGCHI Conference on human factors in computing systems* (pp. 1563–1572). ACM.

Bevan, J. L., Pfyl, J., & Barclay, B. (2012). Negative emotional and cognitive responses to being unfriended on Facebook: an exploratory study. *Computers in Human Behavior, 28*(4), 1458–1464.

Brown, B., Taylor, A. S., Izadi, S., Sellen, A., Jofish'Kaye, J., & Eardley, R. (2007). *Locating family values: A field trial of the Whereabouts clock* (pp. 354–371). Berlin Heidelberg: Springer.

Burke, M., Marlow, C., & Lento, T. (2010). Social network activity and social well-being. In *Proceedings of the SIGCHI Conference on human factors in computing systems* (pp. 1909–1912). ACM.

Chou, H. T. G., & Edge, N. (2012). "They are happier and having better lives than I am": the impact of using Facebook on perceptions of others' lives. *Cyberpsychology, Behavior, and Social Networking, 15*(2), 117–121.

Church, K., & de Oliveira, R. (2013). What's up with whatsapp?: comparing mobile instant messaging behaviors with traditional SMS. In *Proceedings of the 15th International Conference on human-computer interaction with mobile devices and services* (pp. 352–361). ACM.

Debatin, B., Lovejoy, J. P., Horn, A. K., & Hughes, B. N. (2009). Facebook and online privacy: attitudes, behaviors, and unintended consequences. *Journal of Computer-Mediated Communication, 15*(1), 83–108.

Doherty, A. R., Pauly-Takacs, K., Caprani, N., Gurrin, C., Moulin, C. J., O'Connor, N. E., et al. (2012). Experiences of aiding autobiographical memory using the SenseCam. *Human–Computer Interaction, 27*(1–2), 151–174.

Dunne, Á., Lawlor, M. A., & Rowley, J. (2010). Young people's use of online social networking sites–a uses and gratifications perspective. *Journal of Research in Interactive Marketing, 4*(1), 46–58.

Ellison, N. B., Steinfield, C., & Lampe, C. (2007). The benefits of Facebook "friends:" social capital and college students' use of online social network sites. *Journal of Computer-Mediated Communication, 12*(4), 1143–1168.

Festinger, L. (1962). *A theory of cognitive dissonance* (Vol. 2). Stanford University Press.

Gouveia, R., & Karapanos, E. (2013). Footprint tracker: supporting diary studies with lifelogging. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems* (pp. 2921–2930). ACM.

Gouveia, R., Karapanos, E., & Hassenzahl, M. (2015). How do we engage with activity trackers?: a longitudinal study of habito. In *Proceedings of the 2015 ACM International Joint Conference on pervasive and ubiquitous computing (UbiComp '15)* (pp. 1305–1316). New York, NY, USA: ACM.

Grinter, R. E., & Palen, L. (2002). Instant messaging in teen life. In *Proceedings of the 2002 ACM Conference on computer supported cooperative work* (pp. 21–30). ACM.

Hart, J., Ridley, C., Taher, F., Sas, C., & Dix, A. (2008). Exploring the facebook experience: a new approach to usability. In *Proceedings of the 5th Nordic Conference on human-computer interaction: Building bridges* (pp. 471–474). ACM.

Hassenzahl, M., Diefenbach, S., & Göritz, A. (2010). Needs, affect, and interactive products–facets of user experience. *Interacting with Computers, 22*(5), 353–362.

Hu, Y., Wood, J. F., Smith, V., & Westbrook, N. (2004). Friendships through IM: examining the relationship between instant messaging and intimacy. *Journal of Computer-Mediated Communication, 10*(1).

Joinson, A. N. (2008). Looking at, looking up or keeping up with people?: motives and use of facebook. In *Proceedings of the SIGCHI Conference on human factors in computing systems* (pp. 1027–1036). ACM.

Karapanos, E. (June 2015). Sustaining user engagement with behavior-change tools. *Interactions, 22*(4), 48–52.

Karapanos, E., Gouveia, R., Hassenzahl, M., & Forlizzi, J. (2015). *It's not that hard to walk more" Peoples' experiences with wearable activity trackers* (M-ITI Technical Report).

Karapanos, E., Zimmerman, J., Forlizzi, J., & Martens, J. B. (2009). User experience over time: an initial framework. In *Proceedings of the SIGCHI Conference on human factors in computing systems* (pp. 729–738). ACM.

Kittur, E., Chi, H., & Suh, B. (2008). Crowdsourcing user studies with mechanical Turk. In *Proceeding of the 26th annual SIGCHI Conference on human factors in computing systems* (pp. 453–456). Florence, Italy: ACM.

Kross, E., Verduyn, P., Demiralp, E., Park, J., Lee, D. S., Lin, N., et al. (2013). Facebook use predicts declines in subjective well-being in young adults. *PLoS One, 8*(8), e69841.

Lampe, C., Ellison, N., & Steinfield, C. (2006). A Face (book) in the crowd: social searching vs. social browsing. In *Proceedings of the 2006 20th Anniversary Conference on computer supported cooperative work* (pp. 167–170). ACM.

Lederer, S., Hong, J. I., Dey, A. K., & Landay, J. A. (2004). Personal privacy through under- standing and action: five pitfalls for designers. *Personal and Ubiquitous Computing, 8*, 440–454.

Liu, Y., Venkatanathan, J., Goncalves, J., Karapanos, E., & Kostakos, V. (2014). Modeling what friendship patterns on Facebook reveal about personality and social capital. *ACM Transactions Computer-Human Interaction, 21*(3), 20 page(s).

Madden, M. (2012). *Privacy management on social media sites.* Pew Internet Report (pp. 1–20).

McCarthy, J., & Wright, P. (2004). Technology as experience. *Interactions, 11*(5), 42–43.

Muise, A., Christofides, E., & Desmarais, S. (2009). More information than you ever wanted: does Facebook bring out the green-eyed monster of jealousy? *CyberPsychology & Behavior, 12*(4), 441–444.

Nardi, B. A., Whittaker, S., & Bradner, E. (2000). Interaction and outeraction: instant messaging in action. In *Proceedings of the 2000 ACM Conference on computer supported cooperative work* (pp. 79–88).
Odom, W., Zimmerman, J., & Forlizzi, J. (2011). Teenagers and their virtual possessions: design opportunities and issues. In *Proceedings of the SIGCHI Conference on human factors in computing systems* (pp. 1491–1500). ACM.
Oulasvirta, A., Rattenbury, T., Ma, L., & Raita, E. (2012). Habits make smartphone use more pervasive. *Personal and Ubiquitous Computing, 16*(1), 105–114.
Partala, T., & Kallinen, A. (2012). Understanding the most satisfying and unsatisfying user experiences: emotions, psychological needs, and context. *Interacting with Computers, 24*(1), 25–34.
Quan-Haase, A., & Young, A. L. (2010). Uses and gratifications of social media: a comparison of Facebook and instant messaging. *Bulletin of Science, Technology & Society, 30*(5), 350–361.
Raacke, J., & Bonds-Raacke, J. (2008). MySpace and Facebook: applying the uses and gratifications theory to exploring friend-networking sites. *Cyberpsychology & Behavior, 11*(2), 169–174.
Rainie, L., Smith, A., & Duggan, M. (2013). *Coming and going on Facebook*. Pew Research Center's Internet and American Life Project.
Reckwitz, A. (2002). Toward a theory of social practices a development in culturalist theorizing. *European Journal of Social Theory, 5*(2), 243–263.
Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist, 55*(1), 68.
Saarinen, P., Partala, T., & Väänänen-Vainio-Mattila, K. (2013). Little backpackers: studying children's psychological needs in an interactive exhibition context. In *Proceedings of the 12th International Conference on interaction design and children* (pp. 415–418). ACM.
Schwarz, N., Kahneman, D., Xu, J., Belli, R., Stafford, F., & Alwin, D. (2009). *Global and episodic reports of hedonic experience. Using calendar and diary methods in life events research* (pp. 157–174).
Sellen, A. J., & Whittaker, S. (2010). Beyond total capture: a constructive critique of lifelogging. *Communications of the ACM, 53*(5), 70–77.
Severin, W. J., & Tankard, J. W. (1997). *Communication theories: Origins, methods, and uses in the mass media* (4th ed.). New York: Longman.
Sheldon, K. M., Elliot, A. J., Kim, Y., & Kasser, T. (2001). What is satisfying about satisfying events? Testing 10 candidate psychological needs. *Journal of Personality and Social Psychology, 80*(2), 325.
Sibona, C., & Walczak, S. (2011). Unfriending on Facebook: friend request and online/offline behavior analysis. In *System sciences (HICSS), 2011 44th Hawaii International Conference on* (pp. 1–10). IEEE.
Time. (2004). *More than 11 million young people have Fled Facebook since 2011*. Last Accessed on 22.09.14, from http://business.time.com/2014/01/15/more-than-11-million-young-people-have-fled-facebook-since-2011/.
Tuch, A. N., Trusell, R., & Hornbæk, K. (2013). Analyzing users' narratives to understand experience with interactive products. In *Proceedings of the SIGCHI Conference on human factors in computing systems* (pp. 2079–2088). ACM.
Turkle, S. (2012). *Alone together: Why we expect more from technology and less from each other*. Basic Books.
Urista, M. A., Dong, Q., & Day, K. D. (2009). Explaining why young adults use MySpace and Facebook through uses and gratifications theory. *Human Communication, 12*(2), 215–229.
Valkenburg, P. M., & Peter, J. (2011). Online communication among adolescents: an integrated model of its attraction, opportunities, and risks. *Journal of Adolescent Health, 48*(2), 121–127.
Van den Hoven, E., Sas, C., & Whittaker, S. (2012). Introduction to this special issue on designing for personal memories: past, present, and future. *Human–Computer Interaction, 27*(1–2), 1–12.
Zhang, X., de Pablos, P. O., Wang, X., Wang, W., Sun, Y., & She, J. (2014). Understanding the users' continuous adoption of 3D social virtual world in China: a comparative case study. *Computers in Human Behavior, 35*, 578–585.