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*Kathrin Knautz,
Katsiaryna S. Baran (Eds.)*

FACETS OF FACEBOOK

USE AND USERS

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Knowledge & Information

Studies in Information Science

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Use and Users

Edited by
Kathrin Knautz and Katsiaryna S. Baran

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Preface

This anthology presents state-of-the-art research pertaining to information science and empirical study on the social network service (SNS) Facebook.

Over the past decade, online social networking sites have revolutionized the ways we communicate with our friends, groups, and communities, and have fundamentally changed how we approach numerous everyday activities. Without a doubt, the technology has introduced new opportunities for understanding social behavior and for building socially intelligent systems and networks. These variations affect modern-day research due to the continuously updated stream of user-generated content and huge amounts of such data posted on and hosted by social media platforms.

These phenomena have motivated our assembling the following articles for publication as an anthology. We believe they address the most current information science interest as regards Facebook. Our ambition in doing so has been to reflect a wide range of study and results concerning our analysis of this SNS with implications for interdisciplinary fields such as the social sciences, law, information literacy, and history. Our anthology includes original articles on different topics related to Facebook, including such user facets as age, sex, and culture, as well as facets of use, for example, privacy behavior, unfriending on Facebook, Facebook addiction, and perceptions of quality. Nearly every aspect of Facebook use has received careful attention by the authors contributing to this book.

The anthology is composed of the following chapters reflecting both uses and users of the SNS, and pays particular attention to the following facets:

- Chapter 1: Unfriending. This chapter highlights unfriending behavior on Facebook and the categories of friends most often unfriended on this SNS, the causes prompting one person to unfriend others, and the emotions experienced by both those unfriending and those being unfriended.
- Chapter 2: Photo publication. This chapter discusses adolescent image dissemination behavior on Facebook in terms of age, gender, and privacy settings. It especially focuses on the sexting aspect.
- Chapter 3: Addiction. This chapter presents methods used to measure Facebook addiction. The authors focus on Facebook addiction scales and factors that may lead to too much as well as addictive Facebook usage.
- Chapter 4: Gaming. This chapter examines Facebook social games in conjunction with social interactivity and play experiences as well as the role of game play in players' everyday lives.
- Chapter 5: Information literacy. This chapter discusses the level of information literacy observed in Facebook users and describes users' self-assessments concerning their perceptions of information literacy, as well as how

they represent, appropriate, and create information. Legal, ethical, and privacy aspects also are considered.

- Chapter 6: Privacy. This chapter investigates users' privacy behavior after the data security breach in the United States involving government contractor Edward Snowden. The author investigates whether users are concerned about their online privacy and any actions they take to minimize risks of privacy violations. Additionally, the chapter discusses the “pushback” phenomenon.
- Chapter 7: Death and bereavement. This chapter uses of a corpus-based study that compares results found in the international literature investigating connections among online elaborations of mourning. It analyzes web-based community pages that include posts and comments regarding the topic of death.
- Chapter 8: History. This chapter discusses whether Facebook is a valuable source for historical science, especially for microhistory or “history from below.” For such purposes of analysis, informetrics and statistical methods are applied.
- Chapter 9: Science communication. This chapter analyzes how research centers and public universities use Facebook, Twitter, and YouTube to make their scientific findings publicly available. Three aspects are measured: presence, connectivity, and intensity.
- Chapter 10: Biased user perceptions. This chapter investigates if constructs such as the Technology Acceptance Model (TAM) are valid and reliable for SNSs research. The authors detected a bias on quantitative TAM-like surveys, the so-called “standard-dependent user blindness” (SDUB). This finding points out the challenges in gathering unbiased user perceptions on SNSs markets.
- Chapter 11: Legal. The concluding chapter focuses on social networking services and the question of whether current European competition law is sufficient to control these new, rapidly evolving developments for providing information. Markets for consumer communication services (CCS) as well as aspects of data privacy are also addressed.

We believe the intended audience for this anthology will consist of social media researchers, information scientists, social scientists, and, not least, everyone interested in Facebook-related topics. We imagine readers will bring to their reading of the text a basic knowledge in the area of SNS research and methodology. We hope this book will lead readers toward a better understanding of social

media, and in particular, the myriad facets of Facebook users and their use of the service.

Katsiaryna S. Baran and Kathrin Knautz
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August 2016

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Liridona Gashi*, Kathrin Knautz

Chapter 1. Unfriending and Becoming Unfriended on Facebook

Abstract: When using social networking services, such as Facebook, it is easy to become friends with other users. Unfriending (or defriending) is easy as well, requiring only that a user click on Facebook’s “Unfriend” button. This chapter highlights the types of friends who are most often unfriended on Facebook, the role of unfriending in connection with emotions, reasons for unfriending others, and being unfriended by someone. Furthermore, we concentrate on avoiding contact after the act of unfriending. Additionally, we investigate whether hiding and blocking can be interpreted as options for discontinuing contact, as well as why people might choose an alternative to unfriending. We conducted our research using unfriending applications, which demonstrate to the user he or she has been unfriended. The empirical basis of our research consists of 2,201 questionnaires, completed by individuals with Facebook accounts.

Keywords: Unfriending, Facebook, Emotions, Reasons for unfriending, Hiding, Blocking, Unfriending apps, Friend, Friendship, Contact avoidance, Unfriending memory

Introduction

Social networking services (SNSs) have become an inherent part of modern life (Boyd & Ellison, 2007). Behind Google, which is the most visited website, Facebook is the second most visited service in the world with 1.39 billion monthly active users as of the fourth quarter, 2014 (Statista, 2015). On Facebook, users can maintain individual profile pages, connect with others who use Facebook, and visit other users’ pages. On SNSs, it is easy to make new “friends.” One need only one click (and receive a positive response from the user to whom you sent the friend request) to befriend someone. Equally easy as befriending (friending) someone is the act of unfriending (or defriending). To unfriend someone, all you have to do is go to his or her private page and click the “friends” button followed

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by the “unfriend” option. In this way, you cancel contact with this Facebook friend. In past years, the website displayed the unfriend button further down the screen, causing the user to scroll to find it, but in the most recent version, the unfriend button is at the top of the page (see Figure 1). Because the button is now readily available, it may result in an increase in unfrinding behavior.

Mass unfrinding (unfrinding more than one Facebook friend via one command or click) is still impossible. Yet this shifting of the “unfriend” option toward in the top of Facebook profile pages suggests that Facebook can be used to support the separation between individuals according to research of Fox, Osborn, and Walter (Fox, Osborn, & Warber, 2014). Unfrinding can be a sudden disengagement (Bevan, Ang, & Fearn, 2014). Unfrinding is becoming a frequently used function, with comparisons between 2009 and 2011 revealing more users plying the unfriend button and thus disengaging with some of their Facebook friends (Madden, 2012).

The term *unfriend* originated about 2005, and in 2009, unfriend became word of the year according to the Oxford University Press. The *New Oxford American Dictionary* defines the word as follows: “To remove (someone) from a list of friends or contacts on a social networking website” (Oxford University Press, 2009).

The social and physical attractiveness of Facebook friends may influence the unfrinding act (Peña & Brody, 2014). Unfrinding is considered harsh and impolite. Gutierrez, Lopez, and Ovaska (2013) define unfrinding as a hard, unsociable activity, a failure of friendship. People unfriend some of their friends on an SNS to establish distance between them. Being unfriended is akin to one person deescalating a relationship (Bevan, Ang, & Fearn, 2014). A user needs permission to befriend someone, but unfrinding is unilateral; no permission is needed to unfriend another. People do not always notice, at least immediately, they have been unfriended by a former SNS friend. However, if they follow the number of friends they have, they may notice that number has decreased. Alternatively, individuals may search their friendship list for additions or absences and do not find a former contact (Sibona, 2014a). Finally, the user who initiated the friend request is more likely to be unfriended than the one who received and accepted the friendship request (Sibona & Walczak, 2011).

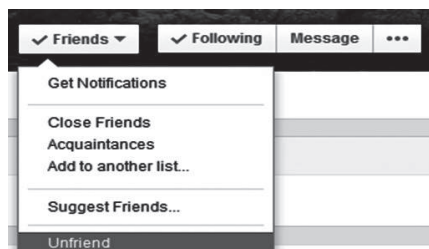


Figure 1: Unfriend Button on Facebook.

After being unfriended, users tend to avoid future contact with the person who unfriended them (Sibona, 2013). Our study differentiates among reasons for unfriending arising in the digital world (“online reasons”) and those emerging from the physical world (“offline reasons”). The main initiators to unfriend someone on Facebook include posting about unimportant topics, categorized as online reasons (Gashi & Knautz, 2015). Reasons someone might be unfriended include, for example, a user dislikes an individual’s behavior in the physical world. Users who unfriend others for offline reasons appear to dislike them more than people who unfriend others for online reasons (Sibona & Walczak, 2011). Thus, one can be unfriended for reasons unconnected with online behavior.

The main motivation for conducting our study was the absence of empirical findings in the literature (especially on Sibona’s studies) concerning the behavior and emotions of users who unfriend others. A secondary motivation was to gather quantitative results on the varieties of unfriending behavior to compare them with Sibona’s findings (Sibona, 2013; Sibona, 2014a; Sibona, 2014b; Sibona & Walczak, 2011). We will examine whether Facebook users also apply other features to disengage with someone, such as hiding a person from a News Feed or blocking, instead of unfriending. Furthermore, this investigation examines the factors that predict both offline and online reasons for Facebook users to unfriend their friends on Facebook, the factors that predict the emotional response Facebook users display after being unfriended, and the emotions exhibited when they unfriend others. In addition, we identified the types of friends (e.g., friend of a friend, high school friends, etc.) who are more likely to be unfriended. Finally, we examine unfriending application usage. The cognitive, emotional, and social causes and effects of unfriending are not yet clear, for research is insufficient. Sibona’s surveys indicate some reasons for users to unfriend their friends on SNSs, but still other reasons may constitute an impulse for one user to unfriend another. We have found no mention whatsoever that answers how users who actively unfriended some of their friends actually feel afterward.

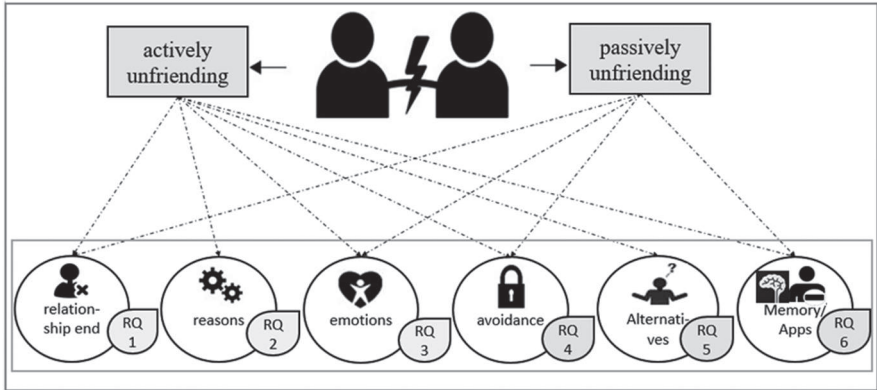


Figure 2: Research Model of Unfriending and Becoming Unfriended on Facebook (Source: Modified from Gashi & Knautz, 2015).

To explore these research questions (RQs), an online survey was developed and distributed among German-speaking Facebook users. The questionnaire consists of 23 questions in total. There were 2,201 test subjects who completed the whole questionnaire.

Literature Review and Background

People form friendships with other individuals because they are rewarding (Wright, 1984). There seems to be a difference between making friends and building friendships in the physical world, however, compared with doing so in the digital sphere (e.g., Facebook). Friendships on Facebook, or in general on SNSs, often represent weak ties between individuals. Strong ties are more likely to be formed in the physical world (West, Lewis, & Currie, 2009). One reason most relationships on SNSs tend to be weak is many people accept friendship requests because it is easier to say “yes” rather than “no” (Boyd, 2006). Young users tend to unfriend Facebook friends more frequently than older Facebook users do (Madden, 2009). Many users consider unfriending to be a harsh act and for this reason, prefer to use the option of hiding other users’ posts from being displayed on the news wall rather than unfriending or blocking them (Gutierrez, Lopez, & Ovaska, 2013). Sibona guess that the social etiquette of unfriending is uncertain and for this reason would some user rather hide others’ posts from being displayed than unfriend them (Sibona, 2014); furthermore, users who initiated the

friend request seem to be unfriended more often than those who accepted the request (Sibona, 2013).

Reasons for ending a relationship in the digital world differ from those experienced in the physical world (Quercia, Bogaghi, & Crowcroft, 2012). We found that relationships embedded in different social circles are more likely to end if friends differ too much in age or if one of them is neurotic or introverted. Women tend to unfriend their SNS friends more than men do. Of women, 67% said they have deleted someone from their network, compared with 58% of men. Furthermore, more women use privacy settings to protect their private information (Madden, 2012). Social attractiveness is a main predictor of the intent to unfriend someone. This means that people who possess high levels of social attractiveness are less likely to be unfriended than those with low social attractiveness. Thus, the intent to unfriend is a perceptual and behavioral process (Peña & Brody, 2014). When Facebook users are unfriended by someone, they tend to interpret the unfriending act as negative (Bevan, Pfyl, & Barclay, 2012) and as an expectancy violation (Bevan, Ang, & Fearn, 2014).

Friendship Dissolution

SNSs support individuals in both maintaining existing social ties and in forming new connections. Individuals mostly use Facebook to keep in touch with old friends (mainly high school friends and acquaintances) and to establish or pursue new connections (Ellison et al., 2007).

The process of online friendships is similar to forming friendships in the real world, with the difference that Facebook keeps a record of who initially reached out to whom, such as the visible request (Sibona & Walczak, 2011). Sibona and Walczak presumed the links between users on Facebook, which are visible, make it difficult to end a relationship online. This explains why unfriending on Facebook may signal to other users that the relationship between the dyad is over (Sibona & Walczak, 2011). When a user unfriends someone (actively) on their SNS, the two people will be more certain who initiated the friendship request. In the case of being unfriended by someone Facebook friend, the unfriended person will be insecure who initiated the friendship request. Those who initiates the request are being more unfriended than those who accepted it. Individuals who are on the receiving end of a friendship request are more likely to unfriend others (Sibona & Walczak, 2011).

Young people who use Facebook have on average, 300 Facebook friends, mostly people they know from school, family members, friends who attend a different school, brothers and sisters, and parents. People whom users never meet

in person, teachers, coaches, and famous personages are not very likely to be friended (Madden, 2013). The end of Facebook relationships often can be predicted by whether dyads are embedded in the same circle of friends, whether there is an age difference, or whether one of them is introverted or neurotic. Dyads sharing a common female friend are not so likely to be desolate over the unfriended, compared with those who have a common male friend (Quercia et al., 2012).

Sibona was able to categorize the types of friends who are unfriended by individuals, as well as those types who do the unfriending. The majority of unfriending affects the following categories: friends from high school (18.6%), others (12.5%), friends of a friend (11.7%), and work (10.5%). Individuals are mostly unfriended by high school friends (16.3%), common interest friends (13.5%), college (11.7%), and coworkers (11.2%). These categories of friend types are those most likely to either be unfriended or unfriend others. In both cases, the high school friend is the one who tends to be unfriended the most and who unfriends others the most (Sibona, 2014a).

These observations lead to our first research question (RQ):

RQ1a: *Which kind(s) of friends do you unfriend mostly?*

RQ1b: *Is the termination of a friendship on Facebook also the end of the friendship in the real world?*

RQ1c: *Are offline friends more important to you than online friends?*

Reasons for Unfriending

Facebook postings that put a strain on the relationship, or messages that cast a shadow on the receiver or reveal contempt for other users are associated with the intent to unfriend a sender. In addition, when someone sends status updates threatening the receiver's concept of self and beliefs, the latter's intent to unfriend the sender grows stronger (Peña & Brody, 2014). Yet the act of unfriending can be caused by real world events as well as those in the digital world. Sibona and Walczak (2011) discuss different reasons, categorized as *online* and *offline*. The largest number of survey respondents (55%) noted they unfriended former friends for online reasons. Among the highest scores of online reasons for unfriending are unimportant topics (62%), inappropriate topics (36%), and posting frequency (33%).

Sibona and Walczak (2011) found that 28% of survey respondents unfriended some SNSs friends in response to offline behaviors. Offline reasons for unfriending included personality (70%), behavior (62%), and misdeeds (57%). Individuals who stated they unfriended another user for offline reasons indicated they

disliked a friend's behavior or had experienced a change in the relationship, meaning a geographic relocation or a romantic relationship's end. In contrast to individuals who have known each other briefly, people who have known each other for a long time are more likely to unfriend each other due to excessive posting on often polarizing topics. As the length of a dyadic friendship increases, the likelihood for citing offline reasons as causes for unfriending (e.g., misdeeds, dislikes, etc.) increases as well.

From this observation, our second RQ arises:

RQ2a: *For which online reasons do Facebook users unfriend some friends?*

RQ2b: *For which offline reasons do Facebook users unfriend some friends?*

Emotional Response

For users who have been unfriended, the event may have actual negative emotional consequences (Bevan, Pfyl, & Barclay, 2012). If the unfriended party can identify the user who did the unfriending, the one unfriended may ponder the act more deeply and experience a feeling of rejection or sadness. If unfriended, individuals who spend a significant amount of time on Facebook often will feel more negatively affected and tend to ruminate longer over the experience. Furthermore, they will reflect on how they present themselves and how others online are perceived them. In addition, results from a 2012 study by Pfyl and Barclay demonstrate that being unfriended by a close friend – such as former friends from the physical world, for example, family members or romantic partners – carries more cognitive weight than being unfriended by distant friends. Rumination and negative emotional responses can also occur when users are unfriended by someone to whom they initially sent the friendship request, because it causes them to wonder why the other person accepted the request at all.

In his study, Sibona investigated factors predicting the presence and nature of a user's emotional response to being unfriended on Facebook. Sibona's research suggests individuals' emotions (for example, botheration, sadness, surprise, or amusement) after losing a connection depend on four factors.

The first factor is how highly a person valued the peak of the relationship – individuals who had a high peak in their relationship tend to be more negatively affected by its loss. The second factor is the level of network vigilance – users who spend more time online are more likely to be negatively affected when they are unfriended by someone. The third factor is the discussion within the dyad prior to the event – users who discuss the unfriending act before it occurs are less likely to be negatively affected by it. Finally, the fourth factor is any discussion occurring

after the act of unfriending – users who discuss the unfriending act afterward to each other are less likely to be negatively affected by it.

Surprise is the most common emotion users experience by the act of unfriending. According to Sibona's research results, 73 % of users react in a surprised manner when they see they have been unfriended. Slightly more than half (51.7 %) expressed they were saddened by being unfriended, and 64.6 % were amused they had been unfriended (Sibona, 2014b).

From this observation, we formulate our third RQ:

RQ3a: *What is the user's emotional response after being (passively) unfriended on Facebook?*

RQ3b: *What is the user's emotional response after (actively) unfriending others on Facebook?*

Avoiding Contact

The study by McEwan, Gallagher, and Farinelli (2008) found the main reason for friendship dissolution is purposeful avoidance; meaning, people reduce their communications with a former friend and seek to avoid further contact.

Some Facebook users do not like to meet other users who have unfriended them. More than 40 % of respondents in Sibona's (2013) survey want to avoid future contact with those who unfriended them because seeing the person after having been unfriended would be uncomfortable (Sibona, 2013).

Avoiding contact after being unfriended depends on different factors. Sibona's (2013) research results present six factors that can predict whether a user will want to avoid future contact with those who have unfriended them on Facebook. The first factor is the discussion that occurs after unfriending (similar to the factors of emotional response). The second is the emotional bond experienced with the unfriending person. The third is the offline behavior of the one being unfriended. The fourth concerns the perceived geographical distance between the two people. The fifth is any discussion that occurred between the two people prior to the unfriending event. The sixth is the evaluation of the relationship's strength.

From these factors, we formulate a fourth RQ:

RQ4a: *Do users avoid real-life contact after being (passively) unfriended on Facebook?*

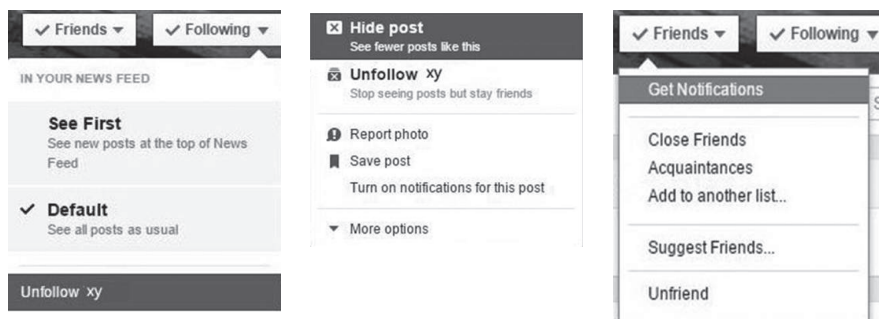
RQ4b: *Do users avoid real-life contact with those they have (actively) unfriended on Facebook?*

Blocking and Hiding Options for Unfriending

Hiding, or unfollowing, along with unfriending, is an online strategy employed to avoid contact with others and move toward dissolving relations (Peña & Brody, 2014). Hiding on Facebook is as easy as unfriending. A user can hide all stories from another user, a page, or a group, which means unfriending is not the only method to exclude one's information from others. When one user hides another, the latter will not be notified about being unfriended. It may be less hurtful to be hidden, in contrast to being unfriended.

To hide (unfollow) someone, imagine User One (a girl) elects to hide away her information from User Two (a boy). She navigates to his individual page, and clicks the “Follow” button, followed by the “Unfollow” button (see Figure 3a), which unfollowing User Two (him) from User One's (her) news wall. The button for hiding (unfollowing) is found at the top of the page, next to the Unfriend button. In addition, a user can hide a single post appearing in her or his news wall (see Figure 3b). Unfollowing a post, a Facebook group, or a specific person is one method to hide away one's information or one's online self.

It is also possible to cease contact with another user without the finality implied by unfriending or unfollowing. Again, imagine User One (a girl) wants to deactivate notifications received from User Two (a boy). User One navigates to User Two's page, clicks on the “Friends” button, then clicks on the “Get Notifications” button. This process requires no additional confirmation from User One. User Two's notifications will no longer appear on her timeline whenever he posts something new; however, his icon will continue to appear in her newsfeed. A user also can hide certain posts, which is another option to block information being transmitted other users (see Figure 3c).



a) Unfollowing

b) Hide a Post

c) Deactivating Notifications

Figure 3: Unfollowing and Hiding Buttons on Facebook.

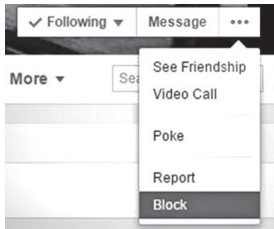


Figure 4: Blocking Button on Facebook.

Another option is blocking information transmission between users. Blocking is not as simple as unfriending or unfollowing. To block someone, the user must take several steps, and the button to do so is not easily accessed (see Figure 4). Once again, imagine our users: Two (a boy) and Three (a second boy). User Two navigates to the right side of User Three's page, clicks the "Block" button, and when a new window appears (see Figure 5), confirms his choice to block. In the future, while User Two will receive information about things User Three can no longer do on Two's page, Three will no longer be able to start a conversation with Two, add him as a friend, and so forth (see Figure 5). He is effectively blocked.

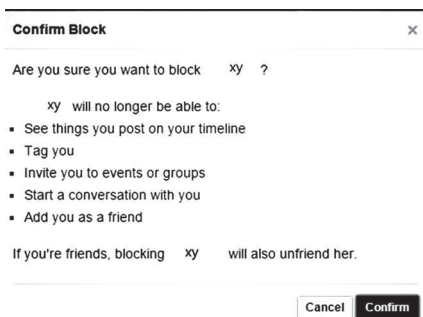


Figure 5: Confirm Button for Blocking on Facebook.

A study by Madden et al. found that 74 % of teen Facebook users have deleted people from their friend list, and 58 % have blocked friends from their SNS. Girls tend to delete or block users more than boys do. People with a large number of friends on SNSs display a greater tendency to block or delete their friends from SNSs (Madden et al., 2013). Additionally, we investigated whether the use of friending, unfriending, and blocking serves as a set of essential privacy management techniques for controlling who sees which content and when. People with a large number of SNSs friends are more likely to block and delete their friends,

compared with those who have a smaller network. Deleting friends from SNSs is becoming a frequently used function, as between 2009 and 2011, more users deleted some portion of their Facebook friends (Madden, 2012).

People who make the receiver look bad by posting face-threatening acts (FTA) are likely to be hidden on Facebook by the receiver. FTAs that damage the relationship are disrespectful, tactless, and insensitive messages that induce people to hide contacts on Facebook. People who are physically und socially unattractive tend to get hidden by the receiver of a message on Facebook. Hiding is not considered as extreme as unfriending. Users tend to hide others when receiving a face-threatening SNS update rather than to unfriend this user on Facebook (Peña & Brody, 2014).

This leads to our formulating a fifth RQ:

RQ5a: *Do people use the hide and block application as an alternative to unfriending?*

RQ5b: *Why are individuals using hiding and blocking instead of unfriending?*

Unfriending Memory

Normally, users do not notice they have been unfriended by a former SNS friend. If they keep track of the number of friends they have, however, they may see that figure has declined. Alternatively, individuals search their friendship list for additions or abstinences and do not find a former contact (Sibona, 2014a).

This leads to our formulating a sixth RQ:

RQ6a: Do users remember more those friends they have unfriended actively on Facebook, or those who have unfriended them?

RQ6b: How do users notice that they have been unfriended?

RQ6c: Unfriending applications (apps): How many people use such apps?

Study Design and Data Collection

This study was conducted using a German-language survey to investigate respondents' opinions, behavior, reasons, and emotions concerning unfriending and being unfriended on Facebook. The survey was distributed online, mainly using Facebook groups from different universities or other communities in Germany, Austria, and Switzerland. The questionnaires were active between July 5 and July

31, 2014 (i.e., for a total of 26 days). In total, 2,517 surveys were started. Of the participants, 88 indicated they have never unfriended someone or been unfriended. A total of 2,201 individuals completed the survey, meaning, they answered all of our obligatory questions.

The items of our survey are a blend of Sibona's questions (Sibona, 2013; Sibona, 2014a; Sibona, 2014b; Sibona & Walczak, 2011) and new questions. The study was designed to take about 25 minutes to complete. All questions were obligatory, but everyone had the opportunity to abstain from answering a question by choosing the option "Not Applicable." The raw data were collected via a commercially available survey tool (Umfrage-Online) and analyzed with IBM SPSS Statistics 21.

Our survey used methods of descriptive statistics, such as percentages to find differences and communalities among the answers. In addition, the study applies factor analysis to investigate factors among the questions. Factor analysis was used to partition questions into meaningful groups. Constructs were generated, based on factor analysis and interpretation of the results.

Results

Demographic Data

The questionnaire was answered by Facebook users only. Those who stated they had never been unfriended or had unfriended someone else were excluded from the survey. On average, the students were 23 years old. The survey was started by 2,517 respondents and completed by 2,201 respondents, $N = 632$ male, $N = 1,557$ female, and 12 respondents who did not specify gender. This study considers only those who finished the questionnaire. Expressed in percentages, the majority of respondents (70.7 %) was female, and close to one-third (28.7 %) was male; only a small proportion of the survey respondents (0.5 %) did not specify their gender. The majority of survey respondents (71.2 %) have a high school diploma, and 25.9 % have a graduate degree. Of respondents, 1.8 % have a general certificate of secondary education, only 0.5 % have a certificate of secondary education. 0.1 % have no degree, and 0.5 % did not specify whether they have graduated.

To assess the two-sided statistical significance between genders, we performed a chi-square test, based on Pearson's. Our study distinguishes four levels of statistical significance: the 95 % level (marked by one asterisk "*"), the 99 % level (marked by "***"), and the 99.9 % level (marked by three "****"). All other cases less than the 95 % level are "not significant" and are labeled "ns."

Table 1: Time Users Spend on Internet and Facebook.

	Women Mean (Median) SD	Men Mean (Median) SD	Sig
Internet	165.02 (120) 137.407	228.59 (180) 174.704	***
Facebook	63.97 (40) 77.577	67.11 (30) 99.981	Ns

Women $N = 1,557$, Men $N = 632$; Not Applicable $N = 12$; SD: Standard Deviation; Unit: Minutes per Day.

On average, respondents spent 183.5 minutes a day on the Internet and 64.86 minutes of this period on Facebook. Our study ascertained men spend more time than women on the Internet and on Facebook (see Table 1).

Slightly more than half of the participants (58.1%) stated they befriended some of their friends only because they could not say “No” to them. The other 41.9% did not accept someone’s friend request because they did not want to be friends with them. More women than men tended to accept friendship requests on Facebook because they felt they could not say “No” (women = 60.3%, men = 52.7%).

For the majority (86.3%) of respondents, gender is irrelevant in making an unfriending decision: only 7.9% unfriends more male friends than female, and 5.8% stated they unfriend more female Facebook friends than male. Both female and male respondents seem to unfriend minimally more male friends on Facebook than female friends. Female friends are unfriended by 4.3% of male users and by 6.4% of female users, while male friends are unfriended by 6% of the same gender and by 8.7% of female friends. Compared with men, women distinguish more often between genders when unfriending another user (women = 15.1%, men = 11%).

Factor Analysis

Factor analysis was performed by the questions with many answering options in order to determine how many dimensions are in the set of variables among the different questions. Factor analysis is a means to identify clusters or groups of related items or factors. Factors are formed relatively independent of one another. The principal component analysis was used to determine whether there are distinct factors that can transform a number of original variables into a smaller set of factors. To determine factor loadings, the Varimax rotations function was used. Component groupings were then analyzed and named according to the questions in the group.

Friendship Dissolution

Types of Unfriended Friends

Which type of friend do you mostly unfriend on Facebook? To answer this question, we allowed multiple items to be selected. The answering options were adopted from the 2014 study by Sibona and Walczak (2014a).

Table 2: Types of Friends Unfriended by Survey Respondents (in Percent).

Type of friend	All %	Female %	Male %	Significance
Friend of a Friend	40.1	42.2	35.0	*
Internet	37.0	38.5	33.4	*
Other school Friend	23.3	25.1	18.7	**
High School Friend	20.5	20.2	21.0	ns
Grade School	15.3	16.2	13.1	ns
Not Applicable	14.3	12.5	18.8	***
Romantic Partner	14.3	15.1	12.2	ns
College	10.6	10.3	11.1	ns
Different Interests	8.4	7.5	10.6	*
Other	7.8	5.6	2	ns
Work	4.9	4.6	5.7	ns
Friend Through Parent	4.9	5.3	3.8	ns
Neighbor	3.4	4.0	1.9	*
Family Member	2.6	2.3	3.5	ns
Friend Through Partner	2.6	2.8	2.2	ns
Church	1.1	0.9	1.7	ns
Common Interests Friend	0.5	0.5	0.6	ns
Friend Through Child	0.4	0.3	0.6	ns

N = 2,201: Women *N* = 1,557, Men *N* = 632, Not Applicable *N* = 12

Sibona's study (2014a) indicated that high school friends (18.6%) are mostly unfriended by survey respondents, followed by the category "other" (12.5%). Other friends are all those types not included among the answer options. The third type of friend unfriended most often is friend of a friend (11.7%), work (10.9%), and friends with common interests (10.5%). The other friend types are unfriended by less than 10% of our participants. This study showed the majority of unfriending occurs with friends of a friend (40.1%), followed by Internet friends (37%). In addition, friends from a different school, which was not listed among the given answers, tend to be unfriended often, for example, other school friends (23.3%), high school friends (20.5%), grade school friends (15.3%), and college friends (10.6%). The answer option "Not Applicable" was chosen by 14.3%, meaning 14.3% chose not to specify the type of friends they unfriend most often. Romantic partners are unfriended by 14.3% of respondents. Friends with different interests (8.4%), other (7.8%), work (4.9%), friend through parent (4.9%), neighbor (3.4%), family member (2.6%), friends through partner (2.6%), church (1.1%), friends with common interests (0.5%), and friends through child (0.4%) are unfriended by a minority of our respondents. We observe some differences between our study and Sibona's study (2014a), which found that high school friends are the type of friend unfriended most often. In contrast, with our sample, high school friends are the fourth most common type of friend to be unfriended, while a friend of a friend is the type unfriended most often.

There are statistically significant differences between female and male participants. The most unfriended type of friend, namely, "Friend of a Friend" (40.1%), is unfriended by 42.2% of all female participants and 35% of all male respondents. Internet friends also are more often unfriended by women (38.5%) than by men (33.4%). Unlike other school friends, who are unfriended more by women than by men (women = 25.1%, men = 18.7%), and high school friends are unfriended more often by men (21%) than by women (20.2%). The only friend type unfriended much more often by men than by women is friends with different interests (men = 10.6%, women = 7.5%). Men choose "Not Applicable" more often than women did, which we understand because male respondents mostly want to abstain from answering which type of friends they unfriend (men = 18.8%, women = 12.5%) to a greater extent than female respondents do. This is the result with the highest significance level in this category. All friend types unfriended by more than 10% of all respondents (either men or women) are unfriended more often by women than by men, with the exception of "High School Friend," "College," and "Not Applicable" (see Table 2).

Unfriending: End of the Relationship?

To learn how unfriending relates to a relationship in real life, we asked the following question: “Is the end of the relationship on Facebook also the end of the relationship in real life?” This question was answered by 2,201 respondents – 1557 women, 632 men, and 12 respondents who did not specify their gender.

Sibona estimated that the visible link on Facebook, which shows that a Facebook relationship is over, could also be a signal for the real-life relationship having ended as well (Sibona & Walczak, 2011). Our study revealed that indeed for 30.2%, unfriending on Facebook also terminated the real-life relationship. For 47.8% of the survey respondents, however, terminating the friendship on Facebook did not end the friendship in real life. The other 22.0% did not specify whether the end of the relationship on Facebook also led to the end of the real-life relationship.

Exactly 32% of women and 25.8% of men stated the end of a relationship on Facebook was also the end of the relationship in real life. More men than women stated that unfriending does not represent the end of the relationship in real life (men = 51.1%, women = 46.4%). About 20% of both men and women did not specify whether unfriending was also the end of the relationship in real life (men = 23.1%, women = 21.6%).

Real-Life Friends Versus Virtual Friends

We asked, “Which friends are more important to you, those in real life or virtual friends?” This question was based on a 1–7 point Likert-type scale. Additionally, the option to withhold the answer was an option.

Real-life friends are more important for the respondents of this study than virtual friends are. The median for real-life friends is 1 (very important), while the median for virtual friends is 5 (slightly important). The standard deviation is 1.507 for virtual friends and 0.840 for real-life friends. Participants with more than 500 friends on Facebook also indicated their real-life friends are more important to them than their Internet friends are, as did the participants who indicated they have fewer than 50. The number of friends on Facebook does not play a role in the decision concerning which type of friend is more important. This means that even if someone has more than 500 friends on Facebook, real-life friends will be more important to this person than the virtual ones. The same result was found for those with fewer than 50 Facebook friends. All results in this area are extremely significant.

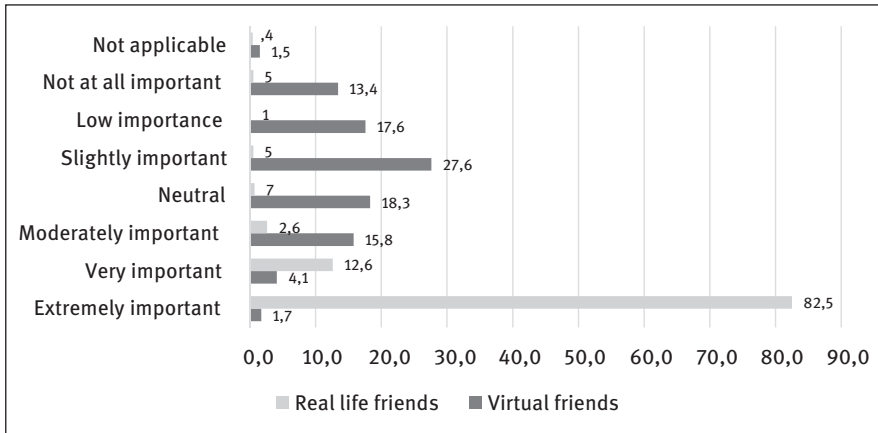


Figure 6: Importance of Virtual Friends Versus Real-Life Friends. ($N = 2,201$)

In Figure 6, we can clearly observe that real-life friends, compared with virtual friends, are more important to survey respondents. The majority of participants (82.5%) stated real-life friends are extremely important. Just 1.7% stated virtual friends are more important. For 27.6%, virtual friends are only slightly important, in contrast to a minority (0.5%) for whom real-life friends are only slightly important to them. A scant 0.5% stated real-life friends are not important at all, while 13.4% stated virtual friends are not important at all (see Figure 6).

Number of Friends

Another question in this area asked about the amount of Facebook friends. To answer this question, survey respondents chose from among 12 options. Their answers were thus unique. This question was answered by 2,201 participants.

Quercia's survey revealed young adults have an average of 300 Facebook friends (Quercia et al., 2012). Our survey showed that Facebook users (on average 23 years old) are mostly befriended by 100 to 200 friends on the site. A minor share (3.9%) indicated they have fewer than 50 Facebook friends. An additional minor share (3.6%) stated they have 450 to 500 Facebook friends. A larger share (11%) indicated they have more than 500 Facebook friends. Participants are thus likely to have 100 to 350 friends on Facebook (see Figure 7).

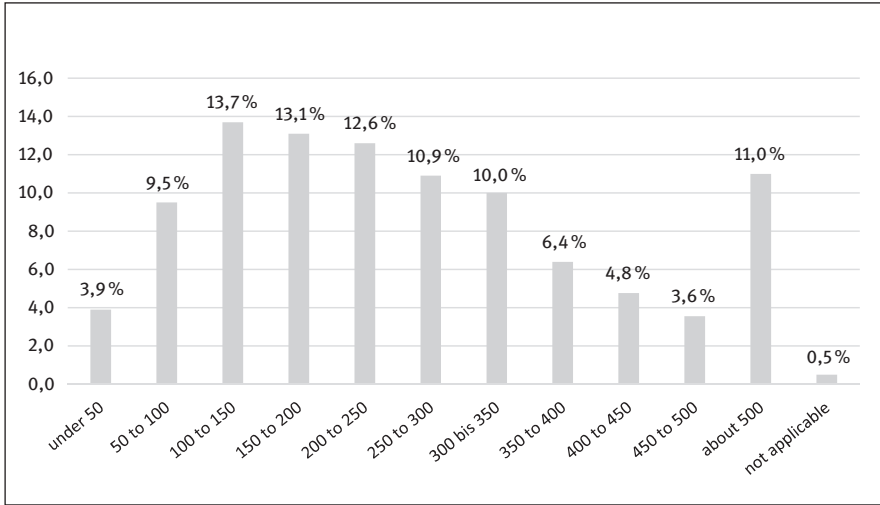


Figure 7: Number of Friends Users Have on Facebook. ($N = 2,201$)

There do not seem to be any significant differences between the genders regarding the amount of friends they have on Facebook. The only significant difference is for the category “more than 500.” More men than women stated that they are have more than 500 Facebook friends (men = 14.7 %, women = 9.6 %).

Reasons for Unfriending

Online Reasons for Unfriending

What prompts Facebook users to unfriend some of their friends? To answer this question, we allowed multiple items to be selected. We differentiated between reasons in the digital world (“online reasons,” 28 options) and reasons rooted in the physical world (“offline reasons,” 16 options). Most answering options were adopted from a study by Sibona and Walczak (2011). A distinction is made here between men and women, as well as “Not Applicable” respondents.

Table 3: Online Reasons Prompting Facebook Users to Unfriend Some Friends.

	All %	Women %	Men %	Sig
Posting Frequently	50.6	52.4	46.4	**
Game Requests	34.5	34.3	35.4	ns
Unimportant	33.4	33.2	33.7	ns
Others	28.7	30.9	22.9	**
Inappropriate	25.9	26.0	25.6	ns
Racist	18.4	18.6	18.0	ns
Promotion	16.8	14.6	22.3	***
Politics	15.3	13.9	18.4	*
Insulting	12.0	12.3	11.6	ns
Sexist	11.9	12.1	10.9	ns
Not Applicable	10.8	9.8	13.3	*
Religion	10.1	8.6	13.9	***
No Response to my Messages	5.9	5.8	6.2	ns
Spouse	5.7	6.1	4.9	ns
Eating	5.1	4.9	5.5	ns
Swaggering	4.9	5.1	4.4	ns
Purchases	4.5	4.0	5.7	ns
Low Activity	3.8	3.6	4.3	ns
Exercise	3.5	3.6	3.2	ns
Swear	2.9	3.0	2.7	ns
Celebrities	2.2	1.3	4.1	***
Child	2.1	2.3	1.7	ns
Sex	1.6	1.8	1.1	ns
Pets	1.8	1.3	2.7	*
Sports Scores	1.8	1.7	1.7	ns
Job	1.3	0.9	2.4	*
Hobbies	1.0	0.8	1.3	ns
Sports Activities	0.8	0.6	1.1	ns

N = 2,201: Women *N* = 1,557, Men *N* = 632, Not Applicable *N* = 12

Sibona and Walczak (2011) demonstrated the main online reasons that people unfriend others are for posts on unimportant and inappropriate topics, and the number of posts. Our study confirms the importance of posting frequency for unfriending. For 50.6% of our respondents, too many posts are the triggering incident to unfriend someone. By the way, too little posting activity hardly ever (3.8%) provokes unfriending. Furthermore, too many game requests (34.5%), unimportant posts (33.4%), inappropriate posts (25.9%), and racist posts (18.4%) are also reasons for unfriending. Politics (15.2%), sexist posts (11.7%), and religion (10.0%) play minor roles in unfriending.

We observed some differences between the genders in online reasons for unfriending others. The largest difference between men and women in unfriending someone occurs when a Facebook friend posts too many promotional posts on Facebook (men = 22.3%, women = 14.6%). There is also a difference in how each group tolerates “Posting Frequently.” When someone posts too frequently on Facebook, we discovered they are unfriended more by female rather than by male friends (women = 52.4%, men = 46.4%). Men tend, more than women, to unfriend their Facebook friends when they post on topics about religion (men = 13.9%, women = 8.6%). This difference is extremely significant. Girls seem to have a wider variety of reasons than boys do (which are not listed on the table) for unfriending, and choose the category “Others” more frequently than boys (girls: 30.9% vs. boys: 22.9%). The difference among the other reasons is less than 5% (see Table 3).

Offline Reasons for Unfriending

Table 4: Offline Reasons Prompting Facebook Users to Unfriend Some Friends.

	All %	Women %	Men %	Significance
Alienation	52.3	54.5	46.7	**
Personality	51.4	54.9	43.0	***
Trust	44.4	48.4	35.0	***
Behavior	43.5	46.4	36.6	***
Dislike	28.5	27.9	30.1	ns
Romantic End	28.4	29.7	25.2	*
Quarrel	26.8	30.3	18.4	***

Tab. 4 (continued)

	All %	Women %	Men %	Significance
Geographical Distance	21.5	20.9	23.4	ns
New Information	20.1	21.0	18.0	ns
Betrayal	17.9	18.3	17.4	ns
Incompatible Friends	17.0	16.3	19.1	ns
Comitted Misdeed	6.5	6.7	6.2	ns
Not Applicable	4.5	2.8	8.9	***
Broke Rule	4.2	3.7	5.4	ns
Other	3.7	3.5	4.1	ns
Divorce	1.2	1.2	1.1	ns

N = 2,201: Women *N* = 1,557, Men *N* = 632, Not Applicable *N* = 12

In Sibona's and Walczak's (2011) research, the top three offline reasons for unfriending were misdeeds (95%), personality (88%), and dislike (87%). Our study confirms the importance of personality (51.4%) and – to a minor degree – of dislike (28.5%), but by no means the offline reason of misdeeds (in our study, only 6.5% of all respondents reported this reason).

The most important offline reasons for unfriending are alienation (52.3%), reasons concerning the personality of the friend (51.4%), (loss of) trust (44.4%), and the behavior of the friend in real life (43.5%). In addition, the end of a romantic relationship (28.4%) or divorce (1.2%) can result in unfriending on Facebook. Sometimes, geographical distance is a reason for unfriending (21.5%).

We offered a list of 16 offline reasons, and only six were chosen by men as why they would be more likely to unfriend their friends than women do: dislike (men = 30.1%, women = 27.9%), geographical distance (men = 23.4%, women = 20.9%), incompatible friends (men = 19.1%, women = 16.3%), and rule breaking (men = 5.4%, women = 3.7%). Not Applicable and Other are also selected more frequently by men than by women. Not Applicable (men = 9.8%, women = 2.8%) and Other (men = 4.1%, women = 3.5%) are also reasons selected more often by male respondents than by females (see Table 4). Compared with online reasons, offline ones are more often significant.

We found extremely significant difference between the genders. "Trust" is more important to women (48.4%) than to men (35.0%), with women being more likely to unfriend a user when trust has been broken. Women also have a

greater tendency to unfriend someone if they do not like a Facebook friend's personality (women = 54.9 %, men 43.0 %). Another extremely significant reason is "Quarrel," with women more likely to unfriend a user after a quarrel (women = 30.3 %, men = 18.4 %). If a user does not behave well in real life, then he or she is more likely to be unfriended by girls than by boys. Almost half of our female respondents (46.4 %) indicated that they unfriend another user because of his/her real-life behavior, while only 36.6 % of male participants stated they do so.

In general, offline reasons seem to be a bigger initiator for women when unfriending others on Facebook (see Table 4).

Online and Offline Reason Factors for Unfriending

Because of the great number of reasons, a factor analysis was performed to find common factors among the different reasons. The factor analysis sums up the 28 variables/online reasons to 8 reasonable factors for online and offline reasons.

Table 5: Online Factors Prompting Facebook Users to Unfriend Some Friends.

Online Reasons for Unfriending Others		
Factors	Reasons	Factor Loadings
Factor 1 Negative Posts	Sexist	.771
	Racist	.678
	Insulting	.673
	Swear	.547
	Inappropriate	.517
Factor 2 Showing-off	Eating	.743
	Purchases	.715
	Swaggering	.599
	Exercise	.545
Factor 3 Unimportant	Posting Frequently	.757
	Unimportant	.697
	Game Requests	.592
	Promotion	.503
Factor 4 Hobbies	Sports Activities	.769
	Sports Scores	.679
	Hobbies	.667
Factor 5 Ideology	Politics	.813
	Religion	.769

Tab. 5 (continued)

Online Reasons for Unfriending Others		
Factors	Reasons	Factor Loadings
Factor 6 Favorites	Pets	.612
	Celebrities	.530
	Children	.480
Factor 7 Lack of virtual activity	Low Activity	.737
	No Response to my Messages	.560
Factor 8 Gender	Sex	.713
	Spouse	.649

N = 2,201. Excluded from the calculation: Not Applicable

Table 6: Offline Factors Prompting Facebook Users to Unfriend Some Friends.

Offline Reasons		
Factor 1 Breakup	Trust	.651
	Behavior	.630
	Quarrel	.598
	Romantic End	.528
	Personality	.484
	Betrayal	.401
Factor 2 Bad Behavior	Committed Misdeed	.742
	Broke Rule	.688
	Betrayal	.505
Factor 3 Distance	Incompatible Friends	.742
	Geographical Distance	.717
	Alienation	.514
Factor 4 Bad Discoveries	New Information	.654
	Dislike	.636
	Personality	.405

N = 2,201. Excluded from the calculation: Not Applicable

We present the rotated factor loadings, which represent both how the variables are weighted for each factor and also the correlation between the two (see Table 5). Because these are correlations, possible values range from -1 to $+1$. On the format subcommand, the option blank (.40) was used, which commands SPSS to only print the correlations that are .4 or greater than .4. This makes the output

easier to read and to interpret by removing the values of low correlations that do not have any great importance.

The principal components analysis (PCA) reveals a total of 12 factors, 8 for online reasons and 4 for offline reasons. These factors predict for which of the summarized reasons people unfriend their friends on Facebook.

We divided the factor analysis into two parts: online reasons, which lead users to unfriend their Facebook friends, as well as offline reasons. For the online reasons, the factor analysis collected 25 online reasons, divided into 8 factors.

The first factor was named **Negative Posts** because the items “Exist,” “Racist,” “Insulting,” “Swear,” and “Inappropriate” load highly in this factor. These items describe posts with negative content, which prompt Facebook users to unfriend their friends.

The factor **Showing off** collects items, demonstrating people’s wealth and material possessions. Items in this factor are “Eating,” “Purchases,” “Swaggering,” and “Exercise.” We found that people who show off their material goods and who gloat on Facebook tend to be unfriended.

The third factor collects **Unimportant** topics. It contains items that hint at the amount of posts the receiver finds uninteresting, such as frequent game requests and inappropriate postings.

The **Hobbies** factor sums up the items in posts that describe activities and hobbies the sender enjoys for fun.

Ideology summarizes statements representing political and religious ideals, meaning people who post political or religious content that does not represent the receiver’s opinions tend to be unfriended by the receiver.

Favorites are posts about pets, celebrities, and children categorized in one factor. We see this factor represents people who unfriend those users who post about their favorites or idols.

Lack of Virtual Activity is the factor representing low activity on Facebook.

Gender. This factor summarizes items that are connected to gender, meaning that people unfriend others because of their gender and often because the partner disagrees about contact on Facebook with other men or women.

For offline reasons, which include 15 variables/offline reasons, 4 factors were found.

Breakup. This factor sums up the items that hint at reasons prompting someone to cancel contact with a person or that represent the end of a relationship. The offline items bundled in this factor suggest the two people involved were in a relationship that has been terminated due to betrayal, which led the unfriending user to no longer trust the other.

Bad Behavior items are bundled into one factor. It is obvious these items are evidence for people's bad actions, such as breaking a rule, committing a misdeed, or betrayal.

Distance represents items indicating a dyad is separated by geographical or social distance.

Bad Discoveries was chosen for the fourth and final factor, which summarizes new information prompting people to dislike and unfriend others on Facebook.

Emotional Response

Sibona's (2014b) research indicated that being unfriended triggers an emotional response. For users who have been (passively) unfriended, emotional effects consist mainly of surprise, amusement, or sadness. Prior to our work, we found no studies on the emotional states of the (actively) unfriending users. Therefore, we asked two questions: 1) What is the emotional response after being (passively) unfriended on Facebook? 2) What is the emotional response after (actively) unfriending others on Facebook? For the passive aspect, additionally, we asked respondents to estimate the unfriending user's importance (is someone important/unimportant to me). We worked with 15 answering options, some of them adopted from Sibona (2014b).

Table 7: Users' Emotional Response After Being (Passively) Unfriended on Facebook.

Sig	By an important Person			By an unimportant Person			Emotion	Sig
	%	%	%	%	%	%		
ns	50.6	47.3	49.5	Surprised	3.4	3.8	2.4	ns
***	47.9	39.6	45.3	Disappointed	2.0	1.9	2.1	ns
**	44.8	37.8	42.6	Bothered	2.2	2.4	1.7	ns
***	45.0	30.2	40.8	Sad	1.5	1.2	2.5	*
**	26.8	21.2	25.0	Offended	3.2	3.6	2.1	ns
ns	13.5	13.4	13.4	Frustrated	0.8	0.6	1.3	ns
**	14.8	10.1	13.4	Angry	0.5	0.4	0.8	ns
ns	6.7	4.6	6.0	Ashamed	0.8	0.9	0.3	ns
ns	4.1	5.1	4.4	Amused	1.0	1.2	0.8	ns

Tab. 7 (continued)

By an important Person				By an unimportant Person				
Sig	%	%	%	Emotion	%	%	%	Sig
ns	3.3	1.9	2.9	Fearful	0.2	0.3	0.2	ns
ns	1.6	1.7	1.8	Other	0.0	0.0	0.0	ns
ns	1.3	1.6	1.4	Neutral	0.6	0.5	0.8	ns
ns	0.8	1.7	1.1	Not Applicable	0.3	0.2	0.5	ns
ns	0.6	0.0	0.4	Unburdened	0	0.1	0.0	ns
ns	0.1	0.0	0.1	Happy	0	0.0	0.2	ns
	85.2	79.0	83.4	Emotional Response	6.8	7.0	6.2	
	12.1	18.4	13.9	No Emotional Response	91.5	91.3	92.1	

N = 2,201: Women *N* = 1,557, Men *N* = 632, Not Applicable *N* = 12

Only 6.8% of our survey respondents indicated they mind if they are unfriended by someone unimportant. Of respondents, 85.2% specified they mind if an important friend unfriends them on Facebook. Table seven shows the emotional response of those who stated they mind if someone important or important unfriends them. Only a few respondents are surprised (3.4%), offended (3.2%), bothered (2.2%), disappointed, (2.0%), or sad (1.5%) if they are unfriended by an unimportant person. If someone important unfriends a user, however, the picture changes dramatically. If that occurs, then about half of all unfriended persons feel surprised (49.5%), disappointed (45.3%), sad (40.8%), bothered (42.6%), offended (25.0%), frustrated (13.4%), or angry (13.4%). Not every unfriending act is experienced negatively, only that by someone important to the user.

Our survey shows the experience of being unfriended by important people can trigger negative emotions. Participants were asked whether their emotions depend on other factors, such as the length of the friendship, the number of friends, and the strength of the friendship. Of participants, 87.5% expressed their emotions depend on the strength of the friendship, and 47% stated their emotions are determined by the length of the friendship, but only 1.5% agreed their emotions depend on the number of their Facebook friends.

We observed some differences between women and men in the emotional response to being unfriended by someone important, the most significant differences being marked with “*,” depending on the level of significance. Nearly 15%

(14.8%) more women than men stated they feel sad when they are unfriended by someone important on Facebook (women = 45.0 % vs. men = 30.2%). Women and men differ also in the emotion “disappointment.” Compared with men, women seem to be more disappointed when they have been unfriended by someone important on Facebook (women = 47.9 %, men = 39.6 %). Women are also more bothered than men when they learn someone important has unfriended them (women = 44.8 %, men = 37.8 %). Offended also occurs more from female respondents (25.0 %) than males (21.2%). The other emotional responses do not indicate significant differences between the genders, with approximately the same occurrence in both women and men.

Gender differences in emotional responses to being unfriended by someone unimportant are not significant with one exception, namely, the emotional response “sad.” Contrary to being unfriended by someone important (when more women than men stated they feel sad after having been unfriended), more male respondents (men = 2.5 % vs. women = 1.2%) stated they feel sad when someone unimportant unfriends them (see Table 7).

Emotional Response to Actively Unfriending

Based on the emotional response to being unfriended by either someone important or unimportant, we designed a new question concerning the emotional response to unfriending others. The multiple responses are a selection of Sibona’s former studies, completed by our own items (2014b).

Table 8: Users’ Emotional Response After (Actively) Unfriending Others on Facebook.

Emotion	All %	Women %	Men %	Sig
Neutral	41.9	41.2	44.0	ns
Privacy Protected	37.5	42.1	26.3	***
Free	31.3	32.8	27.5	*
Unburdened	31.3	34.0	24.4	***
Remorse	10.0	11.1	7.4	**
Amused	5.7	4.3	9.2	***
Not Applicable	4.3	3.2	7.0	***
Happy	4.0	4.1	3.6	ns

Tab. 8 (continued)

Emotion	All %	Women %	Men %	Sig
Disappointed	2.7	2.0	4.4	***
Sad	2.5	2.4	2.5	ns
Angry	2.4	1.8	3.8	**
Other	1.6	1.3	2.2	ns
Ashamed	1.2	1.4	0.6	ns
Frustrated	1.1	1.0	1.4	ns
Surprised	0.7	0.5	1.3	ns
Bothered	0.7	0.5	1.1	ns
Fearful	0.4	0.5	0.2	ns

N = 2,201: Women *N* = 1,557, Men *N* = 632, Not Applicable *N* = 12

For many of the active unfrienders, the act of unfriending is emotionally neutral (41.9%). Some people feel their privacy has been protected after unfriending another user (37.5%) or simply feel “free” (31.3%) and unburdened (31.3%). Emotions are seldom connected to an unfriending act. Sometimes, we observe positive emotions such as amusement (5.7%) and happiness (4.0%), and to a lesser degree, negative emotions, such as sadness (2.5%) and anger (2.4%).

Here, there are some gender differences as well, for example, the emotional response “unburdened.” Nearly 10% more women (34.0%) than men (24.4%) feel unburdened when they unfriend someone on Facebook. Roughly twice as many men feel disappointed when they unfriend others. Amusement is an emotion that occurs statistically significantly more in men than in women (men = 9.2% vs. women = 4.3%).

Factors for Online Reasons Offered for Unfriending Others on Facebook

We also conducted a principal component analysis (PCA) to indicate which emotions can be summarized into factors so we can find similarities between emotion items.

Table 9: Factor Analysis of Emotional Response to Being Unfriended by Someone Important.

Factors	Emotions	Factor Loadings
Factor 1 Unencumbered	Neutral	-.747
	Unburdened	.656
	Free	.656
	Privacy Protected	.560
Factor 2 Unlucky	Disappointment	.738
	Sad	.633
	Angry	.579
	Frustrated	.418
Factor 3 Awkward	Ashamed	.725
	Fearful	.649
	Remorse	.552
Factor 4 Lucky	Amused	.725
	Happy	.669
Factor 5 Astonished	Bothered	.720
	Surprised	.676
Factor 6 Neutral	Neutral	.419

Excluded from the calculation: Not Applicable

Table 10: Factor Analysis of Emotional Response to Being Unfriended by Someone Unimportant.

Being unfriended by an unimportant person		
Factor 1 Desperate	Sad	.745
	Disappointed	.691
	Offended	.635
	Angry	.627
	Surprised	.574
	Bothered	.561
	Ashamed	.476
Factor 2 Pent-Up	Happy	.848
	Fearful	.785
	Frustrated	.440
Factor 3 Released	Amused	.748
	Unburdened	.745
Factor 4 Unexpectedly	Neutral	.829
	Surprised	.493

Excluded from the calculation: Not Applicable

Table 11: Factor Analysis of Emotional Response to Unfriending Others on Facebook.

Factors	Emotions	Factor Loadings
Factor 1 Disgruntled	Angry	.700
	Frustrated	.655
	Sad	.621
	Offended	.601
	Disappointed	.595
Factor 2 Astonished	Surprised	.818
	Bothered	.691
Factor 3 Awed	Fearful	.766
	Ashamed	.731
Factor 4 Unperturbed	Unburdened	.774
	Neutral	.648
Factor 5 Amused	Amused	.845
Factor 6 Happy	Happy	.956

Excluded from the calculation: Not Applicable

Tables 9, 10, and 11: The rotated factor loadings are presented, which represent both the emotion variables weighted for each factor and the correlation between those variables and the factor. Here, the option blank .4 is also used, so only correlations that are .4 or greater are indicated.

The principal component analysis revealed a total of 16 factors, including every emotion: those felt when being unfriended by some important Facebook friend by friends who are not so important as well as the emotion of unfriending other users. For each of the three categories, five factors have been determined. This part of the investigation examines those factors that predict the emotional response a Facebook user may experience when he or she is unfriended by Facebook friends.

We present 6 factors collected from the 14 items representing the emotional response to being unfriended by someone important on Facebook (see Table 9). Next, we present the 4 factors, also collected from items similar to those in Table 9, that predict the emotional response of being unfriended by someone unimportant (see Table 10). Finally, 6 factors representing the emotional response to unfriending others on Facebook are presented (see Table 11). Those 6 factors were collected from 15 items similar to those in Tables 9 and 10, with the addition of the item “Privacy Protected.” The items “Other” and “Not Applicable” are not consid-

ered in any of the tables of the factor analysis because those two emotions are not important for analyzing emotional response.

Disgruntled is the first factor, obviously representing negative emotions only, such as angry, frustrated, and so forth. Therefore, we can state if a user has been unfriended by someone important and feels angry about it, they will also feel disappointed, offended, sad, and frustrated.

Astonished occurs in all three categories: when users are unfriended by someone important, by someone unimportant (passive unfriending), and when users unfriend (actively) others on Facebook. This factor collects two variables, “surprised” and “bothered.” These are two emotions people do not expect to feel, rendering them astonished.

The **Awed** factor collects two variables that can be interpreted as awed, since both of them suggest negative emotions, a kind of indisposition.

This factor is called **Unperturbed** because this term includes positive feelings, such as unburdened or neutral, which are neither positive nor negative, and because the combination of a positive emotion such as unburdened or neutral results in an emotion that is balanced or unperturbed.

Amused, Happy, and Neutral are the only factors that do not have communality with other items. This is why these three factors are simply named analogously to the respective item.

The **Desperate** factor collects the majority of negative emotional responses. This factor represents the worst feelings. Sadness, disappointment and frustration, anger, and offending are emotions that make people feel desperate.

The **Pent-up** factor includes one positive emotion “Happy” and two negative emotions “Fearful” and “Frustrated.” This combination of these three emotions results in feelings that are not released but rather repressed.

Released is the opposite of the factor **Pent-up**. In this factor are collected two positive emotions, “Amused” and “Unburdened.” This factor describes a positive emotional response that in a combination, results in emotions, such as easy-going, untroubled, or simply released.

Unexpectedly collects the emotions “Neutral” and “Surprised.” This description is used because “Neutral” is neither positive nor negative. “Surprised” suggests something unexpected.

The **Lucky** factor sums up the most positive emotions. Amused and happy are emotions that express happiness and a feeling of being lucky.

The **Unlucky** factor is the opposite of the factor above. Here, only negative emotional responses are collected, meaning this factor solely presents emotions that make people feel unlucky (such as “sad,” “disappointed,” “angry,” or “frustrated”).

Unencumbered collects variables representing such emotions as “Neutral,” “Unburdened,” “Free,” and “Privacy Protected.” This factor represents emotions of feeling safe as well as emotions of feeling happy, which, when combined, result in feeling carefree or, as the name of this factor suggests, unencumbered. The item “Neutral” has a negative charge. This means that this item correlates negatively with the “Unencumbered” or the other items in this factor.

The **Awkward** factor represents the items “ashamed,” “fearful,” and “remorse.” These emotions result in feeling uncomfortable or awkward when combined.

Our research investigated 15 factors that can be caused by passive and active unfriending. We investigated 6 factors relating to being unfriended by someone important as well as by unfriending others actively on Facebook, and 4 factors for being unfriended by someone unimportant. The factor analysis found similarities among the variables and indicted similarities may exist between being unfriended by someone important and by unfriending others on Facebook.

Astonished occurs two times as well, in both categories of being passively unfriended as well as in actively unfriending. This means that when a user is amused about unfriending, this individual will also feel happy when being unfriended by someone unimportant or when unfriending others. There are no other common factors among the three different categories (being unfriended by someone important, being unfriended by someone unimportant, and by unfriending others).

The first factors sum up the largest amount on items. Two first factors by being passively unfriended describe negative emotional response, while the first factor of actively unfriending describes positives emotional responses. Three factors were found that do not have communality with any other items (see Tables 9, 10, and 11).

Avoiding Contact

In order to explore contact avoidance, we posed two questions: “Do you want to see former Facebook friends you actively unfriended?” and “Do you want to see former Facebook friends who unfriended you?”

Sibona (2013) found discomfort to be an emotion reported and that some study respondents did not want to see the person again after being unfriended. Additionally, it was revealed that survey respondents also did not want to see a user they have unfriended on an SNS in real life or that they would avoid future contact (Sibona, 2013).

For our German-speaking test participants, avoiding contact is not common. Three-quarters (75.1%) of all unfrienders do not care if they meet the person whom they unfriended. Similarly, 63.8% of those who were unfriended have no problem seeing their unfrienders in real life. Exceptions were some 21.8% of those unfriended avoid seeing their unfrienders in real life. In contrast, only 10.2% of active unfrienders avoid meeting people they have unfriended.

There are no significant differences between the genders. Only two result in statistically significant in actively as well as passively unfriending, namely, “Want to see” and “Not Applicable.” For passively unfriending, more men than women stated they want to see the person in the future (men = 22.6% vs. women = 17.8%). Active unfriending shows similar results to passive unfriending. More men than women stated they want to see the person after they have unfriended them (men = 23.1% vs. women = 17.8%). Not applicable was selected by 4.6% of male respondents for active contact avoidance and by 2.1% of female respondents. Men (5.4%) and women (2.2%) abstain from answering if they would avoid future contact with those who unfriended them (passively unfriending). The “Not Applicable” results are extremely significant.

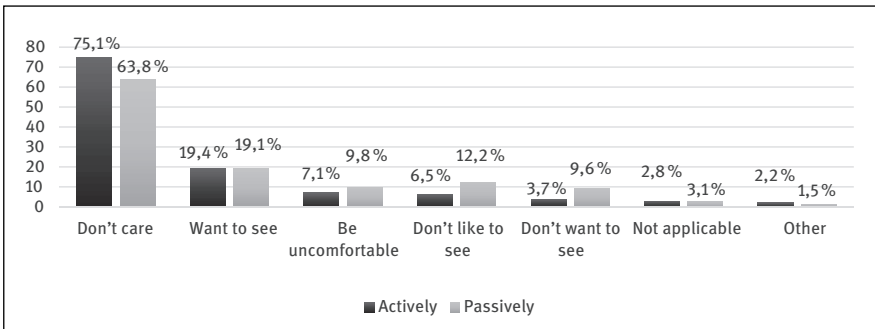


Figure 8: Do people avoid real-life contact after being (passively) unfriended? Do people avoid real-life contact with users they have (actively) unfriended on Facebook? ($N = 2,201$)

Blocking and Hiding as Alternatives to Unfriending

Hiding

To explore whether hiding is used as an alternative to unfriending, the following question was designed: “Do you use hiding as an alternative to unfriending?” If respondents stated they do not use hiding on Facebook as an alternative to unfriending, they could simply omit the next question, which asked why they used hiding instead of unfriending. For the following question, we offered five supplied answers (as well as “Other” and “Not Applicable”).

Table 12: Reasons Prompting Users to Hide Friends on Facebook.

Reasons	All %	Female %	Male %	Sig
Not to Hurt	39.2	39.8	38.2	ns
Impolite	37.6	38.5	35.9	ns
No Discussion	35.8	38.3	41.5	ns
Other	21.5	26.6	22.6	ns
Not Applicable	15.3	16.5	12.6	ns
Don't Dare	6.8	7.6	5.3	ns
Relationship Could be Over	4.4	3.5	6.2	ns

N = 1,088. Women *N* = 741, Men *N* = 340, Not Applicable *N* = 7

Unfriending is often considered as too harsh, which is why some users decide to hide someone from their news wall instead of unfriending them (Peña & Brody, 2014). Sibona presumes that because of social etiquette, some users would elect to hide their friends on Facebook rather than unfriending them (Sibona, 2014a). We discovered that for nearly half of the respondents (49.4%), hiding friends from their news wall on Facebook serves as an alternative to unfriending, meaning that those 49.4% would rather hide than unfriend their friends on Facebook. For 39.1%, however, hiding is not an alternative to unfriending. These users would rather unfriend Facebook friends than hide them. Only 9% did not want to specify whether they would hide their friends instead of unfriending them. The 49.4% who stated they use hiding as an alternative to unfriending were asked to justify their selection by using one of the given answers displayed in Table 12. About 39.2% stated they hide their friends on Facebook because they do not want to hurt them. Another 37.6% would rather hide their friends on Facebook

than unfriend them because they considered unfriending rude. An additional 35.8 % would hide their friends from Facebook because they want to avoid discussion. Another 16.3 % did not specify their opinion and chose “Not Applicable.” A minority (6.8 %) hide their friends on Facebook because they do not dare to unfriend them, and 4.4 % hide their friends on Facebook because they think that the relationship will end if they chose to unfriend instead. Sibona and Walczak (2011) estimated the visible link on Facebook, which shows a relationship on Facebook has ended, could be a signal for the real-life relationship to end as well. Our study indicated that only 4.4 % of respondents choose hiding because they fear that the relationship will end through the unfriending act.

Compared with women, more men stated they would hide someone on Facebook instead of unfriending them because they want to avoid discussion with the user (men = 41.5 % vs. women = 38.3 %). Men also use hiding information from the news wall because they are afraid the relationship could be over if they unfriend the user (men = 6.2 %, women = 3.5 %). Generally, hiding seems to be more frequently used by men than by women (men = 33.7 % vs. women = 15.4 %).

Blocking

To find out whether blocking is used instead of unfriending, we asked: “Do you use blocking as an alternative to unfriending?” The respondent had to select that he or she blocks friends before answering the next question, which asked why block rather instead of unfriending. The sub-question offered three given responses with the options to abstain from answering or to select other.

Table 13: Reasons Prompting Users to Block Friends on Facebook.

Reasons	%	Women	Men	Sig
Not to be Harassed	74.8	80.3	62.6	**
Not to be Found on Facebook	69.1	73.7	58.8	*
No Requests Anymore	67.7	72.3	59.5	**
Not Applicable	10.0	6.9	15.3	*
Other	5.0	3.1	7.6	ns

N = 421: Women *N* = 289, Men *N* = 131, Not Applicable *N* = 1

A study by Madden et al. shows that 74 % of teen Facebook users have deleted people from their friend list, and 58 % have blocked friends on their SNSs. Our study revealed that just 19.1 % block friends when they no longer want to be friends with them. The majority (66.2 %) stated that they would rather unfriend others than block them. “Not Applicable” was selected by 10.7 % of survey respondents, and 3.9 % selected “Other.”

Participants who selected they would block their friends on Facebook answered the succeeding questions as follows: 74.8 % block someone on Facebook because they do not want to be harassed by this user anymore. The second reason a user blocks someone on Facebook is users do not want to be found by the one whom they have blocked. This option was selected by 69.1 % of respondents.

The third reason why (67.7 %) people use blocking is they do not want to get friendship requests from the blocked user anymore (when a user block someone on Facebook, the blocked one can no longer send the one blocking further friendship requests or to find his or her account). Of respondents, 5 % stated other reasons for blocking people on Facebook. Blocking seems to be used more or less equally by men and women, yet there seems to be little difference among the reasons for doing so. Contrary to hiding (which more men than women use), however, more women use blocking.

Unfriending Memory

Sibona and Walczack (2011) found users are more certain of who sent them a friend request when they unfriend the person compared with those who were being unfriended. Our study investigates whether respondents generally tend to remember those they have unfriended or those who have unfriended them. To explore this idea, we asked two questions: “How many users whom you have unfriended do you remember?” and “How many friends who unfriended you do you remember?” These questions were based on a 10-point Likert-type scale, with the additional option of refraining from answering this question.

Our research shows people tend to remember those they have unfriended rather than those who have unfriended them (see Figure 8). The median for actively unfriending is 5 and for passively unfriending (being unfriended from Facebook friends) is 3. The average for unfriending others is 5.51 and for being unfriended by a friend, 3.94.

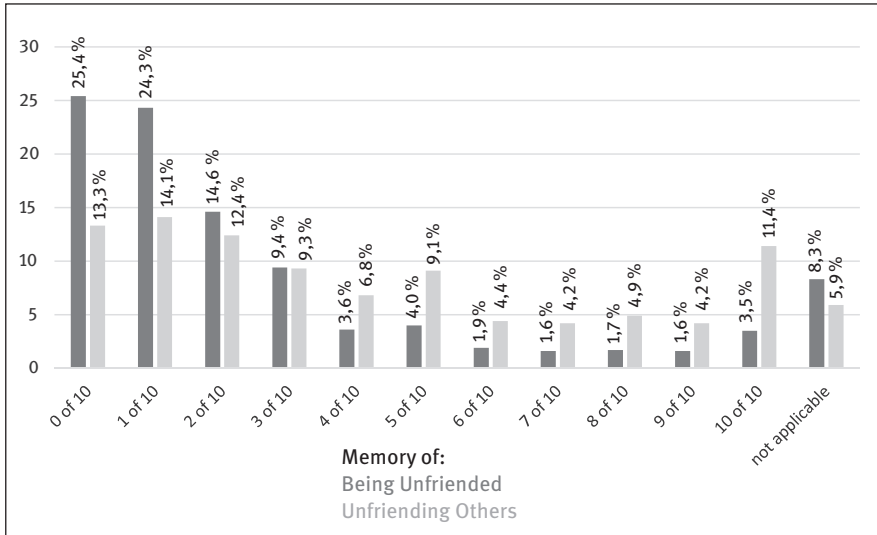


Figure 9: Memory of Being Unfriended and Unfriending Others on Facebook ($N = 2,201$).

Unfriending Notifications

To learn whether respondents realize when they have been unfriended and how they find out that someone has unfriended them, we asked two questions: “Do you notice when someone unfriends you?” and “How do you learn you have been unfriended?” For the second question, we offered three answering options “I look at my friend list,” “I use an app that shows me I’ve been unfriended,” and “By chance.” Additionally, the options to abstain from answering (“Not Applicable”) and “Other” were offered.

Facebook users mostly do not notice they have been unfriended (Sibona, 2014a). This questionnaire allowed us to determine more than half (59.1%) of the respondents indeed do not notice they have been unfriended on Facebook, compared with 40.9% who stated they did notice when they have been unfriended. The following table (see Table 14) considers those who stated they notice when someone unfriends them.

Table 14: Discovery of Having Been Unfriended.

	All %	Women %	Men %	Significance
By chance	85.8	87.2	82.3	ns
Friend list	23.2	21.6	27.8	ns
Other	7.8	7.4	8.3	ns
App	3.3	2.1	6.4	**
Not applicable	1.0	1.1	0.8	ns

N = 901: Women *N* = 634, Men *N* = 265, Not applicable = 12

Concerning being unfriended, the majority of respondents, 85.8%, stated they find out by chance; 23.2% look at their friend lists; a small minority, 3.3%, use unfriending applications; and 7.8% use other methods.

There are no significant differences between female and male respondents concerning “By Chance,” but more men than women apply an app to monitor unfriending. Male respondents also look more often in their friends list, to see if some friend has unfriended them (men: 27.8%, women: 21.6%). In other words, more men than women look actively to learn if they have been unfriended. The answer option “Other” selected by 8.3% of male respondents and by 7.4% female respondents is another indication for the idea that more men look actively to learn if someone has unfriended them. Women tend more often to learn about the occurrence passively (by chance).

Unfriending Applications

It has always been possible to find out if someone has been unfriended on Facebook: a user could visit a friend’s profile and see whether it is still marked that the two of them are friends. In addition, Facebook users can use third-party applications (apps) to be notified in the event of unfriending (Sibona 2014a).

Some apps display to the user others who have unfriended them. Unfriending applications could be attractive for Facebook users because there is no need to click on the profile of every friend to check whether you are still friends. Regardless, Facebook does not allow the use of unfriending apps because this goes against the conditions of the usage agreement, which is why Facebook deletes every unfriending app (Kruse, 2013). At the present moment (early 2016), “Who Deleted Me” is used as a download extension for the Internet browsers Google

Chrome, Firefox, and Opera, and can be downloaded as a free application for iOS and Android devices. Other applications are “Unfriend Finder,” “Unfriend Checker,” and “Who Unfriended Me.”

For our research, the application “Who Deleted Me” was analyzed. At first, no information is displayed, until someone unfriends you. A user can select to see who have unfriended him or her within the last 30 days, throughout the last week, or just yesterday. This app not only displays those doing the unfriending, but also those who *added* the user within the last month, the last week, or the day before. After installing this app, the user will receive notifications if someone unfriends him or her, if friends closed their Facebook accounts, and if friends reactivated their accounts. Furthermore, users receive a notification if they befriend someone new (see Figure 10).

There are a few drawbacks, for example, if one user unfriends another, the first user might receive a notification if or when the one unfriended decides to delete the first user.

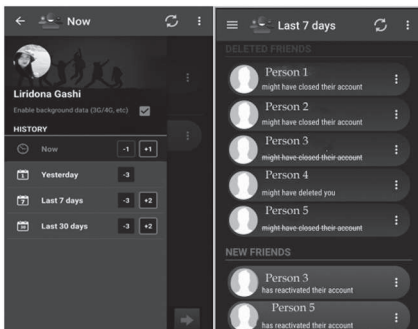


Figure 10: “Who Deleted Me” Application.

Limitation

Although many people answered the questionnaire (to our knowledge, resulting in our having compiled the largest number of respondents for all surveys conducted on unfriending on Facebook), the sampling was not random; therefore, it is difficult to estimate how the general population perceives unfriending on Facebook. Whoever wanted to fill out the questionnaire was allowed to do so on the condition that he or she is a Facebook user and has unfriended someone or have been unfriended by someone. If a respondent said that he or she had

never unfriended anyone, they would skip that section and continue to the demographic questions.

Participants in the present study were contacted via Facebook. The survey link was posted in different Facebook groups. Most of the groups we chose were from different universities because of their high numbers of members. It is thus possible the age distribution was uneven, meaning the majority consisted of college students who were roughly the same age; thus, some statements such as the least unfriended friend type “Friend through Child,” which was unfriended by only 0.4 % of respondents, may not be representative of a broader population sample. For example, it is likely if more of the respondents had been older, they would have stated they had unfriended a friend of a child more often. Another critical point could be that the survey was conducted in German-speaking countries. Therefore, the results only reflect the unfriending behavior of German-speaking people; therefore, we cannot draw a conclusion for other countries. A strong possibility exists that unfriending also depends on cultural aspects. Additionally, twice as many women as men answered the questionnaire, and this too could lead to biased results.

Conclusion

The research model of this study included six dimensions: relationship end, reasons, emotions, avoidance, alternatives, or applications for unfriending. This research model provided us with the possibility to research unfriending behavior, opinions, emotions and reasons. The focus was on passive as well as active unfriending behavior, in other words, on those who had experienced unfriending. All dimensions were analyzed, both in total as well as by gender.

Our study revealed:

RQ1: Relationship end

- Friend types who are mostly unfriended are friend of a friend, Internet friend, other school friend, and high school friend.
- Real-life friends are more important (to both male and female respondents) than virtual friends. The number of friends on Facebook does not play a role in the importance of real-life friends. Even for those with more than 500 friends on Facebook, real-life friends take precedence over virtual ones on Facebook.
- For the majority of participants (nearly 50 %), unfriending on Facebook does not end the relationship in real life. Yet for almost 30 %, unfriending does

signal the end of the relationship in real life. Women are more likely to state that unfriending indeed represents the end of the relationship in real life. In contrast to women, more men are likely to state that unfriending does not represent the end of the relationship in real life.

- Users are mainly befriended by 100–300 individuals on Facebook. Men are more likely to be befriended by more than 500 friends on Facebook.

RQ2: Reasons

- Too many posts, the number of game requests, and posting on unimportant topics are the main online reasons for unfriending someone. Men's tendency to unfriend is more likely due to promotional posts and frequent posting. Other reasons are more likely selected by women.
- Alienation, personality, and trust are the most important offline reasons. The only reasons more responsible for unfriending among men are dislike, geographical distance, incompatible friends, and rule breaking. All other reasons are more likely selected by women.

RQ3: Emotions

- Being unfriended triggers more negative emotions among those who have been unfriended by someone important than among those who have been unfriended by someone unimportant. Being unfriended by someone important triggers surprise, disappointment, and sadness. Women are more likely to be more surprised, saddened, and disappointed than men are in the event of being unfriended by someone important, while men compared with women are more likely to be saddened and disappointed by being unfriended by someone unimportant. Being unfriended by someone unimportant seems to sadden more men compared with women.
- Unfriending others on Facebook seems to trigger either no emotions or (to a lesser extent) positive emotions, such as believing one's privacy is protected by feeling free or unburdened. For men, the majority feels neutral when unfriending others, while women feel their privacy is better protected.

RQ4: Avoiding contact

- Unlike Sibona's (2013) study, which proposed it would be uncomfortable for someone to meet the user who unfriended them (Sibona, 2013), our study revealed most individuals do not mind seeing the former friend in real life. Both men and women display the same behavior in avoiding contact. The only difference is men tend to state they are willing to meet the user they have unfriended or who has unfriended them.

RQ5: Alternatives: Hiding and blocking

- Hiding is used as an alternative to unfriending. Individuals use hiding because they do not want to hurt the other user by unfriending them, they think unfriending is impolite, or they want to avoid the discussion they think will ensue if they unfriend someone. Based on those who stated they use hiding as an alternative to unfriending, men are more likely to hide than women are.
- Blocking is used because individuals do not want to be harassed, to be found on Facebook, or to receive friendship requests from someone. Based on those who selected blocking as an alternative to unfriending, men rely on blocking more than women.

RQ6: Unfriending memory

- People remember those they have actively unfriended more than they do those who unfriended them.
- Unfriending is discovered purely by chance or by taking a look into one's friend list. Individuals mostly find out by chance they have been unfriended. Men and women seem to have the same habit of finding out about having been unfriended. Men check to learn whether they have been unfriended on a more active basis than women do.
- There are applications that show users they have been unfriended by someone, such as the "Who Deleted Me" application. These applications are used rarely but more men than women use unfriending apps.

We believe the field is wide open for future research, for example, what roles do a person's age and educational background play? Does the amount of time a user spends online affect his or her unfriending behavior? Why do individuals accept (or send) friendship requests, and what does this mean for later unfriending? When or with whom do users prefer to use unfriending as opposed to blocking and just the strict filtering of messages? Are there cultural differences in unfriending behavior? All of these questions will provide fertile soil in which to cultivate further study.

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Chapter 2. Photo Publication Behavior of Adolescents on Facebook

Abstract: A persistent theme in Facebook concerns publishing photographs. This chapter aims to describe and analyze adolescent photo publication behavior on Facebook in terms of the young person's age, gender, privacy settings, and the sexting aspect. Collected dates are based on an online survey, which was conducted with 199 adolescent participants (aged 13 to 20 years old). Main constituents were prototypical pictures of 11 general picture categories, such as Portrait or Sexiness. Survey participants rated whether they would 1) choose such pictures for their self-presentation and 2) tolerate them for their friends' use as profile pictures, cover pictures, photos in their timeline, or a photo attached to a private message. The results lead us to conclude that, in general, users' tolerance for friends' usages of photos is higher than for their own self-presentation. We found that the most often used and tolerated picture category for cover pictures is a photo without any actual people in it. For all other picture types on Facebook, portraits are the type most often used and tolerated. Teens are quite careful regarding nudity. We found no adolescent willing to post photos with naked bodies on his/her timeline, and only 2% would even distribute such images via a private message. In hindsight, it is clear our survey, conducted online, and the results it provided demonstrate our developed research model with the six dimensions *User, Use, Privacy, Sexting, Picture Category, and Picture/Photo Publication Behavior* works well in studying adolescents' photo publishing behavior on Facebook.


Keywords: Adolescents, Facebook, Photo, Image, Privacy, Self-presentation, Sexting

Introduction

We live in an age in which social networking services (SNSs) accompany adolescents and adults throughout their daily routines. Our study focuses on adolescent Facebook users, aged 13 to 20 years. We ask how adolescents behave on Face-

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book concerning their postings of photos. Do they respect privacy? Are there any problems in terms of sexting? We pay special attention to both age and gender of Facebook users. We also study photo usage within the users' own content (profile pictures, cover pictures, timeline images, photos in private messages) and tolerance of their Facebook friends' photos. Our study examines the information behavior of adolescent Facebook users, as depicted by their sense of awareness and self-presentation on Facebook.

It is generally agreed Facebook is, at present, the world's most popular SNS. The site's monthly active users numbered 1.545 billion as of November 2015 (Statista, 2015). Facebook's system and services are easy for young and old alike to both use and understand. With a few mouse clicks, Facebook users can write a post, upload a new profile picture, create a photo album, "like," comment, or share posts of friends or reply requests. With a few more mouse clicks, they can start a group to discuss themes, create events, or design Facebook pages for celebrities or music groups. *Prima facie*, it seems there are no problems on the site, and this virtual life facilitates communication, regardless of distance and time. We wonder, however, if a downside exists to using Facebook. Some researchers believe it is possible: "As Facebook becomes increasingly integrated into everyday life, it becomes necessary to monitor and examine the platform's positive and negative impacts on society" (Wilson, Gosling, & Graham, 2012, p. 204). One major problem with such a simplistic interface is when every little thing someone wants to post is so easily published online, it leads to a significant amount of publicly available personal information, including photos that might best kept private. Moreover, one must remember Facebook's database never "forgets" anything added to it. Therefore, users of Facebook must remain information literate, current, aware, and cautious.

We believe the popular quotation, "A Picture Is Worth A Thousand Words" offers an effective illustration. A picture showing your smiling friend conveys happiness and satisfaction. In contrast, another photo depicting nonverbal aggression appears offensive and violent. With the aid of Facebook, its users can post "selfies" (photos a person takes of him/herself holding the camera at arm's length), as well as pictures of food, activities, clothes, quotations, and even images in which users are performing sexually or can be observed in some stage of nakedness. Many of these pictures are uploaded to Facebook with little forethought or are sent to others via private messages.

Studies have found the information behavior of Facebook users can be differentiated with regard to gender and age. A study of McAndrew and Jeong (2012, p. 2364) indicates women behave differently compared with men. They studied participants between 18 and 79 years old, and discovered women "expended more energy than men in using profile photographs as a tool for impression man-

agement” (McAndrew & Jeong, 2012, p. 2364). Could this mean, women are more reflective about the images they post on Facebook?

Information behavior is often dependent of the Facebook user’s purpose. Tifferet, Gaziel, and Baram (2012, pp. 4–5) found that one man, by changing his Facebook profile picture, appeared different to his viewers and became more appealing to single women. One Facebook profile “was accompanied by a photo of smiling young man holding a guitar; the second showed the same man without the guitar” (Tifferet, Gaziel, & Baram, 2012, p. 5). The scientists separated 100 female participants into two groups of the same size. On seeing the photo of a man without the guitar, only 5 women from the first group accepted the man’s request. Some of the female participants also responded they had a boyfriend. Sadly, they gave him a rejection. However, on seeing the photo of him with the guitar, 14 women from the second group accepted the man’s request.

Thus, picture selection can produce different results. Wang, Moon, Kwon, Evans, and Stefanone (2010, p. 232) conclude a picture’s attractiveness is an important factor in choosing whether to accept a friend’s request. “The results suggest that both male and female subjects were more willing to initiate friendships with opposite-sex profile owners with attractive photos” (Wang et al., 2010, p. 232). Nadkarni and Hofmann (2012, p. 245) creates the dual-factor model of FB use, which represents two social needs, namely, the need to belong and the need for self-presentation, as essential with regard to using the site. Facebook enables users to create a profile for self-presentation. Nadkarni and Hofman (2012) write that Facebook “leaves itself open to the possibility that its users display their idealized, rather than accurate, selves through their profiles” (p. 246).

Self-presentation encompasses not only profile pictures, but also information about hobbies, notice board updates, likes, or pictures with comments. DiMicco and Millen (2007, pp. 385–386) found via interviews that self-presentation via Facebook is dependent on one’s perceived audience. As an example, one interviewee deleted nothing and had pictures showing him “drinking alcohol (including directly out of a beer keg) and attending numerous college parties.” Such pictures were on display for all, including his employer, to view (DiMicco & Millen, 2007, p. 385). This interviewee did not see his self-presentation in Facebook as a part of his professional life, and seemed to believe it represented his personal life only. Another interviewee, however, did believe self-presentation via Facebook was more critical with regard to the business world. Before he started a new job, all information from Facebook was deleted. This interviewee “removed all photos of himself involving ‘drinking alcohol’” (DiMicco & Millen, 2007, p. 386).

Consequently, we see self-presentation in SNSs correlates with disclosure of personal information. Beldad and Koehorst (2015, p. 191) have reported the disclosure of such information of adolescent users is dependent on or influenced

by their habits, perceived control, and information-related benefits. They determined participants do not publish personal information without first thinking about the possible negative consequences.

Haferkamp, Eimler, Papadakis, and Kruck (2012, p. 95) discovered differences by using pictures in the German SNS StudiVZ relating to gender. Women prefer to use portraits of faces, while men use pictures that present their whole body, but also “the environment and other people” (Haferkamp et al., 2012, p. 95). Another interesting discovery from Haferkamp et al. (2012) found that a woman seeks to post a presentation of herself that is a “creative and elaborated fashioning” (p. 96).

Kuo, Tseng, Tseng, and Lin (2013) found that “males are more engaged in expressing information than women [...], while females are more involved in privacy control than men” (p. 641). Maybe culture also influences self-presentation (Kuo et al., 2013, p. 642). Vanderhoven, Schellens, Valcke, and Raes (2014, p. 4) indicated users release textual information such as name, date of birth, and gender. “The presence of pictures and interest [...] is proportionally high, while videos, textual wall posts, games/applications and notes seem to be less popular aspects of Facebook” (Vanderhoven et al., 2014, p. 4). Older teenagers post more pictures than younger ones.

Vanderhoven et al. (2014, p. 4) also observe women post more pictures than men do. With pictures, they not only tag more people than men do, they are also tagged more often. The authors acknowledge, however, “the amount of risk represented in pictures and videos is not very high” (Vanderhoven et al., 2014, p. 5). Thus, it is reassuring to learn only a few teenagers “show risky pictures to friends-of-friends than friends” (Vanderhoven et al., 2014, p. 5). Even so, the researchers found “23% are tagged in pictures of themselves partying, 13% in pictures in which they use alcohol, and 16% in pictures of themselves in swim [or] underwear, while these pictures can be seen by friends-of-friends” (Vanderhoven et al., 2014, p. 7). Information carrying some potential for risk includes “alcohol abuse, partying, or nudity” (Vanderhoven et al., 2014, p. 7).

With regard to gender differences Peluchette and Karl (2008, p. 96) found women post pictures or information on themes of romance or cuteness, while men post potentially risky pictures, presenting, for example, sex or alcohol. Regarding the aspect of alcohol, Burkell, Fortier, Wong, and Simpson (2014, p. 980) found in their study that participants do reflect before they publish content, instead posting then deleting content later. Their participants were between 18 and 42 years old. With regard to younger participants’, pictures including drinking alcohol or going to parties “are essentially *de rigueur*” (Burkell et al., 2014, p. 980). Hereby no pictures are posted showing the drinking and partying escalated (e.g.

people who vomit or look drunk). A striking aspect is that older participants tend not to post such pictures; if they do, they delete them later.

Madden, Lenhart, Cortesi, Gasser, Duggan, Smith and Beaton (2013, pp. 71–72) reveal a number of interesting statements by teenagers. One 14-year-old girl stated, “I’m such a different person online. I’m more free. And obviously, I care about certain things, but I’m going to post what I want. I wouldn’t necessarily post anything bad that [I] wouldn’t want them to see” (Madden et al., 2013, p. 71). This explains why she did not accept a teacher’s friend request. She apparently is making the distinction between a professional relationship at school and a one occurring in her leisure time. Because teachers can get a wrong impression of a student, in another instance, an 18-year-old boy deleted pictures that presented him showing the middle finger.

With regard to the current state of gender- and age-related research concerning information behavior on Facebook, we identified a remarkable gap. We are unable to find comprehensive studies on photo publication behavior of adolescent Facebook users. Which kinds of pictures do adolescent men and women use for communicating on Facebook? Do younger teens post different picture types than older teens? Will adolescent Facebook users tolerate pictures of friends they would not post of themselves? With respect to these queries, we arrive at our first group of research questions (RQs):

- RQ1: Are different preferences evident between age groups with regard to the content of publishing a photo on Facebook?
- RQ2: Is there a difference between individuals’ use of photos on Facebook and that of their friends’ on the site?
- RQ3: Are adolescent men and women using different photo categories for their self-presentations on Facebook?
- RQ4: Are adolescent men and women restraining themselves differently with regard to generating a positive public image?
- RQ5: Is the behavior of adolescent Facebook users, divided by age and gender, differentiated with regard to photos, which they choose *not* to use?
- RQ6: Do adolescent Facebook users reflect on their photos’ content before uploading them?
- RQ7: How often do adolescent Facebook users upload an image?

Privacy concerns in Facebook make such considerations critical issues. As noted above, Facebook does not “forget”; posted content is saved in its database forever. However, Facebook does offer different privacy settings with regard to personal content. Facebook users can choose between whether a specific picture can be viewed only by certain friends or be publicly available to everyone. With these site-provided privacy settings, users decide which content should reach which

audience. Are all adolescent Facebook users knowledgeable about these choices? Do they know posted pictures can be downloaded by everyone who has access to the picture? Boyd and Hargittai (2010) noted Facebook users “who are more engaged on Facebook are more likely to modify their privacy settings more frequently.” On the other side, they learned that of Facebook users who only used the site occasionally, a quarter of them never changed privacy settings (Boyd & Hargittai, 2010).

Unsurprisingly, Facebook users who are characterized as regular users make more use of privacy settings (Boyd & Hargittai, 2010). This discovery is confirmed by results from Debatin, Lovejoy, Horn, and Hughes (2009) who found the 9% of Facebook users unfamiliar “with privacy settings (...) were also more likely to not protect their profiles”; yet the opposite held as well: Facebook users who are “familiar with Facebook privacy issues (...) were also likely to restrict their profiles (91%) through privacy settings” (Debatin et al., 2009, p. 93).

Another study revealed user age does not necessarily matter concerning applying appropriate privacy settings: “It is surprising that older teenagers are not more likely to keep their profile private, given the awareness-raising messages to which they will have been exposed” (Livingstone, Haddon, Görzig, & Ólafsson, 2011, p. 39). They also write parents may have told their children to set their profiles to “private,” and it is important to begin with instructions early for young children (Livingstone et al., 2011, p. 39).

Privacy settings allow Facebook users the opportunity to hide pictures from some users. One survey study found that 20% of Facebook users publish pictures that employees perhaps ought not to see (Peluchette & Karl, 2008, p. 96). Activities depicted such things as drinking alcohol and partying are among those one might keep private (Peluchette & Karl, 2008, p. 96).

Why do Facebook users have bad experiences with Facebook and personal data misuse when Facebook offers such a variety of privacy settings? If Facebook users are not aware they can change their privacy settings, then a lack of understanding must exist. “We can assume the consequences to be even worse when publicly exposing risky information related to alcohol and drug abuse, pictures in underwear, signs of aggression, etcetera” (Vanderhoven, Schellens, Valcke, & Raes, 2014, p. 2). Thus, regarding these aspects, specifically, we also want to examine privacy on the site. The next two RQs support this aim:

- RQ8: Do adolescent Facebook users understand Facebook friends can download their photos?
- RQ9: Are adolescent Facebook users aware of the possibilities to change their privacy settings?

With the advent of the electronic age, and in particular, smartphones, tablets, and other mobile devices, people can receive and send pictures, videos, and messages with sexually oriented content. We now have *sexting*, a portmanteau comprised of *sex* and *texting* (Livingstone & Görzig, 2012, p. 151). The following exchange is paradigmatic of the phenomenon:

Girl: What's up?

Boy: I am feeling hot tonight. I need to see you.

Girl: O.K. Do you want to see some pictures?

Boy: Cool. (Katzman, 2010, p. 41)

“Teens are using or misusing cell phones as part of their sexual interactions and explorations” with sexting including the “creating, sharing, and forwarding of sexually suggestive nude or nearly nude images by minor teens” (Lenhart, 2009, p. 3). This sending or receiving of such pictures, of course, is not dependent on cell phones, for images can also be sent via other social media systems, email traffic, or websites (Katzman, 2010, p. 41). It is simply so much easier to do with mobile devices.

Lenhart (2009, p. 2) observed older teenagers like to send and receive more nude or nearly nude images more than younger adolescents do. Of participants, 4 % (12–17 years old) and twice as many of older teens (8 %) have sent such pictures. Receiving a nude or a nearly nude image is also twice as likely for older teenagers than for younger teens (12–17 years old) (Lenhart, 2009, p. 2). Another study (Mitchell, Finkelhor, Jones, & Wolak, 2012, p. 15) found that girls are more likely to appear in, create, or receive nude or nearly nude images or videos.

Why do adolescents send such potential risky photos or text messages? The National Campaign and COSMO Girl (a product of yellow press) (2008, p. 1) conducted a survey with 13- to 26-year-old participants. In the most cases, regardless of age, participants sent or posted sexually suggestive content to a boyfriend or a girlfriend. The second most-observed aspect to sending such photos is when the sender and the recipient do not know each other, but the sender wants to date or hook up with the recipient. In this case, boys are slightly more likely to send such pictures than girls are (The National Campaign and COSMO Girl, 2008, p. 2). Mitchell et al. (2012, p. 16) offer participants’ observations, for example, “I was just dating a boy and he wanted a picture and I just sent him my picture” or “Well, I did not have a boyfriend at this time, and I was curious as to what my body would look like to other people...so I took some pictures” (Mitchell et al., 2012, p. 16).

It becomes clear that people not only want to seem attractive or to flirt, they also want to provoke. Statements such as “in the girls’ locker room and some girl

asked if anyone wanted to see a pic of her and her boyfriend, and we thought it would be them hanging out but they were in bed together,” or “[I was] sitting in [a] room and playing guitar. Got text message. Opened it. It showed pictures of breasts, [a] vagina. I immediately erased it” (Mitchell et al., 2012, p. 16). Katzman notes that “the obvious danger associated with sexting is that the material can be easily and widely disseminated. (...) Teens need to understand that nothing in cyberspace ever really gets deleted. (...) Even if the teen deletes the text or image, it can be copied and sent/posted elsewhere” (Katzman, 2010, p. 42).

Another aspect is for some people, sexting is not something that seems important: “Yeah it happens a lot, my friends do it all the time, but it’s not a big deal” (Lenhart, 2009, p. 9). For others, sexting is slutty and carries the threat of potential risk with significant consequences: “I’ve been asked to send naked pics, but I think that’s stupid. You can ruin your reputation. Sometimes I wonder how girls can send naked pics to a boy. I think it’s gross. They’re disrespecting themselves” (Lenhart, 2009, p. 9). Nevertheless, there are also people who see in sexting a new opportunity – but a risky one: “a safer alternative to real-life sexual activity” (Lenhart, 2009, p. 8). This leads to our next RQs with a desire to learn how adolescents handle sexting:

- RQ10: Does the willingness relating to sexting differentiate with regard to the age groups’ self-presentation activity and their friends’ use?
- RQ11: Does the willingness relating to sexting differentiate with regard to genders’ self-presentation and their friends’ use?

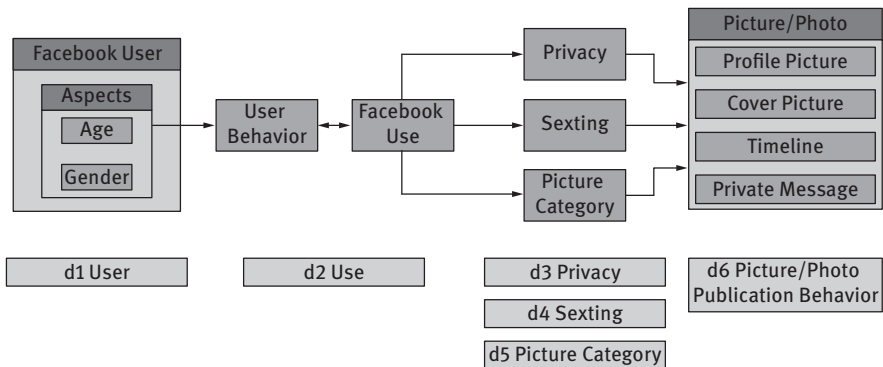


Figure 1: Our Research Model.

Figure 1 depicts research aspects from our study. The six dimensions *User* (d1), *Use* (d2), *Privacy* (d3), *Sexting* (d4), *Picture Category* (d5), and *Picture/Photo Publication Behavior* (d6) are related to each other. The first dimension *user* refers to

Facebook users with special consideration of their age and gender. For our study, we limited these aspects to the target group of male and female adolescents between 13 and 20 years old (d1). For this target group, we wanted to investigate how and which *privacy* settings they are using *pictures/photos* on Facebook (d2, d3), and how these relate to *sexting* (d4). As the model shows, we focused on four types of Facebook pictures (d6) explained in more detail in the next section describing picture categories in detail. The dimension of *picture/photo publication behavior* (d6) includes the participants' Facebook self-presentations as well as the behavior of their friends.

Methods

Our methods section is divided into aspects of picture categories, survey, and data cleansing. To analyze pictures on Facebook, we determine and distinguish between two picture categories: types of Facebook pictures and a general picture category. The category types of Facebook pictures include all possible picture types a Facebook user can upload. Altogether, there exist four subcategories:

- profile picture;
- cover picture;
- timeline;
- private message.

The *profile picture* is the image a user posts as her/his own profile picture. It appears in the profile, beside comments, or during chat conversations. The *cover picture* is displayed at the top of the user's personal profile. The *timeline photo* includes all pictures a profile owner has posted on her/his own Facebook page. A *private message photo* is a picture a profile owner posts in a private message, which only the message recipient(s) can view.

The general picture category is based on a Facebook content analysis by Shelton and Skalski (2013, pp. 343–344), who created 11 categories to use in analyzing Facebook users' photo behavior. These categories form the foundation of our general picture category. We present all general picture categories utilized for our study (see Table 1). We used five categories from Shelton and Skalski and limited the fourth category on heterosexual content, because, especially for very young teens, the boundaries between homosexuality and friendship between girls or between boys could be rather fuzzy.

Hence, we created six new categories, which provide an opportunity to expand our study to several relevant thematic areas or categories, such as “No

Person Depicted” or “Portrait” that are standards for photos used on social media services. Sexting and nudity are current topics as already shown in the state of the research.

Table 1: Categories for General Picture Categories.

Category Number	Category Name	Definition and Source	New, Modified or Unmodified
1.	Partying Shown	“[...] included depictions of groups of three or more in a festive-looking atmosphere” (Shelton & Skalski, 2013, p. 343)	unmodified
2.	Alcohol Shown	“[...] any photo with persons holding alcohol (bottle/glass/can/cup) or with alcohol in the background, etc.” (Shelton & Skalski, 2013, pp. 343–344)	unmodified
3.	Drug Use Shown	“[...] included someone smoking a cigarette or joint, using marijuana paraphernalia, injecting needles etc.” (Shelton & Skalski, 2013, p. 344)	unmodified
4.	Physically/Sexually Suggestive Contact (heterosexual)	“[...] included people deliberately kissing, holding hands, grinding, licking, touching and/or grabbing sexual body parts, etc.” (Shelton & Skalski, 2013, p. 344)	modified, limitation of hetero “couples”
5.	Sexiness	includes people in clothes/positions which should turn someone on; e.g. (low neckline, sexy underwear/sexy swimming wear, sexy posing in (sexy) swimming wear/(sexy) underwear; people aren’t fully naked and genitalia, booty and breast are covered (short or complete)	new
6.	Naked – Head and Full Body	includes people who are completely naked (nothing covered): the whole body and face are visible (it is also ok when parts of the legs/arms aren’t visible – focus lies on breath/booty with genitalia)	new
7.	Naked – Without Head but Full Body	includes people who are completely naked (nothing covered): the whole body but not the face is visible (it is also ok when parts of the legs/arms aren’t visible – focus lies on breath/booty with genitalia)	new

Table 1 (continued)

Category Number	Category Name	Definition and Source	New, Modified or Unmodified
8.	Nonverbal Aggression	“[...] was someone hitting and/or kicking another person, physical conflict with others, displaying the middle finger, etc.” (Shelton & Skalski, 2013, p. 344)	unmodified
9.	Trend	pictures for e.g. ice bucket challenge, duck-face, AIDS campaign, political activities, etc.	new
10.	No Person Depicted	pictures or computer graphics with e.g. comic, object, landscape, animal, etc., but without photos of humans; drawn pictures of humans are allowed	new
11.	Portrait	a photo in a standard portrait format (head shot/head shot with a part of the upper body) and without attributes from other categories (e.g., Sexiness, Nonverbal Aggression, etc.)	new

For every category, prototypical pictures were defined that represent their respective category (see Figure 2). They show an adolescent male or female person or a group in a scenario appropriate for the category. Generally, we chose an adolescent girl and an adolescent boy prototypical picture per category, because the pictures obtain – depending on the gender – different effects. For example, for some people, it makes a difference if a picture shows a girl in a bikini or a boy in swimming trunks. Because we wanted to accurately determine the outcome of such subtle differences, we chose for categories 2, 3, 5, 8, and 11 both a male and a female prototypical picture. Since category 4 automatically shows a male and a female person, only one prototype was needed here. Furthermore, category 1 needed only one prototype because it refers to a group and not to a single person. As we wanted to keep the number of prototypical pictures as low as possible, we also used only one prototype for category 9 because in our opinion, gender does not preponderate. For ethical reasons, we did not want to show our adolescent participants any nude images. Therefore, the categories 6 and 7 were displayed in written form. Category 10 is a collage of four representations to demonstrate the category’s diversity. Thus, we have 22 prototypical pictures for our 11 categories.

The survey includes 66 questions that can be divided into four parts:

- questions about a prototypical picture representing a category (questions 1–54);


- questions about picture uploading behavior to Facebook (questions 55–57);
- questions about security and privacy concerns regarding pictures (questions 58–60);
- demographical and cultural information (questions 61–66).

The survey was created during December 2014–April 2015, and was conducted from April 2015–July 2015. We used UmfrageOnline.com to provide our survey. The version for students offers many functions (e.g., unlimited surveys, extensive question types, image inclusion, etc.), thus it was the best free product available for our study. We promoted the survey on Facebook via Facebook groups (postings), private messages on Facebook, and the Facebook timeline of private individuals as well as Facebook pages. Additionally, we promoted our survey on other Internet services and sites, contacted institutions, and visited three schools. The survey was available in German and Turkish languages. For the Turkish version, three native Turkish speakers translated the German version. Our questionnaire was pretested by four individuals.

It was necessary to clean up the data gathered from our survey. Altogether, 488 people participated. For the analysis, we could account for 199 participants. At first, 278 participants had to be excluded from the survey because they did not fit the age group of 13–20 years or they did not complete the survey. The remaining 210 participants completed the survey and were within the appropriate age range, but 11 of them still could not be considered. For example, some statements were regarded as questionable. Some of them stated, in part, they use naked pictures for a profile picture, a cover picture, or the timeline. They chose this answer, however, in an incomprehensible way or also stated they were conservative rather than liberal, contradicting their own statements. Therefore, because we believed the accuracy of these statements was unreliable, we elected to remove conspicuous participants, leaving us with 199 survey participants.

Results

The following paragraph illustrates the results of our analysis. We considered 199 questionnaires for the evaluation. Distributed by age categories, there were 24 participants between 13 and 14 years, 35 between 15 and 16 years, 49 between 17 and 18, and 91 between 19 and 20 years old. Of the participants, 156 are women and 43, men. If we do not assume a participant value by age groups or gender, the precise indication of participant number is still indicated additionally.




Cat.	General Picture Category	Age Class					Prototype Picture
		13-14	15-16	17-18	19-20	Total	
1. Partying Shown	PP/S	33%	15%	18%	22%	22%	1: 
	PP/O	58%	46%	37%	51%	48%	
	CP/S	54%	44%	51%	51%	50%	
	CP/O	63%	51%	59%	68%	60%	
	T/S	42%	38%	39%	57%	44%	
	T/O	63%	49%	59%	71%	60%	
	PM/S	33%	38%	49%	41%	40%	
	PM/O	54%	51%	51%	68%	56%	
	NIAMA/S	33%	35%	20%	22%	28%	
	2. Alcohol Shown	PP/S	2%	1%	1%	4%	
PP/O		8%	6%	3%	7%	6%	
CP/S		4%	1%	1%	5%	3%	
CP/O		8%	7%	3%	7%	6%	
T/S		0%	6%	4%	18%	7%	
T/O		8%	7%	5%	16%	9%	
PM/S		13%	12%	10%	14%	12%	
PM/O		13%	13%	11%	23%	15%	
NIAMA/S		85%	85%	90%	75%	84%	
3. Drug Use Shown		PP/S	3%	1%	3%	9%	5%
	PP/O	29%	3%	10%	17%	15%	
	CP/S	13%	1%	2%	8%	6%	
	CP/O	29%	3%	11%	16%	15%	
	T/S	6%	3%	5%	13%	7%	
	T/O	29%	3%	17%	20%	17%	
	PM/S	6%	13%	10%	15%	11%	
	PM/O	29%	13%	20%	23%	21%	
	NIAMA/S	81%	87%	87%	77%	83%	
	4. Physically/Sexually Suggestive Contact (heterosexual)	PP/S	50%	52%	49%	40%	48%
PP/O		71%	71%	61%	57%	65%	
CP/S		50%	36%	49%	34%	42%	
CP/O		75%	66%	59%	58%	65%	
T/S		17%	24%	43%	40%	31%	
T/O		63%	60%	61%	62%	61%	
PM/S		21%	27%	43%	39%	32%	
PM/O		42%	46%	53%	51%	48%	
NIAMA/S		33%	33%	24%	33%	31%	
5. Sexiness		PP/S	6%	3%	1%	5%	4%
	PP/O	21%	7%	8%	14%	13%	
	CP/S	6%	1%	2%	2%	3%	
	CP/O	19%	7%	7%	11%	11%	
	T/S	2%	0%	3%	11%	4%	
	T/O	15%	10%	9%	18%	13%	
	PM/S	11%	11%	9%	13%	11%	
	PM/O	23%	17%	26%	26%	23%	
	NIAMA/S	87%	86%	88%	80%	85%	
	6. Naked—Head and Full Body	PP/S	0%	0%	0%	0%	0%
PP/O		0%	0%	2%	0%	1%	
CP/S		0%	0%	0%	0%	0%	
CP/O		0%	0%	2%	0%	1%	
T/S		0%	0%	0%	0%	0%	
T/O		0%	0%	2%	0%	1%	
PM/S		4%	3%	0%	2%	2%	
PM/O		10%	3%	4%	3%	5%	
NIAMA/S		96%	97%	100%	98%	98%	

PP/S: Profile Picture/Self
 CP/O: Cover Picture/Other
 PM/S: Private Message/Self

PP/O: Profile Picture/Other
 T/S: Timeline/Self
 PM/O: Private Message/Other

CP/S: Cover Picture/Self
 T/O: Timeline/Other
 NIAMA/S: Not in any mentioned area

Figure 2: Facebook Photo Publication Behavior of Adolescent Facebook Users. (13–14 years old: $N = 24$; 15–16 years old: $N = 35$; 17–18 years old: $N = 49$; 19–20 years old: $N = 91$; for the self-presentation values, divergences of at least 1 or at most 4 participants partly exist).

Cat.	General Picture Category	Age Class					Prototype Picture
		13-14	15-16	17-18	19-20	Total	
7. Naked – Without Head but Full Body	PP/S	0%	0%	0%	0%	0%	<p>No Pictures, only the following descriptions:</p> <p>6.a: Here would be a picture of a boy/a man who is completely naked. His face is not visibly in the picture.</p> <p>6.b: Here would be a picture of a girl/a woman who is completely naked. Her face is not visibly in the picture.</p>
	PP/O	0%	0%	2%	0%	1%	
	CP/S	0%	0%	0%	0%	0%	
	CP/O	0%	0%	2%	0%	1%	
	T/S	0%	0%	0%	0%	0%	
	T/O	0%	0%	2%	0%	1%	
	PM/S	4%	1%	1%	3%	2%	
	PM/O	4%	1%	10%	3%	5%	
	NIAMA/S	96%	99%	99%	97%	98%	
	NIAMA/O	19%	3%	10%	13%	11%	
8. Nonverbal Aggression	PP/O	19%	11%	13%	16%	15%	<p>8.a: </p> <p>8.b: </p>
	CP/S	13%	9%	5%	12%	10%	
	CP/O	19%	11%	14%	16%	15%	
	T/S	6%	6%	7%	16%	9%	
	T/O	23%	14%	16%	24%	19%	
	PM/S	36%	13%	18%	22%	22%	
	PM/O	23%	16%	28%	24%	22%	
	NIAMA/S	57%	79%	76%	71%	71%	
	PP/S	8%	10%	12%	14%	11%	
	PP/O	25%	14%	20%	26%	22%	
9. Trend	CP/S	4%	10%	6%	12%	8%	<p>9: </p>
	CP/O	13%	11%	16%	23%	16%	
	T/S	0%	13%	10%	30%	13%	
	T/O	25%	20%	22%	34%	25%	
	PM/S	13%	23%	31%	37%	26%	
	PM/O	29%	40%	43%	49%	40%	
	NIAMA/S	79%	61%	57%	47%	61%	
	PP/S	8%	18%	28%	19%	18%	
	PP/O	50%	40%	47%	42%	45%	
	10. No Person Depicted	CP/S	46%	50%	70%	63%	
CP/O		17%	63%	71%	71%	68%	
T/S		17%	24%	26%	30%	24%	
T/O		46%	46%	59%	59%	53%	
PM/S		17%	23%	38%	31%	29%	
PM/O		54%	51%	53%	51%	52%	
NIAMA/S		38%	24%	11%	22%	23%	
PP/S		96%	82%	89%	94%	90%	
PP/O		94%	81%	93%	87%	89%	
11. Portrait		CP/S	53%	38%	44%	45%	45%
	CP/O	85%	79%	80%	81%	81%	
	T/S	47%	38%	53%	62%	50%	
	T/O	90%	77%	88%	84%	84%	
	PM/S	42%	38%	48%	48%	44%	
	PM/O	71%	69%	80%	76%	74%	
	NIAMA/S	4%	13%	8%	5%	8%	

PP/S: Profile Picture/Self
 CP/O: Cover Picture/Other
 PM/S: Private Message/Self

PP/O: Profile Picture/Other
 T/S: Timeline/Self
 PM/O: Private Message/Other

CP/S: Cover Picture/Self
 T/O: Timeline/Other
 NIAMA/S: Not in any mentioned area

Figure 2. (continued)

We learned how many participants stated they would use an image of the respective category type (indicated with “S” in the figure) as well as their acceptance when friends use those pictures categories (“O”) (see Figure 2). Facebook picture types include profile pictures (“PP”), cover pictures (“CP”), pictures on a timeline (“T”), or in private messages (“PM”). Additionally, users could state they would not use a photo, regardless of choice (“NIAMA/S”).

RQ1: Are different preferences evident between age groups with regard to the content of publishing a photo in Facebook?

For RQ1, we divided the representation of the results into the four types of Facebook pictures. Regarding *profile pictures*, it is not surprising that around 90% of participants would use and accept pictures of the category Portrait (category 11).

We did find it rather surprising, however, that the second most common photo choice is the category Physically/Sexually Suggestive Contact (heterosexual) (category 4). Regarding such sexually related content, the acceptance for images by friends (65 %) is higher than for self-usage (48 %). This category is followed by Partying Shown (category 1) and No Person Depicted (category 10). Striking here is that the 13–14-year-old teens tell us that they would use pictures according to the category Nonverbal Aggression (category 8) versus No Person Depicted.

For the self-presentation of *cover pictures* and usage by friends', No Person Depicted (category 10) received on average the highest valuation. Photos from this category are especially useful as cover pictures. If we look at the age distribution for this category, only those 13–14 years old would not prefer those pictures as first choice for their cover pictures. The youngest Facebook users prefer Partying Shown (54 %) for their own photos, and for others, Portraits (85 %).

Teens prefer that their own *timeline* photos contain portraits (50 %) and partying (44 %) and accept images with portraits from others as well (84 %), but also photos with Physically/Sexually Suggestive Content (61 %) and, again, partying photos (60 %). If we more closely at the timeline self-presentation of the 13–14- and 15–16 year olds, we presume younger users were unsure about their preferences for timeline pictures. At age 13–14 years, teens do not use pictures of the category Trend (category 9), but 25 % find it acceptable when their friends do. We detected a similar pattern for the category Alcohol Shown (category 2). While no single 13–14-year-old teen would publish a photo of her/himself with alcohol, 8 % tolerate such photos from friends. At this age, any form of alcohol consumption is prohibited in many countries. Therefore, we find it unsurprising this age group refrains from posting such pictures of themselves.

Even for pictures in a *private message*, the category Portrait (category 11) received a high score (self: about 44 %, others: 74 %). On the first ranks are categories that also received high rankings for the additional three Facebook picture types. We expected to see higher values for categories where their content should not be seen by everyone, for example, the category Sexiness or for pictures in which nudity is shown. For all sexiness-related categories (those numbered 4 to 7), the values for self-presentation are about half those of friends' photos.

Especially for private messages, trend photos become more popular as the user age rises: for own private messages, only 13 % of the youngest participants post such images, but 23 % of teens aged 15–16 do, along with 31 % of those aged 17–18, and 37 % of the oldest teens. Furthermore, trend photos in private messages from others are more often accepted by older teens. Here, the development starts at 29 % (13–14) and ends at 49 % (19–20). In contrast, use and acceptance of photos of the category Physically/Sexually Suggestive Contact declines as the age range rises. While 50 % of the 13–14-year-old teens accept use such images for them-

selves as profile pictures (71% for others), only 40% of adolescents aged 19–20 would upload such photos for themselves (57% for photos from their friends).

RQ2: Is there a difference between individuals' use of photos on Facebook and that of their friends' on the site?

In nearly every case, we observed a greater tolerance of friends' choices compared with one's own self-presentation use. For pictures assigned to the category Portrait, there are recognizable differences. Among the following age groups – 13–14, 15–16, and 19–20 year olds – Facebook users have slightly higher scores for their own use, compared with accepting such pictures by friends.

What we find interesting in these data (with regard to Figure 2) is sometimes, the shares of self-presentation and tolerance of friend's use of the same category are identical. We found 13% of our adolescents (those 13–14 years old) would use private message pictures, which are classified into the category Alcohol Shown. We think it is striking that this tolerance with regard to friends' use of such pictures (those 13–14 years old) is even as high as 13%.

A similar case could be observed regarding the category Drug Use Shown. Of our 15–16-year-old participants, only 3% would post a picture on their timeline that depicted them smoking. If friends use such pictures of themselves, however, only 3% of all 15–16-year-old participants find it acceptable. The previous case, showing one's own self-presentation and tolerance relating to friends' use of pictures of the same category being similar, is recognizable by the category Nonverbal Aggression. Of all 13–14-year-old participants, 19% would present pictures of themselves (e.g., where the middle finger is shown) as a profile picture. If they see profile pictures of friends where a similar gesture is visible, the same share, 19%, would find it acceptable.

Moreover, one case with regard to Figure 2 is conspicuous. If we delve further into the category Sexiness and look at the column of the 15–16-year-old participants, we learn none would present such pictures of themselves on the timeline. However, if friends present pictures of themselves in bikinis or bathing suits, 10% of all 15–16-year-old participants would find such images acceptable. With a few exceptions, this tolerance regarding friends' use of pictures is higher than one's own use of the same picture category. For example, only 8% of 13–14-year-old participants would post pictures of the category Drug Use Shown as profile pictures, but 29% find it acceptable if friends choose to do so. For 13–14-year-old participants, using photos for self-presentation for the category Portrait is quite high (47% would use such pictures in their timeline), and this group's tolerance of others' use of Portrait photos is even higher (90%).

RQ3: Are adolescent men and women using different photo categories for their self-presentations on Facebook?

Cat.	Gender	General Picture Category								
		PP/S	PP/O	CP/S	CP/O	T/S	T/O	PM/S	PM/O	NIAMA/S
1. Partying Shown	Male	26%	35%	58%	53%	53%	58%	40%	51%	26%
	Female	20%	51%	48%	65%	46%	65%	42%	62%	25%
	Total	23%	43%	53%	59%	50%	61%	41%	56%	25%
2. Alcohol Shown	Male	10%	9%	12%	9%	20%	15%	16%	17%	76%
	Female	1%	5%	1%	5%	7%	10%	12%	17%	84%
	Total	6%	7%	6%	7%	14%	12%	14%	17%	80%
3. Drug Use Shown	Male	14%	17%	9%	17%	13%	17%	18%	22%	73%
	Female	4%	13%	5%	13%	7%	18%	11%	21%	84%
	Total	9%	15%	7%	15%	10%	18%	14%	21%	78%
4. Physically/ Sexually Suggestive Contact (heterosexual)	Male	42%	49%	37%	42%	40%	49%	28%	35%	33%
	Female	46%	66%	41%	67%	34%	65%	38%	53%	31%
	Total	44%	57%	39%	55%	37%	57%	33%	44%	32%
5. Sexiness	Male	9%	12%	6%	10%	15%	13%	15%	16%	74%
	Female	2%	13%	2%	10%	4%	14%	11%	26%	86%
	Total	6%	12%	4%	10%	9%	13%	13%	21%	80%
6. Naked – Head and Full Body	Male	0%	0%	0%	0%	0%	0%	6%	7%	94%
	Female	0%	1%	0%	1%	0%	1%	1%	4%	99%
	Total	0%	0%	0%	0%	0%	0%	3%	5%	97%
7. Naked – Without Head but Full Body	Male	0%	0%	0%	0%	0%	0%	5%	6%	95%
	Female	0%	1%	0%	1%	0%	1%	2%	4%	98%
	Total	0%	0%	0%	0%	0%	0%	3%	5%	97%
8. Nonverbal Aggression	Male	15%	14%	17%	16%	16%	19%	22%	20%	67%
	Female	10%	15%	8%	15%	9%	21%	21%	24%	73%
	Total	13%	15%	13%	16%	13%	20%	21%	22%	70%
9. Trend	Male	24%	21%	14%	14%	26%	28%	21%	30%	55%
	Female	9%	23%	8%	19%	16%	28%	32%	47%	56%
	Total	17%	22%	11%	17%	21%	28%	27%	39%	55%
10. No Person Depicted	Male	20%	26%	53%	60%	25%	44%	30%	35%	33%
	Female	20%	49%	62%	72%	26%	58%	31%	56%	18%
	Total	20%	37%	57%	66%	26%	51%	30%	46%	25%
11. Portrait	Male	85%	76%	44%	62%	52%	71%	38%	56%	13%
	Female	92%	92%	45%	86%	55%	88%	48%	80%	6%
	Total	89%	84%	44%	74%	53%	79%	43%	68%	9%

PP/S: Profile Picture/Self
 CP/O: Cover Picture/Other
 PM/S: Private Message/Self

PP/O: Profile Picture/Other
 T/S: Timeline/Self
 PM/O: Private Message/Other

CP/S: Cover Picture/Self
 T/O: Timeline/Other
 NIAMA/S: Not in any mentioned area

Figure 3: Facebook Photo Publication Behavior of Adolescent Facebook Users. (Male: $N = 43$; female: $N = 156$; for self-presentation values, divergences of at least 1 or at most 4 participants partly exist).

With regard to RQ3, we found similarities and differences relating to self-presentation of the genders (see Figure 3). For all groups of adolescents surveyed, 85% of men and 92% of women would use mostly pictures classified in the category Portrait for a profile picture. The second most-favored category, again for both men and women, is Physically/Sexually Suggestive Contact (heterosexual). What we found surprising is the share of participants who would use such pictures as profile picture. Of all participants, 42% of men and 46% of women would use

pictures that depict holding hands with or kissing their partner (category Physically/Sexually Suggestive Contact).

Differences in gender-specific information behavior are obvious when considering categories such as Drug Use Shown, Alcohol Shown, and Sexiness. In these categories, when they relate to profile pictures, more adolescent men (14 %) would use such pictures compared with women (4 %). Such images might show, for example, participants smoking a cigarette. With photos showing alcohol usage by adolescents, 10 % of men and only 1 % of women would use them as profile picture. Again, 9 % of our adolescent men, compared with only 2 % of our adolescent women, would prefer Sexiness photos as profile pictures, with the former showing them, for example, wearing only trunks and the latter, a bikini.

We found it striking that 53 % of men would mostly prefer pictures for their own timeline that present them partying, in contrast to only 46 % of women. In contrast to boys, girls prefer photos from other users in the categories of party photos, photos showing Physically/Sexually Suggestive Contacts, No Person images, and Portraits (across all four picture categories). In contrast to girls, for self-presentation, boys prefer photos from the categories Alcohol Shown and Drug Use Shown (albeit on a low level). More men than women upload Trend photos for self-presentation in profile pictures (24 % vs. 9 %), cover pictures (14 % vs. 8 %), and in their timelines (26 % vs. 16 %), but for private messages fewer boys use such Trend photos (21 % vs. 32 %). For photos of others, more girls (47 %) accept Trend photos than do boys (30 %).

RQ4: Are adolescent men and women restraining their choices differently with regard to generating a positive public image?

Do users exploit Facebook to build and maintain a positive public image of themselves? Of all our participants, 80 % want to create a positive image on Facebook with their profile picture. There are slight gender-specific differences, however, with 81 % of the girls hoping to reach this target, whereas only 74 % of the boys feel the same.

RQ5: Is the behavior of adolescent Facebook users, divided by age and gender, differentiate with regard to photos, which they choose *not* to use?

Which categories are less favored regarding the choice for profile picture, cover picture, timeline, and private message? Regarding preferred non-usage, Table 2 indicates that photos showing naked people or people wearing only bikinis or boxer shorts are very rarely used (98 % reject them). In addition, photos in the categories Sexiness, Alcohol Shown, and Drug Use Shown are seldom preferred. The last two categories, which have a rejection rate of more than 50 %, are Non-verbal Aggression and Trend. The first six categories include risky photos, which

could damage adolescent Facebook users' reputations at the worst, or at the least, send a wrong or bad message about the user. Surprisingly, Trend also represents a high rejection rate, with 61 % (and even higher for younger teens).

Table 2: Photo Categories an Adolescent Facebook User Would *Not* Use.

Rank	Rejection for Self-Presentation
1	Naked – Head and Full Body 98 %
	Naked – Without Head and Full Body 98 %
3	Sexiness 85 %
4	Alcohol Shown 84 %
5	Drug Use Shown 83 %
6	Nonverbal Aggression 71 %
7	Trend 61 %
8	Physically/Sexually Suggestive Contact (heterosexual) 31 %
9	Partying Shown 28 %
10	No Person Depicted 23 %
11	Portrait 8 %

To examine the distribution by age, again we use Figure 2. We see 19–20-year-old adolescents exhibit fewer scruples when publishing photos from the categories Alcohol Shown and Drug Use Shown. In contrast, for our 13–14-year-old participants, the majority rejects such pictures. In addition, only some 17–18-year-olds would accept photos showing naked bodies (without visible heads) in private messages, but only from other people (10 %) and would not post any of themselves (1 %).

Separated by gender (see Table 3), striking differences emerge between adolescent men and women. Both genders agree they would reject photos with naked bodies. Girls reject Sexiness images to a higher degree than boys do (86 % vs. 74 %). More women reject photos showing alcohol consumption (84 % vs. 76 %), drugs (84 % vs. 73 %), and nonverbal aggression (73 % vs. 67 %). Adolescent women also are somewhat more cautious with their self-presentation than adolescent men are.

Table 3: Photo Categories an Adolescent Facebook User Would *Not* Use by Gender.

Rank	Rejection/Male		Rejection/Female	
1	Naked – Without Head and Full Body	95 %	Naked – Head and Full Body	99 %
2	Naked – Head and Full Body	94 %	Naked – Without Head and Full Body	98 %
3	Alcohol Shown	76 %	Sexiness	86 %
4	Sexiness	74 %	Alcohol Shown Drug Use Shown	84 %
5	Drug Use Shown	73 %	Nonverbal Aggression	73 %
6	Nonverbal Aggression	67 %	Trend	56 %
7	Trend	55 %	Physically/Sexually Suggestive Contact (heterosexual)	31 %
8	No Person Depicted Physically/Sexually Suggestive Contact (heterosexual)	33 %	Partying Shown	25 %
9	Partying Shown	26 %	No Person Depicted	18 %
10	Portrait	13 %	Portrait	6 %
11	–	–	–	–

RQ6: Do adolescent Facebook users reflect on their photos' content before uploading them?

We asked our participants about their picture uploading behavior on Facebook. 197 answered this question and 66 % of them always reflect on their behavior before uploading a photo to Facebook. Only 2 % never think about their picture before publishing. The remainder of teens reflect sometimes (13 %) or often (19 %) before acting. Our findings are similar to those Burkell et al. (2014, p. 980) found for 18–42-year-old participants.

RQ7: How often do adolescent Facebook users upload an image?

Figure 4 compares the interval of image upload behavior on Facebook for the four types of Facebook pictures. For our participants, the majority uploads all types of photos at irregular intervals. Some teens have never published photos in their timelines or in private messages.

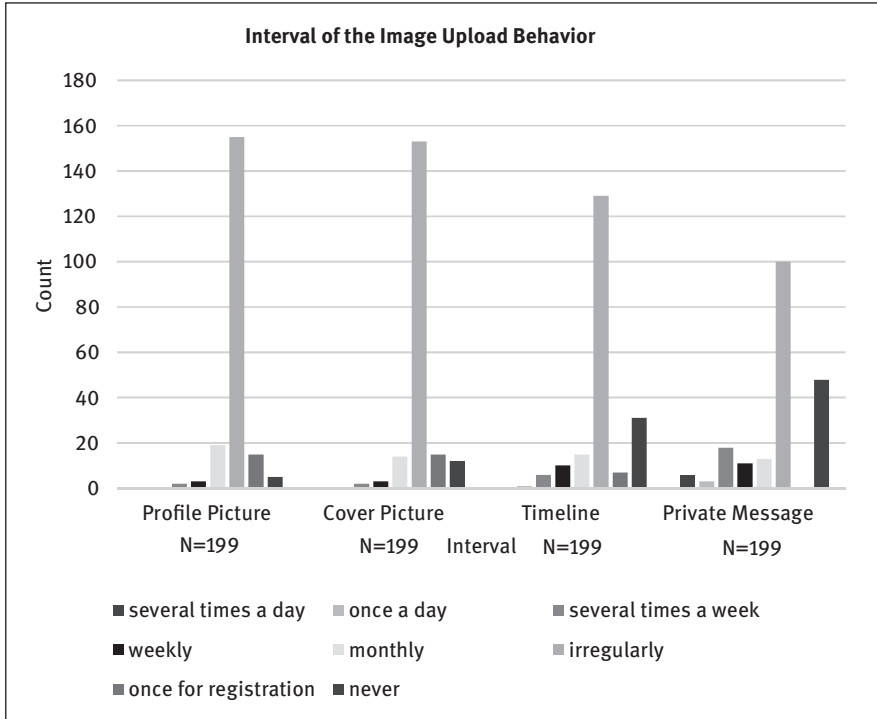


Figure 4: Photo Uploading Frequency.

RQ8: Do adolescent Facebook users understand Facebook friends can download their photos?

Privacy settings are important as they relate to disclosure information and for self-presentation. Beldad and Koehorst (2015, p. 192) found that habit and perceived control affects the disclosure of personal information. Moreover, “the finding that respondents’ perception of control over their personal information also determines information disclosure seems to suggest that respondents do not just habitually and blindly share information without taking into account the possible negative consequences of disclosure” (Beldad & Koehorst, 2015, p. 192). Looking at the frequency values across all age groups, the majority of participants is aware that their friends can download and even redistribute photos received from others. For profile pictures (94%), cover pictures (95%), and timeline photos (92%), relative frequencies differ little from each other. Only for pictures sent via a private message does the frequency decrease slightly. In this choice, only 83% know about the download possibilities. This distribution also remains stable with respect to the different age classes.

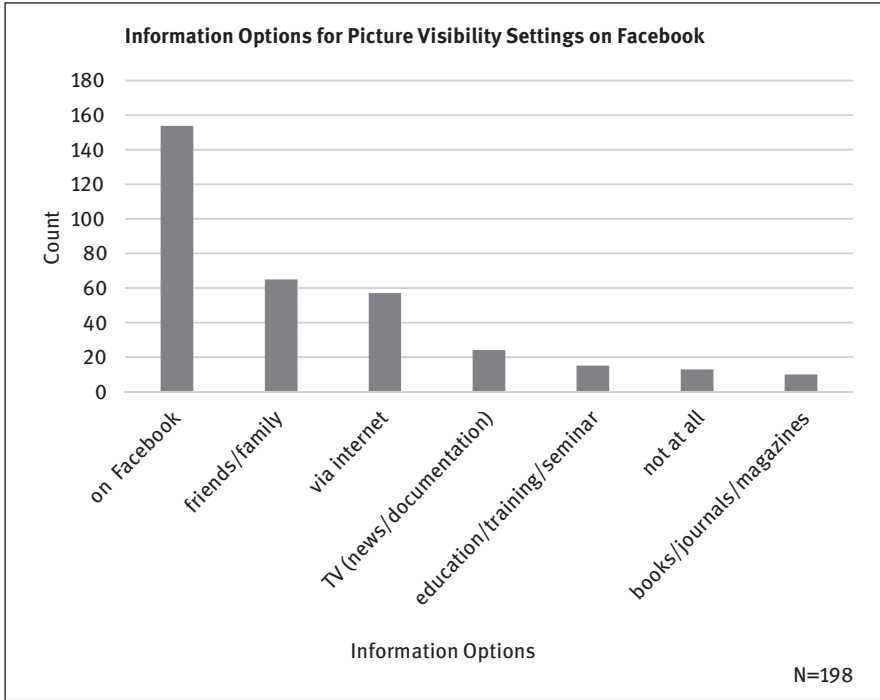


Figure 5: Sources of Information for Privacy Settings on Facebook.

RQ9: Are adolescent Facebook users aware of the possibilities to change their privacy settings?

Only 13 participants were not aware of the privacy settings Facebook offers to control published information. Of these participants, 154 received the information about privacy control from Facebook itself (see Figure 5). Privacy control was also discussed between friends and with family members, with 15 participants getting such information from school or education, training, or in a seminar. Obviously, this topic has not yet broadly arrived at schools.

RQ10: Does the willingness relating to sexting differentiate with regard to the age groups' self-presentation activity and their friends' use?

As discussed above, sexting refers to sending or receiving nude or seminude pictures (Lenhart, 2009, p. 3). All age groups behave very similarly concerning Sexiness (category 5). There are only around 3%–4% of teens who are willing to present themselves in a sexy posture in their profile pictures, cover pictures, or in their timeline. An acceptance of viewing others' Sexiness images, however, is

higher (between 11 % and 13 % for all age groups). For private messages, the story is different. In this case, 11 % of all teens send sexy photos to friends, and 23 % accept sexy photos from others in private messages.

Only 2 % of all participants state they send pictures in private messages showing themselves fully nude (regardless of whether their heads are cropped out of the image). Not a single teen admitted to behaving accordingly concerning all other picture types.

RQ11: Does the willingness related to sexting differentiate with regard to genders' self-presentation and their friends' use?

We believe it is striking that in nearly all cases, the tolerance for other users' photo choices in publications is higher than for one's own self-presentation of certain image types. Of the participants, 15 % of adolescent men would rather send pictures of themselves in boxer shorts than pictures in which they were either nude with head showing (6 %) or nude with head cropped (5 %). It is interesting to learn as well that 11 % of adolescent women (consequently, fewer than men) would rather send pictures of themselves in bikini. That 26 % of adolescent women would tolerate friends sending such pictures, however, is somewhat surprising. In contrast, only 16 % of boys would find it acceptable if friends sent pictures from the category Sexiness. In sum, women are more tolerant than men are regarding pictures expressing sexiness.

Discussion

Our research model with its six dimensions *User*, *Use*, *Privacy*, *Sexting*, *Picture Category*, and *Picture/Photo Publication Behavior* provides the possibility of evaluating photo publication behavior of adolescents (teens aged 13 to 20) on Facebook. It focuses on Facebook photo use in terms of both adolescent users' self-presentations as well as the behavior of their Facebook friends. Beyond that, privacy and sexting aspects are included. All dimensions were analyzed in total as well as by age and gender of the cohort.

With respect to the research model and the 11 RQs derived therefrom, we arrived at the following main results:

- Acceptance regarding photo publication behavior is generally higher for friends' usage than for one's own self-presentation.
- For profile pictures, adolescent Facebook users mostly prefer portraits. Pictures from the category No Person Depicted are most often preferred as cover pictures, but are followed closely by photos showing partying.

- Across all four picture categories – profile picture, cover picture, timeline, and private message – pictures showing nudity received the lowest approval rating. Adolescents predominantly do not want to use such pictures for themselves and also do not want to see them from/of their friends.
- About four-fifths of teens want their profile pictures to generate a positive image.
- The uploading rate of pictures is an irregular activity. When adolescents do get ready to publish images, they reflect on their content before uploading them to Facebook.
- Considering the privacy aspect, it is surprising that only 15 participants (7.6 %) received timely and pertinent information from the settings of school or education, training, or a seminar.
- Teens understand the images they upload – profile pictures (94 %), cover pictures (95 %), timeline pictures (92 %), and pictures in private messages (83 %) can be subsequently downloaded by other Facebook users.
- Contrary to expectations, this study did not find any conspicuous results for sexting behaviors related to age or gender.

These results are partly in line with some previous studies. Vanderhoven et al. (2014, p. 5) observed that the rate of risky pictures and videos being published is not very high. Due to the high rating for the nonuse in any mentioned area of the categories Naked – Head and Full Body, Naked – Without Head and Full Body, Sexiness, Alcohol Shown, Drug Use Shown and Nonverbal Aggression, we can confirm this result for adolescent Facebook users participating in our study as well.

Burkell et al. (2014, p. 980) pointed out their participants do reflect before they publish instead of deleting content later. But their survey sample comprised adults, not adolescents. We also determined our participants reflect on their pictures' content. Moreover, for the younger adult participants observed by Burkell et al. (2014) it is “essentially *de rigueur*” to post pictures that show alcohol consumption or partying. We must contradict this statement it is normal for teens to post pictures of themselves showing alcohol consumption. Comparing these other studies with our results, we can only confirm that partying pictures are posted at a moderately high frequency rate, but not photos showing an explicit relation to alcohol (or drugs). However, our respondents do demonstrate a higher tolerance for alcohol-depicting photos of other Facebook users. A possible explanation for this higher acceptance for friends' usage might be that viewers' feel little or no responsible for pictures uploaded by their friends.

Our study is limited to aspects of our research model. For further studies, it would be interesting to extend the model. Culture can influence self-presentation

(Kuo et al., 2013, p. 642) and acceptance of photos by others. Are there cultural differences (Baran & Stock, 2015b) regarding teens' photo publication and acceptance behavior? Do adolescent Facebook users from different cultures select the same types of photo categories for their self-presentations? We only considered the use of Facebook. Depending on the country, other SNSs are common. If we, for example, want to study teenagers' SNS behavior in Russia, we must analyze VKontakte, the domestic SNS (Baran & Stock, 2015a) for Russia, instead of Facebook.

Our approach is of a quantitative nature. It should be deepened by applying qualitative methods. For a better understanding of the photo publication behavior of adolescent SNS users, researchers should conduct personal interviews with young women and men from the different age groups.

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Appendix

Creative Commons information for the used prototype pictures. Prototype picture numbers refer to the numbers in Figure 2. All pictures were downloaded from *flickr.com*.

Prototype Picture Number	Creative Commons Information
1	CC TheArches
2a	CC I woke Up Today
2b	CC Peter Burgess
3a	CC Nadja Tatar
3b	CC DLSimaging
4	CC Eleazar
5a	CC HotlantaVoyeur
5b	CC Richard Kang
8a	CC Nick Douglas
8b	CC Paula Fernande
9	CC Jade Nemy Leonard
10	Top left: CC [Duncan], Top right: CC Sam Howzit, Bottom left: CC Brian Neudorff, Bottom right: CC sneakerdog
11a	CC mckinney75402
11b	CC chloe delong

Sarah Hartmann*, Brigitta Wanner

Chapter 3. Does Facebook Cause Addiction? An Analysis of German Facebook Users

Abstract: With the increasing use of social networking services (SNSs), such as Facebook, the topic of Facebook addiction attracts more and more researchers' interest. However, until recently, it has been neither clear which characteristics define Facebook addiction nor whether it even exists. This chapter aims to explore the relatively new phenomenon of Facebook addiction and identify factors pointing toward excessive Facebook usage. As Facebook addiction is presumed to be a specific form of Internet addiction, an Internet addiction scale was tested for its applicability to measure Facebook addiction and was used as the basis for developing a Facebook addiction scale. Using an online survey, German Facebook users' addiction potential was measured; moreover, participants supposed to be at risk were analyzed in detail to gain further insight into factors that may lead to excessive as well as addictive Facebook usage.

Keywords: Facebook addiction; Online behavioral disorder; Excessive Facebook usage; Social networking site addiction; Internet addiction

Introduction

The use of social networking services (SNSs) has increased significantly in recent years. One of the most prominent examples is Facebook, with 1.44 billion monthly active users in March 2015 and a year-over-year increase of 13 % (Facebook, 2015). Facebook is the world's largest SNS and has become an integral part of most users' daily lives. On average, 69 % of German users visit Facebook at least once per day, with 33 % using it for more than one hour (BITKOM, 2013).

With the use of such SNSs on the rise, however, the potential for a new mental disorder has entered the discussion: *social networking site addiction* (Kuss & Griffith, 2011). Facebook use was found to be primarily motivated by users' maintaining and participating in offline social networks in contrast to many other social networking websites, which are primarily aimed at establishing new contacts

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(Ellison, Steinfield, & Lampe, 2007). In particular, however, the maintenance of these offline networks and social ties is assumed to be related to addictive behavior (Kuss & Griffith, 2011). Furthermore, Griffith (2000) argues users become addicted to specific activities they carry out on the Internet, as a medium, and are not addicted to the Internet itself. Therefore, it is possible users may have already been addicted to an activity before using the Internet, like pathological gambling, in addition to becoming addicted while using functions that are only available on the Internet, like an online chat service (Widyanto & Griffith, 2006).

To explore the phenomena and extent of Facebook addiction in more detail, addiction scales are needed (Andreassen, Torsheim, Brunborg, & Pallesen, 2012; Koc & Gulyagci, 2013), but are still only sparsely available. We also lack a consistent body of research as well as widely accepted theories to explain such activities (Kuss, Griffiths, Karila, & Billieux, 2014). These deficiencies may explain why none of the previously mentioned behavioral addictions is included in the recent version of the *Diagnostic and Statistical Manual of Mental Disorders* (American Psychiatric Association, 2013). Accordingly, we will explore the phenomenon of Facebook addiction in detail and analyze core components of addiction and usage behavior of participants considered to be at risk in the following sections of this chapter.

Online Behavioral Addictions

Thus far, pathological gambling is the only behavioral addiction that has been recognized as a formal disorder. However, research has underlined other potential behavioral addictions, such as mobile-phone addiction (Choliz, 2010), online sex addiction (Griffiths, 2012), and Internet addiction (Young, 1998), which one day may also be officially recognized as psychological maladies.

The American psychologist Kimberly Young was the first scientist to establish a set of criteria for identifying Internet addiction, based on the characteristics of pathological gambling (Young, 1996). She categorized Internet addiction by the five subtypes: cyber-sexual addiction, cyber-relationship addiction, net compulsions, information overload, and computer addiction, and established an 8-item scale to measure dependence (Young, 1998). However, Internet addiction can also be deduced from criteria on substance-based addictions (Brenner, 1997). Further co-occurrences with psychiatric disorders, such as impulse control disorder can be found (Shapira, Goldsmith, Keck, Khosla, & McElroy, 2000). In addition, such factors as personality traits and self-esteem seem to be related to Internet addiction (Widyanto & Griffith, 2006). These findings support the assumption that the

Internet itself is not the causal factor of behavioral addiction. No consensus on a definition has been reached. Indeed, Griffith (2012, p. 519) argues the term *Internet addiction* “may already be obsolete” as it comprises several activities to which users can be addicted (e.g., social networking). He calls for research concerning the addictive potential of these specific activities, instead endorsing such terms as *social networking site addiction* to describe the disorder.

Social Networking Site Addiction

As SNS usage has increased over the past two decades (Brenner & Smith, 2013), many people believe they must use them to stay in contact with their offline social connections, in addition to finding or establishing contact with people from work or educational contexts, romantic relationships, or individuals sharing similar interests (Ellison et al., 2007).

The concern of SNS addiction falls into the category of cyber-relationship addictions as a specific form of Internet addiction (Young, Pistner, O’Mara, & Buchanan, 2000). The term *social media addiction* (Al-Menayes, 2015) can also include other platforms, for example, Twitter or YouTube. According to Griffith (2005), SNS addiction should be seen from a bio-psychological perspective. To establish the pathological definition for an addiction, he argues one must derive criteria from already recognized addictions (Kuss & Griffith, 2011). He defines six criteria that addictions share in general (Griffiths, 1996): salience (the activity dominates the person’s life), mood modification (the activity causes a sense of delight), tolerance (increasing amounts of activity are needed to retain mood modification), withdrawal symptoms (the occurrence of unpleasant feeling states or physical effects when use is discontinued or suddenly reduced), conflict (interpersonal conflicts, conflicts with other activities, or within the individuals themselves are caused by too much spent on the activity), and relapse (the tendency to revert to earlier patterns after periods of abstinence or control). Observing the presence of these criteria is the first step to diagnosing behavioral addictions, in this case, an SNS addiction.

Social reasons, for example, keeping in touch with people known from offline relationships, were found to be the main motivation for SNS usage (Subrahmanyam, Reich, Waechter, & Espinoza, 2008). Some users prefer online communication via these services rather than face-to-face interaction (Kujath, 2011). In particular, exhibiting a preference for online communication via social networking websites is assumed to be one causal factor of SNS addiction (Kuss & Griffith, 2011). Further influencing factors are personality traits: people who have low self-esteem (Steinfeld, Ellison, & Lampe, 2008), narcissistic tendencies (La

Barbera, La Paglia, & Valsavoia, 2009), and high levels of extraversion as well as of low conscientiousness (Wilson, Fornasier, & White, 2010) were found to be more likely to become addicted to substances or activities. Subrahmanyam et al. (2008) stated the most commonly used social networking activities are reading messages (77 %), reading comments and posts (75 %), and browsing pages (66 %). Furthermore, some studies observed age and gender differences in SNS usage, although the results in the latter instance vary widely among studies (Pfeil, Arjan, & Zaphiris, 2009; Raacke & Bonds-Raacke, 2008); thus, its effect on SNS addiction remains vague.

Concerning reasons and motivations underlying SNSs usage, contrasting results were reported. These may be best understood broadly in terms of examining SNSs in general instead of focusing on specific services (Ryan, Chester, Reece, & Xenos, 2014). We can presume the reasons for using social networking websites depend on the specific service (Dunne, Lawlor, & Rowley, 2010; Gülnar, Balcý, & Çakýr, 2010), with further differentiation among SNS addictions needed, for example, Facebook addiction (Ryan et al., 2014) compared with another platform. However, the extent to which differences and characteristics of SNSs causes behavioral addictions remains unclear as the existence of SNS addiction has not yet been established (Griffiths, Kuss, & Demetrovics, 2014).

Facebook Addiction

A recent literature review found only a small number of studies concerning Facebook addiction had been conducted (Ryan et al., 2014). Similar to SNS addiction, these studies also ascertained that personality traits, such as neuroticism and extraversion, are positively related to Facebook addiction scores, whereas conscientiousness is negatively related (Andreassen et al., 2012). Furthermore, Facebook addiction could be linked to aspects of psychological wellbeing, such as depression (Hong, Huang, Lin, & Chiu, 2014), anxiety (Koc & Gulyagci, 2013), loneliness (Balakrishnan & Shamim, 2013), or relationship dissatisfaction (Elphinston & Noller, 2011). In addition, symptoms of preferring online social interaction, along with mood alteration, deficient self-regulation, negative outcomes, salience, loss of control, withdrawal, relapse, and tolerance also were found (Ryan et al., 2014).

The main reasons for using Facebook are to maintain existing relationships or simply to pass time (Ryan et al., 2014), to occupy oneself, or to procrastinate (Foregger, 2008; Sheldon, 2008). Additional reasons are self-expression and entertainment (Gülnar et al., 2010), companionship, and escape from problems (Ryan et al., 2014). Research has found the motives of self-presentation and escapism especially strongly related to Facebook addiction (Masur, Reinecke, Ziegele, &

Quiring, 2014). Reasons for both general use and specific activities (e.g., chatting or posting status updates) are presumed to be interlinked with usage intensity, and these may lead to heavy Facebook use (Alhabash, Park, Kononova, Chiang, & Wise, 2012). Excessive use does not necessarily lead to addiction, although the reverse is often true (Ryan et al., 2014).

To measure Facebook addiction, we needed to develop appropriate measurement scales. In most cases, these are based on Internet addiction scales that in turn adapt criteria from other addiction disorders, such as pathological gambling or substance-related disorders as mentioned above. Until recently, only a few measures concerning Facebook addiction have been developed, which “underscore a lack of construct validity surrounding Facebook addiction” and therefore differ widely (Ryan et al., 2014). Examples of Facebook addiction scales are the Bergen Facebook Addiction Scale (BFAS) by Andreassen et al. (2012), which includes addiction criteria such as salience, withdrawal, and relapse; the Facebook Intrusion Questionnaire (Elphinston & Noller, 2011), which also includes loss of control and euphoria; and the second Generalised Problematic Internet Use Scale (GPIUS2) (Lee, Cheung, & Thadani, 2012), which includes a preference for online social interaction as a factor to measure Facebook addiction. However, none of these measures proposed a cutoff score to identify problematic Facebook use. Moreover, they have not yet been clinically tested, which is most especially presumed to be mandatory to establish any of the previously mentioned online behavioral addictions in the international classification manuals (Griffiths et al., 2014).

Therefore, the scope of criteria that must be defined to classify Facebook addiction remains unclear. Griffiths (2012) commented on the BFAS that Facebook is a commercial product of which social networking is just one aspect. He believes we must clarify which activities people become addicted to on social networks and which behaviors scales like BFAS are measuring. SNSs are capable of changing quickly and can offer an increasing array of activities, such as playing games, watching videos and films, swapping photos, and sending messages (Griffiths, 2012). Thus, it seems reasonable to posit these varied activities might lead to different types of addiction. However, in the case of Facebook, most of the offered functions, for example, posting, commenting, and so forth (with the exception of playing games on Facebook) are aimed at social interactions among people and the maintenance of relationships, which are both among the main motivations for using Facebook (Ryan et al., 2014). Therefore, the nature of Facebook activities (e.g., reading posts) should certainly be considered when seeking to uncover more about the causal factors of Facebook addiction.

This chapter aims at offering further insights into the causal factors of Facebook addiction and excessive Facebook usage by presenting results obtained

from an online survey conducted with German Facebook users. This sample is used to test an extended version of an Internet addiction scale for its applicability to Facebook addiction. In addition, we look at participants thought to be at risk to detect salience in usage behavior and coherences between Facebook addiction and usage motivations as well as the activities they pursue while using the site.

Method

To measure the extent of Facebook addiction and to investigate whether there are coherences between usage reasons as well as performed activities and Facebook addiction, an online questionnaire was distributed among Facebook users. The questionnaire was online from September 12, 2014 until October 16, 2014, and was disseminated on the authors' Facebook wall as well as on several Facebook groups (with more than 30,000 members total) and forums for university students, for example, forum.student.de and www.studentenseite.de. Both the Facebook groups and the two student forums were chosen because they had a large number of members, which were assumed to be of potential interest for the underlying study. Furthermore, these forums aim to distribute surveys and find participants.

The questionnaire could be answered in approximately ten minutes. In the event a participant needed to pause or stop the study, the survey tool (umfrageonline.de) offered a resume code for each participant, so the study could be resumed after a break.

The measure of Facebook addiction was based on the well-validated Internet addiction scale developed by Hahn and Jerusalem (2010). Their original scale comprises 20 items covering five dimensions of addiction: loss of control, tolerance, withdrawal symptoms, negative consequences for social relations, and negative consequences for work and performance. Each dimension is addressed by four items that can be answered using a 4-point Likert scale: "Strongly Disagree" (1), "Disagree" (2), "Agree" (3), and "Strongly Agree" (4). The wording of the original questions was modified to fit the topic of Facebook addiction with the exception of one item. "I spend more money for the Internet than I can afford" was excluded since money can only be spent for gaming activities on Facebook and not for social networking purposes. After excluding that item, the subscale "loss of control" is composed of only three questions, such as "I spend more time on Facebook than I originally planned" or "I already tried in vain to reduce my time spend on Facebook." The items of the other subscales were adapted in a similar

way to accommodate Facebook usage, but we retained the original number of items.

Based on the literature review, we located a few items from other addiction scales that Hahn and Jerusalem (2010) did not include, but that seem reasonable for our study. For example, Al-Menayes (2015) included such items as “I often use social media while driving” or “My school grades have deteriorated because of my social media usage.” Also, items regarding some motives for Facebook use (e.g., self-presentation, escapism, loneliness, passing time, and self-esteem) were included and tested for their potential to be integrated into a Facebook addiction scale as these motives were reported to be strongly related to Facebook addiction (Masur et al., 2014).

We asked survey participants about usage reasons, which they could select from among 21 possible answers. In this case, multiple specifications were possible because participants could have more than one reason to use Facebook. In addition, a free text field was added if participants had another reason for using Facebook not listed in the 21 possibilities presented (Kuss & Griffiths, 2011). Furthermore, participants were asked to specify the average time they spend on their Facebook activities per day. Possible activities were “Reading postings from other users” to “Chat usage” (Rosen, Whaling, Rab, Carrier, & Cheever, 2013, p. 1246). In total, there were 17 possible activities, which could be rated on a 6-point Likert scale ranging from “Never” to “More than 3 hours,” adapted from Rosen et al. (2013).

To determine excessive Facebook usage, learning the average amount of time spent on Facebook, along with the time of day or night users log in and during which situations, were all deemed important considerations. We compared whether they log in at generic times (e.g., “right after getting up,” “during my breaks,” or “right before going to bed”) or during critical situations, which could be assumed to result from excessive usage (i.e., “during school/college/work,” “when I am driving or biking,” or “in the middle of the night”) (Wilson et al., 2010). For these items, we used a 4-point Likert rating scale.

Results

Of the 218 students surveyed, five (2.3%) did not have a Facebook account and therefore were forwarded to the end of the questionnaire. After a validity check, one inapplicable answer (age: 211) was found. As we do not know whether that answer resulted from a typing error or an act of conscious deception, we removed all answers from the participant. Finally, an answer set of 212 partici-

pants remained for analysis. The sample included 70 male (33 %) and 142 female (67 %) participants with an average age of 27 years, and more than 90 % of all participants were 40 years old or younger. The youngest participant in this study was 16 years old, whereas the oldest one was 66 years old. For most of the participants, (47 %), the highest level of education was the “German university entrance diploma” closely followed by 92 participants (43 %) with a university degree. Most of the participants have had a Facebook account since 2009 (29 %); 28 % joined Facebook before 2009; and 28 %, in 2010. The age distribution was unaffected by gender.

Facebook Usage

Over the years, time spent for Facebook use changed. More than 46 % reported the time they spent on Facebook had increased over the past few years, whereas nearly 30 % saw a decrease of time spent on the social network. Barely 24 % of the participants recognized no change.

The most common usage reasons are “to stay in contact with acquaintances” (181 participants), “to communicate with friends I see less often” (170), “to get news from friends” (157), “to stay in contact with family and friends” (125), and “because I am bored” (119). These results confirm findings of other studies as described in the literature review (section above, this chapter).

The activities “chatting,” “reading posts,” and “browsing photos” are those on which participants reported spending the most time. On average, participants spent 14 minutes per day chatting, twelve minutes reading posts, and five minutes browsing through photos, with 23 participants stating they chat approximately from half to one hour daily. Of participants, eleven use this function more than one hour daily, while six participants use it more than three hours per day. Of the participants, 18 said they read postings from others up to one hour a day, while 17 participants read Facebook posts more than one hour a day. Furthermore, “browsing photos” was reported to be used over a long period each day. While 13 participants look at other people’s photos up to one hour per day, one person uses this activity up to two hours a day.

Measure of Facebook Addiction

To verify whether survey participants exhibit addictive behavior or tendencies, a Facebook addiction scale should be used. However, as noted, there is no generally accepted scale, and all available scales result in great differences in the

underlying criteria and characteristics, in the number of items measuring addiction, as well as in survey samples. Therefore, as noted, our decision was to draw on a well-validated Internet addiction scale, based on a German sample, and modify its items to correlate with Facebook addiction. Several other Facebook addiction scales are based on this approach because researchers have presumed the underlying criteria and characteristics of Internet addiction, SNS addiction, and Facebook addiction are similar.

The resulting Facebook addiction scale needed to fit the data collected from this study. To verify fit, we subjected the scale to exploratory factor analysis using primary component analysis (PCA) as well as confirmatory factor analysis (CFA). With PCA, we tested which factor structure underlies our measurement items as well as whether that is equivalent to the structure supposed by Hahn and Jerusalem (2010). CFA is used to test the acceptability of the suggested measurement model by verifying the number of underlying dimensions, called factors, and the pattern of item-factor relationships, called factor loadings (Brown, 2006). Factor loadings are regression coefficients expressing the latent variables' (the factors) direct effect on the indicators (the items); their value should be at least 0.3 (Brown, 2006). In addition, error variances are given for each indicator; they show the proportion of variance in the indicator not explained by the factor.

The original scale proposed by Hahn and Jerusalem (2010) consists of five factors whose variance is explained by Internet addiction, that is, loss of control, withdrawal, tolerance, negative consequences for social relations, and negative consequences for work and performance. However, PCA analysis proposed a different factor structure than the original scale, explaining 63.5% of the total variance. Instead of two factors addressing the negative consequences (one in relation to work performance and the other to social consequences), PCA suggests subsuming all items addressing the negative outcomes under one factor. In addition, the four items addressing the concept of withdrawal should be split into two factors, one comprising the items SA01 and SA02, and another with the items WDO1 and WDO2 (see Figure 1).

With CFA, we tested whether the hypothesized model fits the data and if the factorial structure of the model can be assumed to be valid for the population. This means we test whether the relationships and the structure we arranged by the model coincide with the relationships seen in the sample. The model fit can be verified by a number of criteria that have been established for CFA. A very popular index is Chi-square (χ^2), but it is very sensitive to sample size and always leads to the rejection of the model for higher sample sizes (Brown, 2006). Therefore, it should always be reported in combination with other indices, such as the standardized root mean square residual (SRMR), root mean square error of approximation (RMSEA), Tucker-Lewis index (TLI), and the comparative fit index

(CFI). Nevertheless, Byrne (1989) recommends that the value of χ^2 divided by the degrees of freedom (CMIN/*df*) should have a value below 2. Furthermore, Hu and Bentler (1999) proposed cutoff values for the RMSEA should be close to .06 (according to Browne and Cudeck (1993), below .08 at a minimum), the cutoff value of the SRMR should be close to .08 (according to Weston and Gore (2006), below .10 at a maximum), and the TLI and the CFI should be close to .95, but definitely not below .90 (Hu & Bentler, 1999). Comparing these criteria with the model suggested by Hahn and Jerusalem (2010), no satisfactory model fit could be achieved.

Because the model structure proposed by PCA was different from the original model, the new factor structure, as well as the original one, was analyzed with CFA, which is used to test the validity of the proposed factor structure. Whereas the original model did not fit any of the above-mentioned criteria (χ^2 (147) = 366.45, $p < .001$; CMIN/*df* = 2.49; CFI = .84; TLI = .81; RMSEA = .09, 90 % confidence interval (CI) [.08, .10]; SRMR = .10), the factor structure proposed by the PCA revealed much better results and, with a few changes in the number of items, a good model fit (χ^2 (99) = 150.757, $p < .001$; CMIN/*df* = 1.523; CFI = .95; TLI = .94; RMSEA = .05, 90 % confidence interval (CI) [.04, .07]; SRMR = .07). One item addressing the factor tolerance as well as two items of the negative outcomes had to be deleted to achieve an optimal model fit. The new model explains 61.11 % of the total variance.

Although the model fits the above-mentioned criteria, factor tolerance seems to be a very weak factor of Facebook addiction. In addition, the literature suggests that other factors and items are important in order to explain Facebook addiction. In particular, aspects of mood modification as well as intrinsic motivations are missing in the Internet addiction scale of Hahn and Jerusalem (2010) although were shown to be important by several subsequent research studies (Balakrishnan & Shamim, 2013; Lee et al., 2012; Masur et al., 2014). To check whether other items might be more suited to measure Facebook addiction and should therefore be integrated into an addiction scale, ten additional items were included in the questionnaire. These were extracted from other addiction scales, such as the BFAS (Andreassen et al., 2012), the GPIUS2 (Lee et al., 2012), or revealed by the literature (Balakrishnan & Shamim, 2013; Ryan et al., 2014).

Three of the ten items were excluded from further analysis as they had shown weak inter-item correlations. A PCA with the remaining seven items revealed a slightly different factor structure. An additional factor comprising five items was necessary to integrate the new items into the scale. The items underlying this factor seemed to address the topic of mood modification, which is in line with the current literature. The other three items fit the negative outcomes. CFA as well as an analysis of scale reliability led to the final Facebook addiction model presented

in Figure 2. The standardized factor loadings of all 18 items of the new Facebook addiction scale are above .30 and statistically highly significant ($p < .001$). Nevertheless, Facebook addiction explains only a small proportion of the variance of the factors' loss of control (22% of the variance) and tolerance (11% of the variance). In addition, Hahn and Jerusalem (2010) reported the factor tolerance to be a weak factor. Therefore, further research is needed to verify whether this factor is indeed one of the components of Facebook addiction. Either weak factor loadings might be due to item selection or this factor might be of less importance to measuring Facebook addiction and therefore should be removed from future scales.

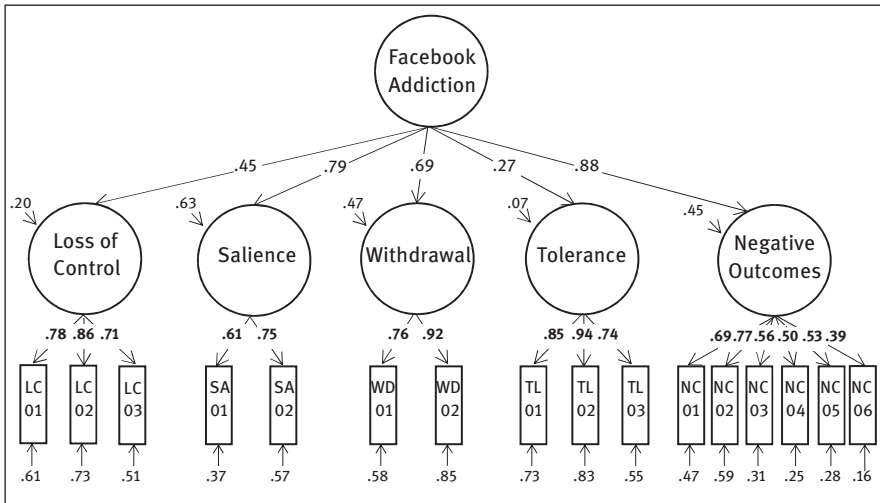


Figure 1: Standardized Model Resulting from a Confirmatory Factor Analysis of 16 Items Measuring Facebook Addiction (Based on Hahn and Jerusalem (2010)). Factor Loadings (in Bold) and Error Variances are Assigned to Each Indicator and Factor.

However, by adding the factor of mood modification and with some modifications in the factor of negative outcomes, the model fit could be improved. The factor mood modification is comprised of the items “I would be bored without Facebook,” “I think less about the problems I have in real life when I am on Facebook,” “I use Facebook to actively form the image that others perceive of myself,” and “I feel vindicated by getting lots of likes and comments,” which also represent the motives of passing time, escapism, self-presentation, and self-esteem. In addition, one new item, “I have less time for hobbies since I am using Facebook,” was added, and three items addressing the negative outcomes had to be dropped to achieve a better model fit. The confirmative factor analysis of the new 6-factor

model shows a better model fit with $\chi^2 (129) = 180.654, p < .001$; CMIN/df = 1.40; CFI = .96; TLI = .95; RMSEA = .05, 90 % confidence interval (CI) [.03, .06]; SRMR = .07). The new model comprising 18 items can be assumed to constitute a good scale for measuring Facebook addiction in this sample and explains 68.74 % of the total variance.

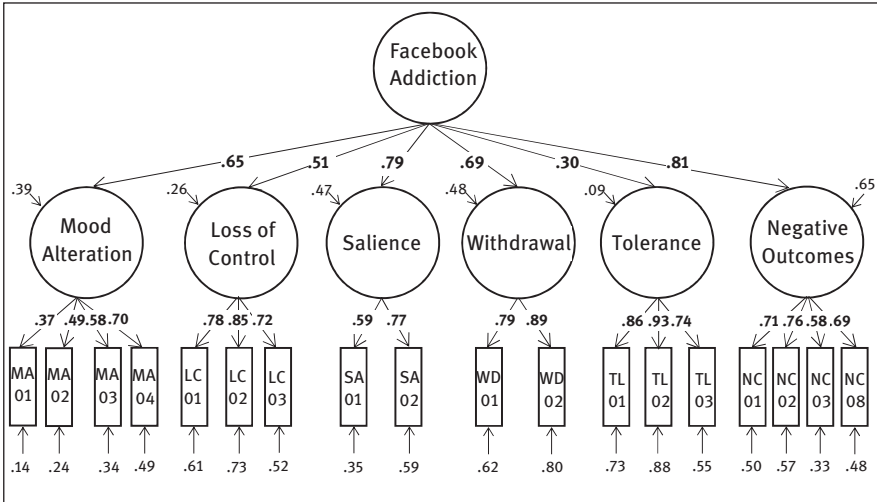


Figure 2: New Standardized Model with 18 Items Including the Factor Mood Modification. Factor Loadings (in Bold) and Error Variances are Assigned to Each Indicator and Factor.

In addition, the new scale displays acceptable internal consistencies (see Table 1). Although the subscales of salience and mood modification indicate poor values of $\alpha = 0.60$, as PCA and CFA support this factor structure, it can be assumed the poor internal consistencies are due to item selection. In the case of the factor salience, the scale should be extended with further items because a construct of only two items is weak, whereas the items of the subscale mood modification should be better directed to measure only one concept because they seem to measure different aspects for now.

Table 1: Addiction Scale with Mood Modification Items.

<i>Items</i>	<i>α</i>	<i>M</i>	<i>SD</i>
Loss of control	.82		
I often catch myself saying: 'Just a few more minutes' and then I cannot stop. (LC01)		1.90	0.95
I often spend more time than I originally have planned. (LC02)		2.23	1.03
I often tried in vain to reduce my time spend on Facebook. (LC03)		1.58	0.79
Salience	.60		
I think about Facebook during all of my online activities. (SA01)		1.24	0.50
My thoughts circle around Facebook, even though I am not online at all. (SA02)		1.11	0.35
Withdrawal	.81		
If I'm not online for a longer time, I get nervous and uneasy. (WD01)		1.26	0.56
I get irritated and dissatisfied if I cannot be on Facebook. (WD02)		1.14	0.43
Tolerance	.88		
Meanwhile, I spend more time on Facebook than at the beginning. (TL01)		2.25	1.07
The time I spend on Facebook has steadily increased in comparison with the beginning. (TL02)		1.96	1.00
My need for spending more time on Facebook increased. (TL03)		1.61	0.80
Mood Alternation	.60		
I would be bored without Facebook. (MA01)		3.24	0.94
I think less about my problems in real life when I am on Facebook. (MA02)		1.44	0.73
I use Facebook to actively form the image that others perceive of myself. (MA03)		1.69	0.93
I feel vindicated by getting lots of likes and comments. (MA04)		2.32	0.98
Negative Outcomes	.77		
I already had trouble at work/school/college, because I was active on Facebook to often instead of working/learning. (NC01)		1.19	0.60
My working/learning performance has suffered under my Facebook usage. (NC02)		1.15	0.48
I often neglect my duties in order to spend more time on Facebook. (NC03)		1.23	0.55
I have less time for hobbies since I am using Facebook. (NC08)		1.15	0.52
Facebook Addiction Scale	.83	19.71	7.01

The results of this analysis as well as previous literature suggest it is reasonable to believe there are six core components of Facebook addiction (Andreassen et al., 2012). Therefore, we maintain the proposed addiction scale for further analysis. According to Hahn and Jerusalem (2010), a person is addicted to the Internet if

an average answer of “I agree” (3) on all 20 items is reached. Since our research presents an 18-item scale to measure Facebook addiction, an equivalent value of 54 must be reached for a subject to be classified as addicted to Facebook. Moreover, Hahn and Jerusalem (2010) specified a value range for being at high risk of becoming addicted to the Internet. The scale range for risk they proposed corresponds to an average item value of 2.5, equivalent to a value of at least 45 on our Facebook addiction scale.

At-Risk Participants

By applying the cutoff scores noted above, one participant (0.5 %) could be classified as addicted to Facebook, and five (2.4 %) participants appeared to be in danger of becoming addicted. These participants are the same individuals who ranked the highest according to the scale proposed by Hahn and Jerusalem (after it was modified to fit the sample; see Figure 1). However, declaring these participants as addicted might be rash, because clinical testing is needed to make a firm diagnosis.

Nevertheless, the participants with the highest values are analyzed further on below as they might give some indication of other aspects to be considered when measuring Facebook addiction. In total, 15 participants were analyzed because their values on the addiction scale are very close to each other. Reasons for Facebook usage, Facebook activities, and the duration of their use as well as the point of time when Facebook is used are all considered related to excessive Facebook use (Ryan et al., 2014). Therefore, it is presumed that participants who may be at risk display differences in these aspects, compared with the whole sample.

Regarding usage motives the motives of loneliness, escapism, and self-presentation especially were reported to be strongly related to Facebook addiction (Balakrishnan & Shamim, 2013; Masur et al., 2014). In total, 35 participants (17 %) selected these to be reasons of their Facebook use and four out of 35 participants are in the highest 15. Thus, 3 % of the participants who use Facebook because they feel lonely tend to use Facebook excessively. Escapism (“I think less about my problems in real life when I am on Facebook”) was reported by 10 % of all participants and 7 % of the at-risk participants to be a reason for their Facebook usage. Furthermore, 40 % of the participants at risk use Facebook to increase their online popularity, but only 22 % of all participants selected that reason. Whereas loneliness and self-presentation were reported to be a reason for Facebook usage by a higher proportion of the at-risk group than from among the entire sample, the proportion of people who mentioned escapism as a reason is the reverse. Only a very small number of people agreed with the motive of escapism, which could

be reasoned from the small number of participants that could be classified as being addicted to Facebook in our sample, but that should be tested in future research.

All participants use Facebook in order stay in contact with people they know from real life, to get news from these people as well as to stay in contact with people whom they meet less often in real life, for example, because they live too far apart from each other. However, 73 % of the 15 addicted and at-risk participants state they use Facebook to share content quickly, in contrast to only 30 % of all participants who report this as a reason for Facebook use. Furthermore 27 % of participants with addictive tendencies use Facebook to improve their position in society, make up for real-life relationships, and to publish selfies, whereas concerning the entire sample, less than 5 % considered these to be reasons to use the site.

Beside the reasons for Facebook usage, the duration as well as point-of-use time are presumed to be related to excessive Facebook use. Notwithstanding which activity was asked about, at-risk participants stated they use all activities longer than average. The most significant differences in the amount of time used for an activity between those at risk and the entire sample were found for “browsing photos” at 27 %, “sharing posts or photos” at 25 %, and “posting photos” at 21 %. However, the activities that represent the highest amount of time spent are “reading posts,” “browsing photos,” “browsing profiles,” and “chatting.” When considering the point-of-use time, Facebook is mostly used “after work, university, or school,” “during breaks,” or “before going to sleep.” About 40 % of the at-risk participants reported accessing Facebook “during the night” as well as “while in traffic,” which is a very high number, compared with 11 % (“during the night”) and 7 % (“while in traffic”) for the entire sample.

In addition, the Pearson correlations between the above-mentioned criteria and the Facebook addiction scale support the assumption that some usage reasons, activities, as well as the point of time when Facebook is used are all related to Facebook addiction. We present the highest significant Pearson correlations between the reasons for Facebook use and Facebook addiction (see Table 2). The results confirm the above-mentioned salience shown by the highest 15 at-risk participants regarding usage reasons, since “making up for real-life relationships,” “publishing selfies,” and “increasing position in society” indicate the highest correlations with Facebook addiction.

Table 2: Correlations Between Facebook Addiction and Usage Reasons.

	1.	2.	3.	4.	5.	6.	7.	8.	9.
1. Facebook addiction	1								
2. Getting news from friends	.320**	1							
3. Experiencing group membership	.295**	.139	1						
4. To amuse oneself	.230**	.271**	.075	1					
4. Increasing online popularity	.284**	.125	.220**	.156*	1				
5. Increasing position in society	.331**	.148*	.412**	.112	.509**	1			
6. Making up for real life relationships	.382**	.088	.220**	.073	.517**	.435**	1		
7. Being bored	.308**	.234**	.047	.429**	-.020	.044	.060	1	
8. Sharing content	.248**	.152*	.138	.229**	.153*	.187**	.147*	.124	1
9. Publishing selfies	.354**	.076	.266**	.126	.394**	.330**	.864**	.115	.104

** p < 0.01

Table 3: Correlations Between Facebook Addiction and Activities.

	1.	2.	3.	4.	5.	6.
1. Facebook addiction	1					
2. Reading posts	.358**	1				
3. Liking	.211**	.356**	1			
4. Browsing photos	.329**	.399**	.315**	1		
5. Browsing profiles	.262**	.252**	.254**	.688**	1	
6. Posting photos	.249**	.268**	.277**	.179*	.073	1

** p < 0.01

Table 4: Correlations Between Facebook Addiction and Point-of-Use Time.

	1.	2.	3.	4.	5.	6.	7.
1. Facebook addiction	1						
2. During breaks	.334**	1					
3. After work/university/school	.385**	.420**	1				
4. During meeting friends	.419**	.302**	.216**	1			
5. When participating in traffic	.331**	.204**	.153*	.418**	1		
6. Before going to bed	.357**	.188**	.366**	.336**	.146*	1	
7. During the night	.351**	.147*	.190**	.317**	.436**	.342**	1

** $p < 0.01$

Regarding the activities used by participants, only five could be found to indicate significant correlations with Facebook addiction. Of these, “reading posts” and “browsing photos” indicate correlations higher than .30. Thus, specific activities seem to be less important in explaining Facebook addiction.

All points-of-use time correlate significantly and highly with Facebook addiction (see Table 4). Using Facebook during meetings with friends is especially related to our Facebook addiction scale. However, surprisingly, also using Facebook after work/university/school shows a high Pearson correlation with Facebook addiction, but could result from 88 % of participants having reported using Facebook during those hours.

Discussion

Our proposed Facebook addiction scale considers a person addicted to Facebook if he or she has a scale value of 54 or higher. This corresponds to an average answer of “Agree” (3) for all 18 items of the scale. Based on this guideline, in our study, only one participant would be considered addicted. Hahn and Jerusalem (2010) defined not only the group of Internet addicts, but also the group of at-risk users. Those vulnerable users have a scale value between 45 and 53 on our Facebook addiction scale; therefore, they have an average item value of at least 2.5. Taking into consideration the value for participants at risk, this study would have four participants who are vulnerable users according to Hahn and Jerusalem (2010). However, Hahn and Jerusalem totally disregard the aspect of mood modification, which several other researchers found important when

measuring online behavioral addictions. We believe there would be a better internal consistency if some items were removed and if the two subscales for negative consequences were merged into one. Finally, the best results with CFA could be achieved by adding the factor mood modification. However, further studies are needed to verify whether this result is due to our specific sample or can be applied in general.

The participants at risk showed differences toward the entire sample for usage motives of loneliness and self-presentation, but not for the motive of escapism. In addition, the reasons for Facebook usage, the duration of using specific activities, as well as the point of time indicated significant correlations with Facebook addiction. However, the correlations for Facebook activities are very low, indicating these played a less important role. Point-of-use time seems to be of greater importance to Facebook addiction; this should be analyzed in future studies. One must bear in mind, however, that several factors play important roles in diagnosing an addiction, and possibly not all could be detected by the applied models. Thus, measuring psychological problems with standardized scales is questionable in general and is one of this study's limitations. Future research as well as clinical testing should be used to analyze the extent to which the aspects we presented should be integrated into Facebook addiction scales and whether cutoff points to define addiction might be reasonable to apply.

Further limitations of this study are the questionnaire distribution via Facebook posts and shares, in Facebook groups as well as Facebook forums. The number of excessive Facebook users might therefore be higher than that found among the general population. Furthermore, the number of participants in general is not representative and quite low for scale validations. In addition, it may be questionable whether all participants answered the questions truthfully and objectively. This process would need further validation as well.

Nevertheless, what we could demonstrate is that Facebook addiction remains a very complex construct. A few core components, which had already been mentioned in the literature, were confirmed by this study. Most especially, the aspects of loss of control, mood modification, salience, tolerance, withdrawal, and conflict were found to be of importance in measuring Facebook addiction, although the concept of tolerance seems to be one of lesser importance. Thus, the proposed scale admits for improvement, but brings together many aspects and components already shown by other studies, and therefore helps to unify the different research findings in terms of Facebook addiction.

Conclusion

In sum, the aim of this study was to explore the phenomenon of Facebook addiction and identify factors for excessive Facebook usage. We were able to confirm the assumption that further aspects are related to Facebook addiction and should be integrated into addiction scales, and we also demonstrated some participants are in danger of becoming addicted to Facebook. Thus, the study of Hahn and Jerusalem (2010) may be a good starting point to use in detecting vulnerable users who are likely to develop an Internet addiction, but their scale is insufficient for determining whether a person is addicted to either Facebook or the Internet itself. Further factors, such as usage motivations, also must be considered. Discovering more of these indicators should comprise the work of future studies.

Although a few participants received exceptionally high scores on our Facebook addiction scale and indicated some notable abnormalities concerning Facebook addiction, we reject classifying them as addicted to Facebook since further clinical testing is needed to confirm this classification. However, we do feel we can describe the at-risk participants from our study as excessive or extreme Facebook users whose usage, in turn, might lead to addictive behavior. To diagnose an addiction, the participants would need to be interviewed privately, so more details could be uncovered and the factors influencing excessive usage examined more closely.

Future studies might also use the model presented in this study to determine addiction to other popular applications, such as Tumblr, Twitter, or Instagram, and compare these with the results of Facebook addiction. Such studies could verify whether it is indeed reasonable to believe that users become addicted to specific platforms or whether the classification of being addicted to specific social media activities would be a more suitable label. Facebook is still the most popular SNS in Germany, but this situation could change with the emergence of new services or the improvement of existing ones. Nevertheless, to whichever service the topic of addiction is linked, with the increasing importance of social media in society and culture, the issue of behavioral disorders rises in proportion, and certainly is one that deserves further study. Current research is, as yet, far away from ensuring any such disorders can or will ever become treatable.

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Chapter 4. Facebook Social Games

Abstract: The popularity of Facebook social games is usually attributed to factors in the three areas of *social interaction*, *play experience* and the possibility for easy, *casual play* (Kinder-Kurlanda, 2012). It is, however, unclear, how these factors relate to the everyday lives of the largest user group, namely female players over the age of 35. An exploratory study of Australian players of Facebook social games was conducted to shed some light on gender-specific play behaviour in everyday circumstances (Willson, 2015a, 2015b). A similar study is planned for the German context.

Keywords: Facebook; social games; gender; everyday; casual games; domestication of technology.

Introduction

This chapter explores some of the ways in which players engage in Facebook social games, reasons for this play and investigates how game play is situated within players' everyday lives. Facebook social games such as Farmville are online games that are accessed and played through the Facebook social network site. These games first gained attention around 2009–2010 when they started attracting millions of players within a relatively short timeframe. Since that time, these games have undergone considerable development driven by a competitive market and by new ideas being adopted at a rapid speed: Once a new gaming idea is successful, clones and adaptations of the game idea quickly follow. At the same time as there has been a rise in Facebook social games, there has also been a rise of mini-games on mobile devices, as games such as Candy Crush Saga, reminiscent of the 1980's games arcades, have become popular. Such games often also can be linked to Facebook and its various features for social interaction. The Facebook social gaming market is therefore also influenced by the rules of mobile app generation and distribution. This has caused some difficulties with appropriate nomenclature – these games are variously referred to in the literature as social

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games, social casual games, and social network games. This paper is adopting a very particular focus on Facebook accessed games (i.e. games that are entered via the Facebook social network site) and therefore will use the term, Facebook social games.

The first wave of Facebook social games, and especially Farmville, were greeted both with success and with some scepticism. Attempts within the literature to explain Farmville's success mainly focus on the three aspects of *sociality*, *play experience* and a *casual* character of the gaming experience (Di Loreto, 2010). Explanatory models assume that games such as Farmville require the maintenance of social relationships and thus serve as focal points for the generation of online fan communities (e.g. Rao 2008). At the same time, the games enable – through clever design strategies – short term experiences of self-efficacy and an uncomplicated integration of play into everyday life (Juil, 2010). Within these discussions, however, there has been little sustained attention to the question as to why it might be that the largest group of Facebook gamers, according to user statistics, appear to be women, usually over the age of 35 (Kuittinen et al., 2007; Consalvo & Begy, 2015). A look at the everyday circumstances of use for these women could explain which aspects of enabling social relations, providing a play experience and facilitating casual gaming make Facebook social games so attractive to them.

While traditional motivations for gaming such as immersion and achievement clearly play a role in the popularity of any game, Facebook social games are special because of their embeddedness in a specific social network platform, namely Facebook. Drawing on theories from the literature on Facebook gaming and a preliminary study employing questionnaires we explore what 'social interaction' means in the context of Facebook social games: Often interactions are in fact not simultaneous but asynchronous (e.g. gift-giving), occur with in-game characters, or are extremely formalized and limited (Consalvo, 2011) with criticism about the instrumental nature of many interactions (Rossi, 2009). On the other hand, gamer communities have started to evolve both on forums and in-game.

In this chapter, we frame Facebook social gaming as a 'domestication' of technology (Silverstone & Haddon, 1992) allowing us to better understand how social interactions and Facebook gaming experiences are integrated into everyday life. Social games on Facebook are part of a complex regime of social interaction and creative identity work (Willson, 2015b). They satisfy a specific need for staying in contact via small gestures such as gift-giving and thus have a particular place in users' management of friendship networks (Kinder-Kurlanda, 2012). They are also able to be played in ways that complement or accommodate everyday life practices and routines.

Who is playing Facebook social games and why?

The success of Facebook social games, which at least at first glance seem to be less complex than ‘traditional’ computer games, has increased popular and academic attention to playing within internet facilitated social networks and also to the rise of so called ‘casual’ games (Williams, 2006; Di Loreto et al., 2010; Juul, 2010). Partly as a result of growth in casual games and Facebook social games and the demographics of those who play them, computer gaming is no longer merely seen as the sole domain of young male players (Shaw, 2012).

Female players and players of ‘casual’ or ‘friendly’ games are seldom the target of research although this is beginning to change (see, for example, Consalvo, 2011). Concerning gender and age the statistics in this follow typical usage patterns of casual games (Berry, 2010). Demographically, casual games in fact appeal to various groups of people, but a very large group is reported to be women over the age of 35 (Kuittinen et al., 2007). Juul (2010) noted in his study of casual gamers more broadly, that 93 per cent of his respondents were female with an earlier study in 2006 noting that the majority of female players were over the age of 35 years. It is therefore frequently said that, “the average female social gamer is a 43-year-old woman who plays more frequently than men” (Teller mann, 2010). Consalvo and Begy (2015) however caution against oversimplification of players and their motivations based on players’ gender. Rather, they show that players, for varied reasons, enjoy diverse aspects of those games that go against traditional game tropes, and rather focus on friendliness and caretaking.

While casual gaming often is seen in opposition to hard core gaming, many casual games fans spend long intervals of time playing and repeatedly return to the game. A study already showed in 2009 that while casual gamers only played about half as long as “hardcore gamers”, their play time still amounted on average to 31 minutes per gaming session.¹ More recent research on the casual game “Angry Birds” have shown that players spend as much time on it daily as on watching television shows.² Especially early adopters spend a large time of their free time playing casual games and then become ambassadors within their networks and experts for the game facilitating prolonged and enduring success of the game (Teller mann, 2010).

¹ <http://blog.nielsen.com/nielsenwire/consumer/report-americans-serious-about-casual-game-play>

² <http://www.telegraph.co.uk/technology/video-games/8303173/Angry-Birds-the-story-behind-iPhones-gaming-phenomenon.html>

Commentators have already partially taken these observations into account when analysing the success of Facebook social games. However, there are also contradictions and gaps in current theorising. An investigation of the various users, user groups and of the everyday situated nature of casual game play may be able to further understanding as to why Facebook social games are so successful. In the following some theoretical groundwork shall be laid – also as a foundation for future research – to answer the question of what is so fascinating about playing games on Facebook. What makes games such as Farmville so successful? To answer this question, the three attributes that distinguish Facebook social games from other computer games and that have found recognition within the literature shall be discussed, namely the focus on *social* interactions and cooperation, the specific type of *play* experience and the fact that the games are seen as *casual* games (see also Kinder-Kurlanda, 2012).

Social interactions – or are they?

Often Facebook social games' success is attributed to its successful integration of existing social relations within the Facebook network. In many of these games, players are encouraged to build up and maintain social relations in the form of a network of in-game friends in order to progress: While it is possible to play many games without interacting with other players, having 'friends' or 'neighbours' is usually rewarded in some way. In Farmville, for example, most elements such as animals, trees or special collection items can be bought with Farmville money. These items are very expensive. However the game design allows these types of items to be given free as daily gifts to others. In addition, the player is reliant on neighbours for other advancements and improvements in the game, for example, to increase the size of the farmable plot. Players are thus motivated to encourage others to also play in order to increase the number of their friends or neighbours in the game (Rohrl, 2011). Indeed, players are not only encouraged to ask others to also play the game, but, once they have joined the game, they may feel obligated to continue playing for the sake of companion players. This could partially explain why players repeatedly return to the game.

Additionally, Rao (2008) has researched how social gaming applications serve to establish a playful mood and thus encourage and initiate Facebook use, thereby establishing Facebook as a virtual 'third place' (Oldenburg, 1997). A third place in this conceptualization is a space which exists outside of both work and the home and which, like a transient version of a café, serves as a place for recreation and meeting others (Rao, 2008) and thus constitutes a focal point for

the emergence and maintenance of communities (Williams, 2006). Third place theorizing arose mainly out of the experience of US American sub-urbanisation in which non-virtual third places lost their importance. As a result of humans finding few real-world outlets to meet their desire for community and social interaction, it has been suggested that certain social ties have moved online as part of a virtual community (Williams, 2006, p. 15).

Facebook social games, by enabling a location for meeting online, thus not only contribute to making the Facebook space more attractive and interesting but also define it as a third place in which relaxation and socializing outside of either home or work become possible. Di Loreto et al. (2010) even postulated the emergence of so called ‘new tribes’ in the electronic age, a concept borrowed from Maffesoli (1996). Accordingly, tribes are appearing in social games on Facebook where social ties are fostered that make the player return to the game application repeatedly. An increase in the importance of a feeling of community for the players is the result (Di Loreto et al., 2010). The tribes are unstable, small, affective and arise outside the parameters of ‘modern’ society and we are even witnessing “... the tendency for a rationalized ‘social’ to be replaced by an empathetic ‘sociality’, which is expressed by a succession of ambiances, feelings and emotions.” (Maffesoli, 1996, p. 11). The network is held together through common focal points: The shared focus on the gameplay creates a line between insiders and outsiders which allows the emergence of communities in Facebook social games. The exchange of gifts, for example, enables players to create a feeling of belonging together within a tribe, which is held together through the practice of gift-giving (Di Loreto et al., 2010).

Critics have claimed Facebook social games are not social: that games position player’s friends purely as resources, and that the possibility for in-game communication is extremely limited raising questions about the types of sociality enacted (Bogost, 2010; Rossi, 2009; Consalvo, 2011). Flanagan and Nissenbaum note the contradictory values embedded in the game mechanics design: “First, *Farmville* relies on community, trust, and friendship, but the game also involves the exploitation of these values, and this exploitation often negates the positive values” (2014, p. 28). While this might be the case, there is also growing evidence that Facebook social games do indeed act as a mechanism to allow people to stay in contact and to enact phatic communication practices easily (Burroughs, 2014; Wen et al., 2011). Kelly Boudreau and Mia Consalvo (2014), for example, note that social games offer a way for families to stay connected through their activities in game in a way that also means they do not have to undertake separate and possibly intense direct communication. Facebook game activity also does not stay entirely inside the game itself: Achievements and activities are noted on a

Facebook user's profile, and often broadcast to a user's Facebook friends thereby encouraging broader conversations (Wen et al., 2011; Willson, 2015b).

As Flanagan and Nissenbaum (2014) note, Facebook game developers explicitly aim to further or even force player collaboration. Developers argue that players use Facebook out of a desire for communication and only find games attractive if these facilitate or enable relationship maintenance:

The player is coming to the website to build and enjoy relationships with friends, not to play games. So, when a game helps players take care of their main social networking goal – building relationships with their friends – players will stay with the game longer and are more likely to evangelize the game to their friends. (Rohrl, 2011, p. 59)

Developers thus often seem to assume that Facebook users are mainly interested in social interaction. Developers are also interested in profiting from the possibilities for social interaction while enabling them. Brian Reynolds, game designer at Zynga (a social casual games developer whose offerings include Farmville) goes even further in postulating that games offer better opportunities for maintaining social contacts than other means of communication such as, for example, e-mail: "...there's all these different levels of social interaction that you can have, and these games provide tools for people to have those interactions." (Nutt, 2010)

There may be other, underlying reasons connected to the financial benefits of collecting consumer data on social networks which contribute to game providers furthering players' linking games with their social network on Facebook (Willson & Leaver, 2015). This happens even in those cases where the game is not per se a Facebook only game (as is the case, for example, in iPad app games such as Candy Crush Saga or Hay Day where players are regularly asked whether they would like to link the game with their Facebook account to gain certain in-game rewards). In any case game developers assume an important role in generating communities and in enabling communication and social interaction. Multiple strategies are applied that are intended to further collaboration between gamers such as the possibility to click on friends' game-related messages in the Facebook stream to gain a game-specific reward.

Paradoxically both designers and researchers assume that many interactions in the game do not constitute 'real' collaboration. A typical example of a game designer's position is Rohrl's (2001, p. 60) explanation that offers of collaboration in the game merely serve to give players the 'feeling' of interaction. Both Rao (2008) and Di Loreto et al. (2010) have argued that interactions in Farmville are merely representations of interactions. Players are not actually able to influence the game behavior but rather representations are offered which can be interpreted in various ways but cannot be changed through player interactions (Rao,

2008). Seen like this the presence of other players is a symbolic representation of others within the game experience in which actual game interactions do not take place: “the presence of friends seems more a symbolic representation worth the aim of giving a feeling of community and participation without actual co-presence or interaction.” (Di Loreto et al., 2010, p. 80)

Results and interactions in the game are, however, published on Facebook. This contributes to the creation of the user’s Facebook identity without requiring interactions with other Facebook users. Players who surf onto the Facebook page looking for social interactions are given the illusion of community and activity on Facebook becomes possible without others’ input and is pre-structured through playful elements. It is worth mentioning that although many opportunities for interaction and in Farmville can be seen as fictional representations, other forms of collaboration, for example, the exchange of gifts, are not of a fictional character.

To summarize, in the literature various reasons can be found that attribute Facebook social games’ success to their sociality. Requests for game-specific actions and replies engender both the spreading of the game and its repeated use. Additionally, Facebook social games serve as focal points of shared interest and enable easy communication and interaction between players. While some interactions are only ‘fictional’, the asynchronous, not simultaneous and partially interactive nature of interactions may satisfy a demand of players for uncomplicated maintenance of specific social contacts.

Play experience

Some authors (e.g., Kuittinen et al., 2007) have suggested that the play experience in casual games does not only refer to the actual game experience itself. For Facebook applications a multitude of playful experiential spaces is noticeable which cannot be reduced to narrow game sessions or even originate in these (Kuittinen et al., 2007). Social interactions or playing ‘on the side’ while engaged in other activities indicate that important influences on the game experience can be found outside of the actual game sessions or at least outside of the narrow frame of actual interaction with the game application. Different users with their individual motivations, abilities and resources are attracted to different elements of the game experience (from easy accessibility all the way through to various elements of the game itself). Which elements are attractive to which user groups for whatever reasons requires further investigation.

Game developers seem to usually assume that specific game mechanics and design elements contribute to the success of a Facebook game. For example, Rohrl (2010) suggests various recipes for success à la Farmville as promising strategies for casual games design. Two examples are ‘timed re-engagement’ (i.e. encouraging taking up the game at a later point in time) and ‘limiting game-play’ (i.e. setting a limit to the possible play actions per session).

In Farmville players are encouraged to return to the game at a later point in time, for example, by the fact that crops planted on the farm will have grown after a certain period of time and then can only be harvested within a specific time interval. After this time period plants will wither and cannot be harvested anymore. Rohrl (2010, p. 14) writes: “This has become a potent device for encouraging users to make a commitment to playing the game and to returning over and over.”

The second strategy, i.e. to limit possible interactions within the game sound paradoxical but is also intended to ensure that players return to the game. Only a certain number of game tasks can be accomplished in one session. After that players need to wait for plants to grow, for gifts to be returned and so on, which encourages them to play long-term and repeatedly.

Psychological studies of players’ desire for self-efficacy show how such strategies can be successful. Self-efficacy refers to experiencing one’s own direct-causal influence on the game occurrences as a feeling of success (Klimmt, 2006). Why players find these experiences in social casual games specifically is not entirely clear. The brevity of game sessions and the fact that small experiences of success can be achieved easily may contribute to an especially accessible and uncomplicated way of experiencing direct-causal influence. One can assume that the specific type of playing offered by Facebook social games occupies a very specific role in players’ complex everyday home and work environments.

‘Casual’ play (to fit in with other everyday activities)

Facebook social games can be played while being busy with other activities that require time and attention. ‘Casual’ games or playing refers to the way in which play may happen in short intervals or not be given full attention. Facebook social games can thus be played ‘on the side’ while engaged in other activities. Juul (2010) indicates that one of the attractions of casual games is their interruptibility which means that they can be played episodically: “Casual games just fit in better with my life.” (Juul, 2010, p. 12). Casual playing also allows realizing a

social component, which becomes possible through so-called ‘asynchronous multiplayer’ (Bogost, 2010). Facebook social games (like Facebook itself) allow social networking through asynchronous conversations that do not rely on simultaneous presence: Two players do not have to be online at the same time to be able to interact with each other. Game events are communicated to the player through game messages or symbolic means and they can reciprocate or react later on. The resulting breaks in the game allow the player to fit in both game requirements and everyday offline needs and obligations (Rao, 2008). The asynchronous game mechanics and the mechanisms of time-delayed re-engagement further Facebook social games as games ‘on the side’ to be played casually and easily fitted around other activities.

Open questions

From the literature we can conclude that there are three areas, namely social interactions, play experience, and the casual nature of the games, where reasons for the games’ attractiveness are likely to be found. Questions remain in all three areas:

- a) Social interactions: How do players view the possibilities for interaction? What kind of friendships and networks are emerging?
- b) Play experience: What do experiences of self-efficacy look like when playing Facebook games? Are they different from other games?
- c) Casual Gaming: What roles do casual games fulfil in the context of daily life and work?

How are these questions related to the everyday domestic and work lives of female players over the age of 35? Are the attractions of Facebook social games a particularly good fit to many of these female players’ situations and interests? Further light can only be shed by empirical investigation of players’ everyday playing practices within the context of their daily lives. Facebook social games are part of the ‘domestication’ of new technologies in which players actively work at integrating them into their daily lives, making them fit with other demands and interests and may even use them in ways not intended by the developers (Silverstone, 1992, Sørensen, 2005). Media use is thus always embedded in the everyday situated context of everyday communication and interaction (Bausinger, 1983).

Facebook social games thus can play a multitude of functions according to a range of different factors within people’s everyday lives, depending on individual life situations and needs (Wohn & Lee, 2013). It follows that not only the specific

content or nature of the games is important in order to understand people's interaction with them but also the cultural context of the situations of use. From the situated dimension of concrete use, a more general dimension of meaning can be distinguished. These meanings are influenced by the knowledge the user possesses, for example, about the general view of the used technology in the media (Beck, 1997). Social casual games are thus, for example, connected to discourses around privacy and 'low' culture or smut. Different discourses can be important, depending on where the players live. In Germany, for example, new technologies tend to be viewed with far more skepticism than in many other countries (Bausinger, 2000).

Social, individual and design aspects of playing need to be studied within the various (differing) cultural contexts. In addition, the examination should pay special attention to the largest user group of female players over the age of 35. It should be clarified which of their characteristics make Facebook social games so appealing to this group in particular, which of them are shared with other user groups, and which are idiosyncratic for this group.

As a first step towards answering the questions above we can ask whether there are any observable differences in the play patterns of male and female players with regard to time, place and reasons for playing that might serve to further our understanding of why people play. As the following section shows, doing so highlights some first insights that may in a next step be exploited to further understanding of play motivations.

Some answers from a study in Australia

An exploratory study was conducted in Australia to discover how social games played with others through social network sites such as Facebook are situated within the everyday. Australian game players were asked about their management and integration of game play within the everyday and the results were analysed with a particular focus on gender. The results – while preliminary – show that social games perform a range of interactive and integrative functions across and within people's lives.

According to a study in 2015 of 1274 Australian households and the 3398 individuals (of all ages) living in those households, 83 per cent of game households now use a PC for games (this is up from 53 per cent in 2013 – explained by the authors as a result of growth in content delivered online), 66 per cent of game households use mobile phones, while tablet computers have shown significant increases from 26 per cent in 2013 to 55 per cent of game household use in 2015

(Brand et al., 2015). The study noted that 68 per cent of all Australians play video games, of which social games form a subset, with 98 per cent of households with children under 18 years of age having computer games.

An exploratory study was conducted in 2014 that investigated the ways in which Australian social games players integrate game play into their everyday routines and practices. An online survey was distributed over a two-month period using a snowball sampling technique (More details on the survey, the method of sampling and the analysis can be found in Willson, 2015a). Once the data was collected, it was analysed according to gender to see whether there were noticeable differences in social games practices or patterns of play, and motivations. Differences might suggest that social games may be instantiated in the everyday in different ways and for different reasons in people's lives in part according to their gender. The survey was intended to identify areas worthy of further investigation.

Participants were asked to complete a short online survey on social games and the everyday. 154 responses were collected altogether with 94 of the respondents being female. The survey was addressed to both players and non-players of social games. The first questions were largely demographic and included questions about age, gender, education level achieved, household arrangements, size of household and questions about game enabled device ownership (i.e. tablets, smart phones, consoles etc.).

The next section asked about social game play: Of the 154 responses, 82 identified as players, 65 said they didn't play social games, three were unsure and four did not respond at all. On closer inspection, the three who were unsure all indicated they played games that could be classified as social games but included the possibility of accessing the game from outside of social network sites. Given some of the ambiguities around social and casual games in terms of definition and their shifting use in terms of platforms used and ways accessed (Deterding et al., 2010), this lack of surety is understandable. However, because this particular paper focusses specifically on Facebook social games, these three respondents have been excluded from the following analysis and discussion.

Players were asked to list the games that they most commonly play (a later question asked about what aspects of game play they enjoy). Of the total respondents, there were 69 respondents who identified as Australian players. The remaining questions were directed to understanding social game play in the everyday in Australia: questions as to who people play with; what devices they use; how often they play; where they play and so on were asked in order to get a sense of how social games might sit within the fabric of people's everyday lives, routines and practices.

The age of survey respondents ranged from 17 years or younger, to over 60 years with the majority (62 per cent) falling within the 30–49-year age group.

When non-players were removed from the dataset, this percentage increased to 86 per cent. There was a high proportion of female respondents overall (94 females to 58 males, two other/do not want to specify gender). When the data was focused on just Australian players, this higher response rate was still evident with a total of 49 female players, 19 male players and one other completing the survey. Females in the age bracket of 40–49 formed the largest proportion of respondents (37.73 per cent or 18 out of 49 respondents. The next highest proportion was the 50–59 age group with 20.41 per cent or 10 respondents).

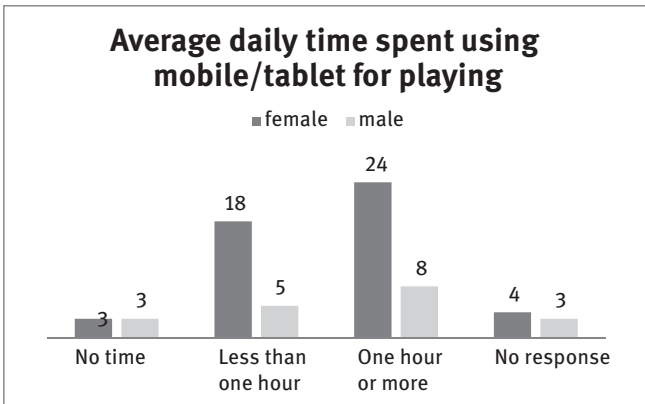
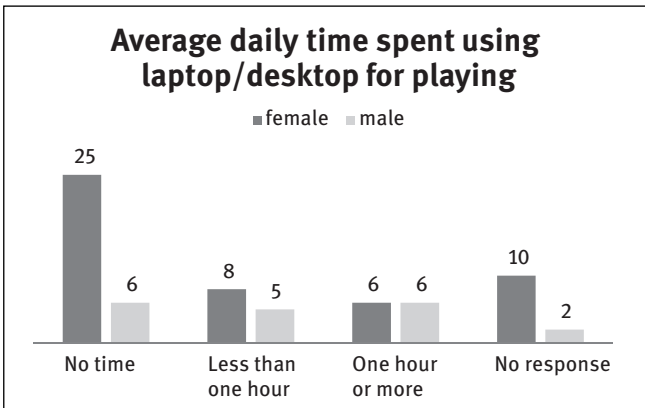


Figure 1: Average daily time spent on laptop/desktop or mobile/tablet for play of number of female and male players.

When the data was analysed on the basis of male and female gender, a number of noticeable differences in game play preferences and patterns became evident.

First, the amount of time spent on various devices differed. Respondents were asked about their social game use in relation to the amount of time they spend on various devices (desktop/laptop and mobile/portable devices) for their game play. Females in the study overwhelmingly used portable mobile devices for their game play with 25 respondents noting they spent no time at all on desktop or laptops for game play on average whereas only four females spent no time on mobiles. This contrasted strongly with male respondents whose time was more easily spread across devices (with the exception that half of the male respondents spent more than one hour/day on mobile/tablets).

There are obvious difficulties in assessing time spent on game play given that many people may multi-task with games running in the background while they are busy with other tasks or duties. Self-reporting of time spent playing may also be influenced by possible negative connotations associated with playing, e.g. feeling of too much time being ‘wasted’. Although both genders typically under-report time spent, researchers note that women’s underreporting is significantly more extensive: Williams et al. (2009) found that female players underreported their playing time roughly three times more than male players.

When linked with other survey data about when people are likely to play and where, these differences point to different allocations of time and types of activity undertaken within everyday routines. As Paavilainen et al. (2013, p. 810) note, “Social games fit into the players’ daily rhythms. The appointment (offline progress) mechanics enable the player to schedule their playing to fit their weekly schedule.” Consideration of gendered play differences point to the likelihood of different weekly schedules and everyday practices.

Play patterns

Differences were also noted in terms of locations where people play their games. When asked where they most commonly played (tick all that apply), and given a list of locations, females overwhelmingly nominated ‘on the couch’ at 84.8 per cent as their most common location. This differed noticeably from their male counterparts who nominated equally ‘in my room’ and ‘in my study’ as the most common locations, with ‘on the couch’ receiving less priority at 33.3per cent. While females also ranked ‘in my room’ higher than the males at 47.8per cent, it is the contrast in locations in relation to the popularity of couch play, that is most startling (see table 2 below). This difference would indicate a range of possible reasons and differences in everyday life practices and the ways in which social game play is undertaken within this.

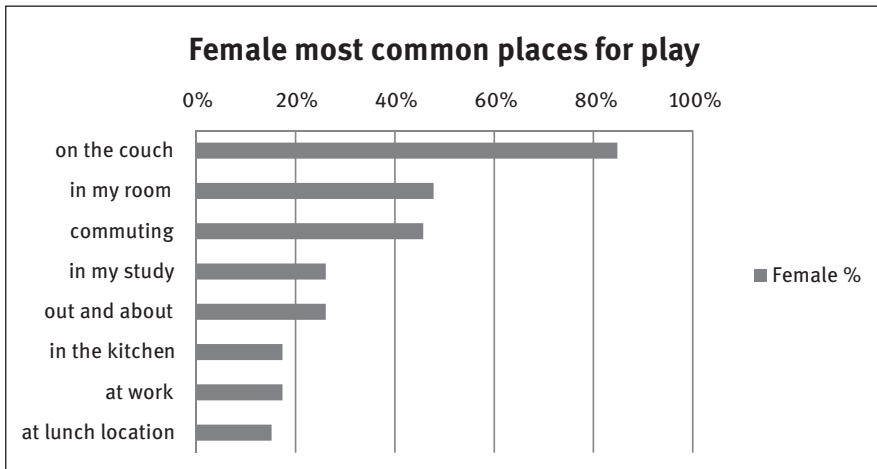
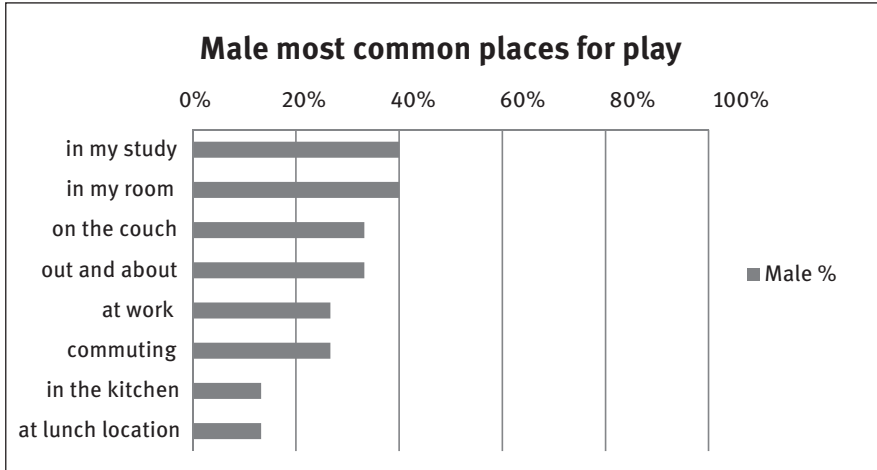


Figure 2: Female and male most common places for play.

There are a range of possible reasons as to why this might be the case – differences might indicate as early studies on television viewing indicated (Walker, 1996), that women have less control over the programming choices made for the main television screen in the house; it might be that all members of the household could be using multiple screens but the women are choosing social game activities as they indicate that they play for different reasons than their male counterparts; or they are undertaking more activities generally in the lounge area (while supervising children, for example). However, these rationales are all purely speculative and further study is warranted. It is worth also noting that

playing on the couch is enabled more readily by play on tablet or mobile devices (correlating with females indicating a high allocation of play time undertaken on these devices).

Respondents were asked about their play patterns in a typical day, trying to find out whether the fact that the games, as ‘casual’ games might be easier to fit around everyday activities indeed was a factor in the games’ attractiveness, especially for women. The responses when given a range of options as to when people are most likely to play were interesting and somewhat difficult to interpret. As indicated in Table 3, the female players’ highest responses were noted as ‘while waiting’, whereas male players nominated ‘in-between tasks’. This is an interesting differentiation. While perceived differences between what constitutes waiting and what constitutes in-between-tasks could arguably be suggested to infer the same or similar activity, the deliberate differences in the choices made by both genders raises some interesting questions about everyday activities and how these might map onto gender roles in Australian society.

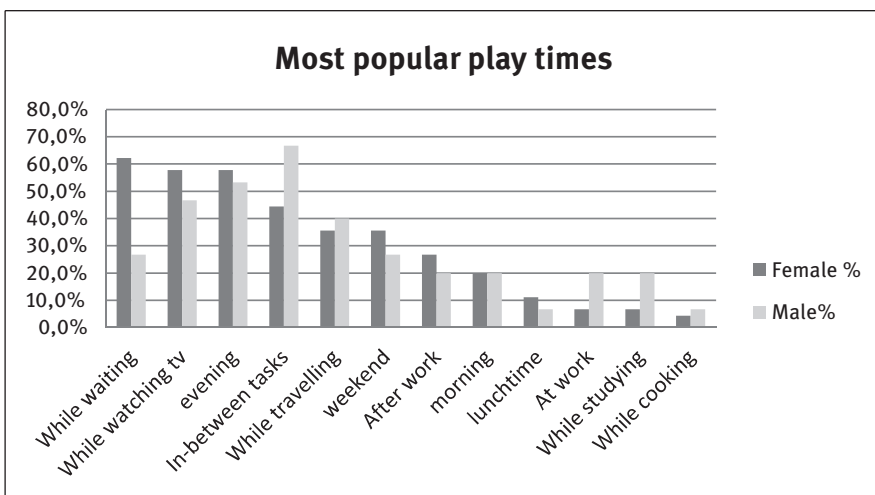


Figure 3: Most popular play times of female (45 answered, 4 skipped) and male (15 answered, 3 skipped) players.

Passing Time or Building?

Respondents were asked what aspects of game play they enjoy most and given a range of options to choose from in order of preference. These choices were dis-

titled from previous studies alongside observations drawn from consideration of the various activities made possible within these games. Differences again were noted in terms of the responses given by male and female respondents as noted in Table 4.

Table 1: What aspects of the games do you enjoy most? The table shows the aggregated ‘enjoy most’ (ranked 1) responses.

	female	male
Quests	2	3
Designing, maintaining building activities	3	4
Interaction with others	4	0
Competition	3	2
Passing Time	12	2
Relieving Stress	11	0
Mental Stimulation	9	2
Sense of achievement	2	1

According to Wohn and Lee (2013) ‘coping’ is the only motivation that they noted as having significant gender differences in social play as female players played games to cope more than males. The results in this Australian study would seem to accord with the finding that women play social games more often to cope (here represented within the categories of relieving stress and passing time), or at least this is the aspect of the game they enjoy most, whereas their male counterparts indicated they enjoy the elements of quests and building (whereas relieving stress did not receive any first preference responses). Importantly, this assertion is made on the basis of a relatively small sample and therefore the inferences that can be drawn are limited. However, it is notable that none of the male players noted relieving stress as one of the most enjoyable activities (again possibly pointing to different gender stress relief practices).

With regard to the question of sociality, the study also showed that sociality in terms of the people with whom the respondents played was a less commonly noted activity. When asked who they most commonly play with, males noted that they play equally by themselves (26.67 per cent) and with family they live with (26.67 per cent), whereas women overwhelmingly chose by themselves (40 per cent) and then friends elsewhere (26.09 per cent). This suggests possibly different gender role patterns in terms of the ways in which games are instantiated in

everyday routines. One interpretation would be that the males may be using the games as a way of building relationships with family members at home, while the women keep in contact with their broader social network of friends through playing the game.

Players were also asked about how they found out about games. The answers reflect how socially these games are embedded in the everyday: both genders nominated word of mouth as the most common way they find about social games (64.7 per cent [11] male, 63.94 per cent [29] women). Extending the finding recounted above about who they play with, women also note invitations from friends more highly (52.17 per cent [24] female) than their male counterparts (29.4 per cent [5] male).

Other indicators of the ways in which the games are embedded in social interactions is reflected in the fact that of the 26 women who noted that they discuss their game play with others, it was overwhelmingly conducted face to face (96.3 per cent), of the 10 men, they noted this slightly less at 90 per cent: both figures indicating that the majority of discussion players undertake with others about social game play takes place in a face to face context outside of the game or Facebook environment.

Discussion

Wohn and Lee (2013) examine gendered play practices in social games and note that gifting and space customisation practices are practiced more commonly amongst women than men. Similarly, they note that women play 'to cope' more frequently than men. Williams et al. (2009) also note sufficient differences in gender play practices to argue that they are a significant area of research and thus that gender considerations should be included in games research. The survey findings recounted here point to some noticeable differences in the ways in which Australian male and female respondents engage with social games and how they fit their game play into their lives and everyday routines.

Adrienne Shaw's work suggests that some of these differences may be a result of the expectations and behaviours that are built into socialised and cultural understandings of particular genders. Drawing on Judith Butler's work on performativity and identity, Shaw (2013) writes,

People are not simply playing parts in different social contexts. Rather, for Butler the performance of gender is like much more like a speech act (Austin, 1962). The performance of gender is what constitutes gender. These performances must draw on a broader system of meaning which helps render those utterances, those performances, intelligible.

The research recounted here as result of this exploratory study points to sufficient differences across Australian gender play of social games being evident and therefore warranting further investigation.

Taking these factors into account, it is worth revisiting the open questions posed earlier to ascertain if answers can be found.

- a) Social interactions: How do players view the possibilities for interaction? What kind of friendships and networks are emerging?

It is clear from the survey responses that social games are a mechanism for social engagement whether enacted within the game as a way to engage with family and friends; or as something to talk about in other external (i.e. not in-game) contexts. The survey results indicate that gender might also be a factor as to whether family or friends are predominantly played with and also the location (whether co-located or living elsewhere) where these other players are situated may make a difference. Whether these differences might be a result of different types of relational and bonding practices is something to consider. Given the small numbers examined (particularly in relation to male players) this is not able to be determined here but it is certainly something that warrants further examination and consideration.

- b) Play experience: What do experiences of self-efficacy look like when playing Facebook games? Are they different from other games?

As demonstrated in the survey responses, Facebook social games can be easily fitted into everyday routines and practices. This can be seen in terms of intermittent play practices, with short play periods being possible, and also the capacity to play on mobile devices and thus being always-on-hand. Waiting, in-between tasks or watching television were indicated as the most popular times to play, seemingly often while sitting on the couch. These descriptions all indicate the use of Facebook social games as a mechanism to enhance a situation, to address a (possibly unavoidable) otherwise 'empty' or unrewarding experience: as a way to claim a space and activity or refashion it in a way to suit an individual's experiences and desires. These are different types of responses and experiences than we might expect to see from players who may be playing console based games which require either players to be locked into particular static locations for their play activities, or which often require involved and lengthy game play sessions.

- c) Casual Gaming: What roles do casual games fulfil in the context of daily life and work?

Jesper Juul (2010) and many others note that the ways in which daily lives alter over time result in changes in work and family responsibilities and related time demands and availabilities. These changes impact on the types of games

that people want to play, the time and other resources that they can allocate to game play and also the way in which games are situated within their social and familial networks. Casual games, of which Facebook social games form a subset, are able to meet and circumvent or accommodate a range of these constraints in ways that are clearly attractive to a large number of people, and particularly it is suggested, to women in the over 35 age demographic. The survey results recounted here suggest that Facebook social game players turn to social games as a way to relieve stress and boredom, and to keep their minds active, as a mechanism to facilitate social and familial engagement, and also to fill their time (and possibly even to gain some control over their time) when they may be unable to do other things because they are waiting for events, people or circumstances to happen. Understanding what the different responses on the basis of gender might indicate about these relationships with time, families and friends' warrants more detailed investigation.

Outlook and Future Work

In Germany Facebook has received much criticism for infringing on users' and non-users' privacy. Gulyas (2013) has shown that German social media users tend to view social media as more problematic than in other countries. Journalists in her study were more concerned with privacy issues preventing them from using social media than, for example, journalists in England. A study with a translated questionnaire is planned for the German context in order to investigate German users' specific motivations and situated ways of domesticating Facebook social games in their everyday lives. A comparison with the Australian results may help better understand motivations as related to play experiences situated in typical everyday situations.

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Chapter 5. Information Literacy Levels of Facebook Users

Abstract: How information literate are Facebook users? An online survey ($N = 742$) was conducted to examine how Facebook allows users to develop skills and abilities concerning the correct use of information (e.g., knowing how to find information, correctly dealing with information on Facebook, and adhering to privacy, as well as legislation governing Internet policies). One approach, based on the Association of College and Research Libraries standards and the derived research model, provides the framework for our study design and data interpretation. We investigate users' self-assessments of their perceptions of information literacy on Facebook. Concerning evaluation, adherence to laws/ethics, and privacy, our participants performed well. In terms of representation, making use of, and creating information, however, they felt less sure of themselves. Taking all building blocks into account, users appear to rate themselves, on average, at a medium level of information literacy (1.71 on a scale between 0 and 3). In addition, the differences between our women and men are statistically very significant. Men estimated their information literacy levels to be higher than women did. Comparing general Facebook use with Facebook groups' behavior indicates that general Facebook functions develop more information literacy abilities than do operations in Facebook group functions. Thus, users' general information behavior strongly influences their information literacy levels on Facebook.

Keywords: Information literacy, Privacy, Social media, Facebook, ACRL, Information retrieval literacy, Social media literacy, Knowledge representation literacy, Facebook groups, Facebook functions, Information behavior.

Introduction

Facebook is currently the top social networking service (SNS) and one of the most visited social media websites (Statistica, 2015). Founded in 2004, it has become one of the most popular tools for sharing, commenting on, and posting new

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content (e.g., text, photo, link, video, etc.). Many educators complain that students may feel negative effects through social media usage. However, positive effects in the area of information retrieval and knowledge representation often are not picked up by the debate nor in scientific studies, yet are nevertheless important to consider.

With the advent of social media (Web 2.0), web users handle information differently than they did even 10 years ago, with the ability to do so usually linked to information literacy. Only a few studies have treated Facebook in terms of information literacy (e.g., Hanell, 2014). Unfortunately, only one study, an analysis by Witek and Grettano (2012) entitled “Information Literacy on Facebook: An Analysis,” has extensively investigated information literacy. However, to date, no one has produced any empirical research. Thus, the analysis of Witek and Grettano (2012) serves as an inspiration for our study. Recognizing this void in the literature, our study will illuminate this area and examine the acquisition of practical competencies for information retrieval and knowledge representation literacy through the use of the SNS Facebook.

To analyze Facebook users’ self-assessments concerning information literacy, we looked at their actual information literacy abilities. The purpose of this study is to identify the nature and self-perception of Facebook users’ information literacy levels and the competency factors that develop and promote information literacy. Practical competencies of information literacy regarding Facebook have been empirically evaluated. We present two primary components of information literacy with their competencies listed below:

- Information Retrieval
- recognizing information needs
- searching for and retrieving information
- evaluating information quality
- making use of information
- Knowledge Representation
- creating information
- representing and storing information
- providing for privacy
- providing for an understanding of information laws and ethics

Additionally, we observed Facebook users operating at different competency levels. Therefore, the study attempts to identify the knowledge level of Facebook users according to a model of the level of competence (Zichermann & Cunningham, 2011) and subsequent application of information literacy (Knautz, 2015). We work with four competency levels:

- level 0: information illiterate person
- level 1: novice
- level 2: problem solver
- level 3: expert

Information Literacy

When addressing the concept of *information literacy*, what do we mean? Due to the increasing amount of digital content available – especially in the context of social media – searching, finding, using, generating, and indexing information have become necessary skills in the 21st century. Information literacy refers to the ability to access and use a variety of information sources to solve an information need. It means defining one’s information needs, searching, finding, evaluating, using, and subsequently communicating that found knowledge. Hence, an information literate person must be able to identify the knowledge gap as well as identify appropriate research methods. Additionally, he must be able to critically evaluate and formulate questions accordingly. For this, she must be able to search for answers to those questions in increasingly diverse ways. Finally, individuals must constantly be learning to remain information literate as it is a “learning experience” (Hapke, 2007).

Information literacy includes two competencies. The first one encompasses all that pertains to information retrieval literacy (recognition, searching, finding, evaluating, and using information). The term “information literacy” was coined by the president of the Information Industry Association, Paul Zurkowski, in 1974:

People trained to the application of information resources to their work can be called information literates. They have learned techniques and skills for utilizing the wide range of information tools as well as primary sources in molding information solutions to their problems (Zurkowski, 1974, p. 6).

Since that time, many other definitions have been applied to the term. One of the most widely recognized definitions and the one most often applied today comes from a 1989 “Final Report” by the American Library Association (ALA): “To be information literate, a person must be able to recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information” (ALA, 1989, p. 4).

Social media use has led to the development of additional literacies of knowledge representation includes creating, representing, and storing information, as well as providing for its privacy. An information literate person must know how and be able to create, represent, and be able to store information. In addition,

he or she must be able to understand the economic, legal, and social issues surrounding the information and be able to adhere to privacy requirements concerning it (Stock & Stock, 2013). This competency of providing for an understanding of information laws and ethics is relevant for both literacies we have outlined – information retrieval and knowledge representation.

Some researchers have examined the relationship between social media and research skills (Hicks & Graber, 2010; Purdy, 2010). Numerous studies have been conducted concerning Facebook. Unfortunately, only two analyses treat the topic of information literacy. Hanell (2014) conducted an ethnographic study of a Facebook group and analyzed – more as a by-product – the impact on information literacy. The study by Witek and Grettano (2012) was divided into two parts, with the second part not yet finalized. The first part (groundwork for the second) consists only of an analysis of Facebook functions. Witek and Grettano analyzed Facebook with particular regard to the Association of College and Research Libraries (ACRL) Information Literacy Competency Standards for Higher Education (ACRL, 2000). They analyzed each of the ACRL standards and examined which Facebook functions promote and support being an “information literate person.” Questions they asked included “Which Facebook features enable users to locate or find information?”; “Which tools aid users in the evaluation of information?”; and “In what ways does Facebook help users utilize information to accomplish a specific purpose?” (Witek & Grettano, 2012, p. 244).

It has been found (but only in theory) three Facebook functions (feeds, shares, and comments) lead to Facebook users acquiring greater information literacy. According to this analysis, there are two types of feeds (News Feed and Timeline). In the News Feed, users can decide which information they want to receive. In the Timeline, a user publishes content. Relevant information is detectable in the Timelines of Facebook friends and of all others who publish their information publicly. Both functions aid Facebook users in controlling their content on the SNS. The share function is helpful for evaluation and syntheses (ACRL, 2000, p. 11). In addition, with the comment functions, Facebook users have the possibility to recognize information needs.

Some studies discuss web use in terms of information literacy. For example, Luo interpreted Web 2.0 tools in relation to information literacy (Luo, 2010, p. 32). Another analysis mentioned Facebook as an information literacy tool (Click & Petit, 2012); however, the authors merely discussed it, but did not describe or analyze it. Bicen and Cavus (2011) found Facebook tools can help increase users’ knowledge, concentration, and search abilities. Witek and Grettano (2014) identified social media usage effects – Facebook use specifically – on students’ information literacy practices and behaviors.

Applying the work of Zichermann and Cunningham (2011), Facebook users' knowledge can be categorized into levels of information literacy. Kathrin Knautz (2015, pp. 94–95) also applied this concept on gamification with regard to information literacy. Zichermann and Cunningham (2011) have five levels (“novice,” “problem solver,” “expert,” “master,” and “visionary”) in their model to use in recognizing the progress of competency and in acknowledging which knowledge level the user has attained.

In our study, Facebook users were only categorized as far as the “expert” level because we did not use the “master” and “visionary” levels. We applied knowledge levels in our study to identify in which areas Facebook users perform well with regard to information literacy. With the help of mean values of our empirical evaluation, Facebook users were categorized into four levels (scale: 0 = “information illiterate person” to 3 = “expert”). Depending on the level of information literacy, a Facebook user may be observed at different levels handling different types of information (see Table 1).

Table 1: Levels of Information Literacy, According to Zichermann and Cunningham (2011).

Level of Information Literacy	Description
Level 0: “information illiterate person”	Information illiterate persons are ignoramus and they do not know which functions will be offered to them. Thus, they are not familiar with Facebook. Additionally, they do not have the basic skills and knowledge (e.g. the conditional terms or the functions on Facebook). Users with a mean value of our empirical evaluation (scale: 0 to 3) between 0 and 0.74 have been categorized into this level.
Level 1: “novice”	At the next level, the user is introduced to the “new learning environment.” So, on the level of “novice” they learn the basic skills and abilities of information literacy but they do not deal with “deeper problems yet” (Knautz, 2015, pp. 94–95). Users with a mean between 0.75 and 1.49 have been categorized into this level.
Level 2: “problem solver”	In the next step, the problems and challenges are becoming “increasingly complex.” The user acquires new skills and knowledge to handle the functions and information on Facebook correctly, which will allow him/her to solve challenging problems (Knautz, 2015, pp. 94–95). Users with a mean between 1.50 and 2.24 have been categorized into this level.

Tab. 1 (continued)

Level of Information Literacy	Description
Level 3: “expert”	<p>After this, the user progresses to a higher level, with a mean of 2.25–3.</p> <p>In terms of the level of knowledge and skills, she learned the new skills and extensive abilities.</p> <p>The user knows more than the standard user: „At the expert level, a player knows something that is not obvious to the casual player” (Zichermann & Cunningham, 2011, p. 31).</p> <p>If there is a problem, the user applies her existing knowledge and can solve the problem. She can always solve the problem. Hence, the user has an extensive knowledge base.</p> <p>The user has completely understood the learning application and believes that she has everything under control.</p>

All older models of information literacy concentrate on information retrieval. Models of information retrieval literacy describe the phases of detecting information needs, information search, information evaluation, and found information utilization. The 1989 ALA “Final Report” inspired a group of university professors in the United States to develop models concerning the process of searching for information, resulting in the creation of the “big 6 skills” model by Eisenberg and Berkowitz (1990). The “information seeking process” model by Kuhlthau (1991) was also successful. Further interesting models were developed, such as the “seven pillars model for information literacy” (SCONUL, 1999), and two German models, the “dynamic model of information literacy” by Homann (2000), and the “information literacy 2.0” model by Hapke (2007).

With the growing importance of information literacy in schools and higher education, national and international standards have emerged from these models and definitions. In terms of university students, the “Information Literacy Competency Standards for Higher Education” (ACRL, 2000) and the Australian “Information Literacy Standards” (Council of Australian University Librarians, 2001) have been enforced. There now are also standards for information literacy, such as the “Nine Information Literacy Standards for Student Learning” (American Association of School Librarians, 1998) and the German standards of the network information literacy Baden-Württemberg (NIK-BW, 2006).

According to Catts and Lau (2008), the competencies are portrayed as a layer model (basic competence, media competence, and information literacy). With these existing definitions and models, the original model can be extended to include a “new dimension of the practical skills for knowledge representation”

(Gust von Loh & Stock, 2013, p.4). Figure 1 represents the building blocks of the information literacy model according to Stock and Stock (2013). This model includes two main dimensions – practical competencies for information retrieval and practical skills for creating and representing information. There are eight building blocks:

- Recognizing information needs – What information do you need?
- Searching for and retrieving information – How will you search and where might you find the information?
- Evaluating the quality of found information – How useful is this information?
- Making use of information – How will you use this information?
- Creating information – How to create new information?
- Representing and storing information – Are you able to store and to index this information?
- Providing for privacy – Are you aware of the privacy (settings)?
- Providing for an understanding of information laws and ethics – Do you adhere to information laws and to information ethics?

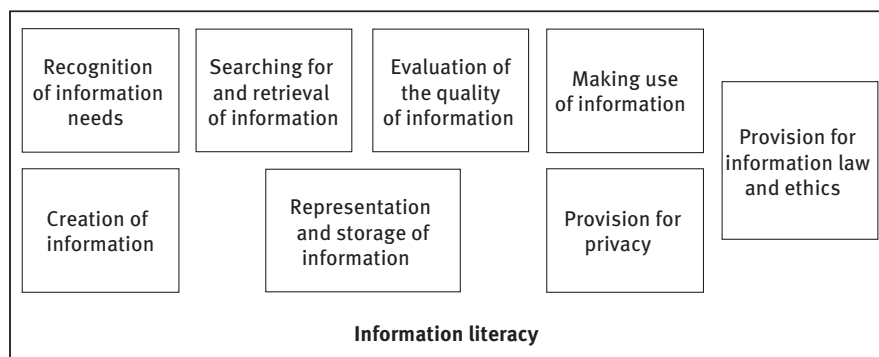


Figure 1: Building Blocks of Information Literacy: Source: Stock and Stock (2013, p. 79).

The information literate person begins by *recognizing information needs*. The ability to do so is the basic requirement for successfully retrieving information. An information literate person must know what she already knows and be able to identify any knowledge gaps. In addition, she must determine which information will satisfy her information needs and understand the form, volume, and format this information will take. What does the term “information needs” mean? Generally, if someone desires knowledge of things unknown, those are information needs. They are not always easily recognized, however, because a person must

first realize a knowledge gap exists. Only then can it be decided which kind of information is necessary.

This building block is present in almost all models and standards of information literacy. The ACRL of the American Library Association also offers a description of information needs: “The information literate student determines the nature and extent of the information needed” (ACRL, 2000, p. 8). This also includes identifying terms, research topics, and question wording. Furthermore, articulating information needs is equally important. An information literate person should be able to articulate information to other people that is helpful in terms of information organization. One could ask whether she has acquired sufficient information for understanding a topic. For example, to obtain a subject overview, one source might be adequate, but when writing a term paper, a researcher must be able to recognize that more sources ought to be consulted with more information gathered. In most cases, a single source is insufficient to satisfy information needs. For this reason, one must also revise her information needs as she goes about assembling and organizing data.

What does recognizing information needs mean when applied to an SNS, such as Facebook? Some of Facebook’s most useful functions can have a positive effect on users themselves in recognizing their own information needs. As mentioned above, Witek and Grettano (2012) analyze the News Feed function as follows: “News Feed content is an information retrieval system that is completely customized to the user’s information needs and optimized to display content only from trusted or preferred sources” (Witek & Grettano, 2012, p. 247).

With the help of the News Feed function, the Facebook user gets much new content posted by other subscribers. By reading this, he comes to recognize his information need. This is the passive solution: Users read new posted content on their News Feed and realize they have an information gap in terms of understanding it. This indicates they must acquire more information. The posted information one has been read can help in getting new ideas. Furthermore, there is an active solution that can play an important role. Users can acknowledge their information needs by posting or commenting on new content on their timelines. They must be clear on which topic they are posting new content; therefore, they must examine it diligently. Thus, the process begins with producing a question. By posting new content, users must be clear about which words and information they want to include in their post to express themselves.

After recognizing one’s information needs, the information literate person next moves to *searching for and retrieving information*, a standard the ACRL defines as follows: “The information literate student accesses needed information effectively and efficiently” (ACRL, 2000, p. 9). This standard, which includes searching for and locating information, characterizes the importance of and

ability to search for and retrieve information. Because of the missing information (knowledge gap), the person must ascertain where to obtain needed information and then how to find out exactly what he wants to know. First, the information literate person must create and develop an effective search strategy by identifying and locating useful, accurate, and accessible information sources (e.g., “How will I search for and where might I find the information?”). He might ask, “Is the needed information digital or analog?” An information resource can be digital (e.g., a file on the Internet or a post on Facebook) or analog (e.g., a book). One must have access to the needed information. Certain databases (e.g., LexisNexis, STN International, Genios, etc.) can only be accessed by registered users *at a cost*. Therefore, the user or his institution must pay for the information. As a result, many people primarily search online for information that has no monetary cost attached to it via general search engines, such as Google.

How do users search for and find (quality) content on Facebook? In general, Facebook offers only a very restricted search function. It has a search bar on every page, into which users can enter terms to find posts, photos, groups, places, events, or videos that are public or were shared with them in the past, but can only do so by entering 1) names of Facebook users, 2) title terms of posts, or 3) hashtags. Through this primary search capability, one can also find a search function in Facebook groups, where users can search with keywords in posted content, group members, files, and so forth.

The next step for users is *evaluating the quality of found information*. The ACRL defines this third information literacy standard as follows: “The information literate student evaluates information and its sources critically, and incorporates selected information into his or her knowledge base and value system” (ACRL, 2000, p. 11). Users must critically evaluate all retrieved data. Any information found on the Web or elsewhere must be evaluated. Thus, the information literate person determines a source’s relevance and importance as regards the given information. How does one decide which information is necessary? For this, he can ask the following questions to determine relevancy: “Is the source reliable?”; “Is this piece of information necessary?”, and “Will it satisfy my need for knowledge or understanding?” In this way, sources and search results can be refined, leading to new search arguments. Information is only relevant if it helps to answer the respective questions.

Furthermore, criteria must be invoked that will enable the user to decide whether information or sources are reliable. Which critical factors will influence the decision made through the evaluation? How meaningfully the search was begun is crucial for the quality of the results returned by the information search process. If the information source is inadequate, the result cannot be sufficient. Smith (1997) proposes a list of criteria to be applied, including analog and digital

publications, in both form and content. Thus, evaluating information quality is divided into two areas. First, using the metadata, a user can evaluate the information or a source, without having to read it. Before doing so, however, one must answer the question “What might be a more credible, reliable source?” Then, in the second step, the content should be evaluated.

Is there “information overload” through Facebook? Koroleva, Krasnova, and Günther (2010) explore this idea. Because the SNS is essentially free to use, it may be too much information or content is available. Accordingly, Facebook users must decide which information is useful and “good” in terms of quality. How can the SNS enable an evaluation? Witek and Grettano (2012) discuss the utility for doing so using Facebook functions, such as commenting and sharing, that enables a type of evaluation process on Facebook. Other users can comment on posts. This may start a discussion following the post. The outcome of this is assessment and reevaluation of content, and these differing interpretations can bring forth new understanding, provocation for new arguments, an idea, or maybe an endorsement. The comment function enables collaborative evaluation and collective understanding. The share function enables the preparation of new information. Additionally, the “like” function can operate in the same way a social peer review does.

After finding and evaluating information, it must be *used and transformed into “action-relevant knowledge”* (Stock & Stock, 2013, p. 42). The ACRL defines this aspect of information literacy as a fourth standard: “The information literate student, individually or as a member of a group, uses information effectively to accomplish a specific purpose” (ACRL, 2000, p. 13). The information literacy process cannot be completed without the user effectively and efficiently making some use of the information. Effective use would be to fill identified gaps and information needs, to achieve predefined targets, or to gain new insights. In addition, this process includes independently developing theses, ideas of one’s own, and selecting appropriate information.

Like other building blocks of knowledge representation literacy, *creation of information* is not denied as a separate point of ACRL. With the advent of social media, however, a paradigm shift has occurred on Internet usage. The web user (“consumer”) has also become a “producer.” Users create new information (e.g., on Facebook as a post or write an entry on Wikipedia) in the role of producers and at the same time actively use these services as consumers – summarized in the term “prosumer” (Toffler, 1980).

How can users create new information with the help of Facebook functions? The SNS offers many ways to create new information. One way is by creating or posting new content (e.g., a post, image, video, or link on a user’s timeline). Moreover, the comment function itself may indirectly influence this process. If

a user comments on something, this may start a new discussion topic, which in turn creates new, more informed knowledge and learning opportunities. The same applies for asking and answering questions on Facebook.

The next new dimension includes practical skills for *storing and representing information* (Gust von Loh & Stock, 2013, p. 3). Representing information in this context focuses on selecting appropriate means for information retrievability. This dimension includes two steps: The first aspect is the ability to store or save self-created information on an information service, for example, uploading an image or a video on Instagram, Flickr, YouTube, or Facebook. The second aspect refers to the description of the stored information by expressive titles and by tags (or – in some services – by hashtags) (Peters, 2009).

Information on social media in general as well as on Facebook in particular must be retrievable. In this area, Facebook offers some options for representing and storing information. What are the options for saving information on Facebook? Using the Save function, users are offered the option to upload documents (e.g., links, videos, images, music) onto the SNS, which makes them retrievable. Furthermore, in Facebook groups, a user can create a file or document and store it for later retrieval. The type of search for a file or document in Facebook groups makes the whole process easier. Here, visibility plays an important role. Information can be posted as usual on Facebook with the exception that the document is only visible “by me.” It will be stored and retrievable.

The same type of saving can be done with photos. Users can create a photo album and constrain its visibility. We see then the role of Facebook functions is important. Because of its many possibilities for creating new information, Facebook users become active users. Creating information on social media (e.g., on Facebook) thus can be understood an important building block of information literacy. Hence, Facebook users create much new information that needs to be stored and effectively indexed (e.g., by hashtags).

In the age of social media, *providing for privacy* as well as *for information laws and ethics* has become increasingly important (Gust von Loh & Stock, 2013). Again, we can refer to the ACRL for an appropriate standard to follow: “The information literate student understands many of the ethical, legal, and socioeconomic issues surrounding information and information technology” (ACRL, 2000, p. 14). This area of information literacy includes the topic and the role of laws and ethics, which refer to aspects of treating other social media users with consideration. Ethical values and information on legal principles are usually closely related.

A typical question for this building block of information literacy is “What should I mention before posting anything on Facebook?” Intellectual property is a vital concern (Linde & Stock, 2011, p. 120). One critical consideration is how to safeguard copyrighted material. Whose right is being infringed upon? If a person

did not create a wall post or a photo by herself (e.g., recording a live concert), by whose legal authority does she operate in posting the concert's music or related images? By what license does she post? Facebook prohibits the posting of content to which other people or entities hold the copyright without first receiving the owner's permission. Additionally, content that includes the following is forbidden: hate speech, threats, anything inciting violence, pornography, images containing nudity, and graphic or gratuitous violence. Facebook users are instructed to provide their real-life names and provide accurate personal information on the site. False information and fake or pseudonymous names are forbidden. Users can register only one account for their use.

Providing for privacy also concerns using information responsibly as well as protecting personal (one's own and others') data on the Internet (Beutelspacher, 2013). Which steps can Facebook users take to protect their private data? They can control their posts and personal information. They can choose with whom and which information they share on the site (i.e., by understanding and using settings for public, friends of friends, friends, only me, custom) and can target specific audiences to receive status updates. Privacy settings thus are an essential type of knowledge to acquire and apply.

Research Questions, Model, and Methods

In this section, we present the questions, model, and methods for our research. A user-related concept for answering these questions by self-assessment has been developed. Our study aims to discover and investigate Facebook users' self-perceptions of their information literacy levels. We ask several questions: Which Facebook function covers a building block of information literacy? How effective are the Facebook functions? How does Facebook promote information literacy? Do Facebook users handle Facebook correctly, lawfully, and fairly? A sub-question treats the knowledge level on a scale of 0 to 3 of Facebook users. In addition, this study also distinguishes between general Facebook functions and functions in Facebook groups. This refers to, for example, the general search function in Facebook or the search function in a Facebook group. Thus, we ask our first research question (RQ):

RQ1: What are Facebook users' perceptions of their own information literacy and which Facebook functions aid in developing information literacy behavior?

To deepen our knowledge, we ask two sub-questions with regard to gender and general Facebook/Facebook group use:

RQ1.1: Is there any difference between male and female information behavior?

RQ1.2: Are there any differences between information behavior concerning Facebook groups and general Facebook use?

Additionally, we analyzed different forms of information behavior (RQ2.1 to RQ2.7) in relation to the users' information literacy:

RQ2: Does users' information behavior trigger different information literacy levels on Facebook?

RQ2.1: Are there differences between library users and nonusers?

RQ2.2: Which differences are there between users who control their content on Facebook and those who do not?

RQ2.3: Do the terms on Facebook influence user behavior?

RQ2.4: Are users who store their real names on Facebook more likely to be information literate than users who create fake accounts?

RQ2.5: Are users who view third-party content more likely to be information literate than users who do not?

RQ2.6: Are there differences in providing for privacy with regard to privacy settings ("public" and "custom")?

RQ2.7: Is there a difference between users who have an account to accomplish a specific purpose and users who joined Facebook groups just for fun?

Figure 2 presents our research model, developed on the information literacy model and its building blocks. Our model has three main focuses:

- to analyze the self-perceptions of the users' state of information literacy on Facebook,
- to analyze gender-specific differences as well as differences between general Facebook use and behavior concerning Facebook groups,
- to relate general information behavior (e.g., library use) and information literacy.

The research model presupposes that the identified eight building blocks are indeed the key factors of information literacy. The information literacy model used was empirically examined with the help of German Facebook users. To assess their information literacy levels, an online survey was designed and distributed on both Facebook and an Internet forum frequented by German Face-

book users, which asked them to identify their knowledge level in terms of information literacy with a subsequent pretest (10 participants). The online survey used multiple-choice questions with predefined answers given (Bühner, 2010). Beutelspacher (2014) has noted that with this survey method, every participant gets identical questions and predefined answer options.

The target participants of this study were current Facebook users in Germany. Empirical data for this study were collected via the online survey tool umfrageonline.com. The study was open for four weeks (9 March–12 April 2015) and was based on previous study questions by Förster and Orszulok (2013) and the information literacy model by Stock and Stock (2013). The survey included items regarding the above-discussed building blocks of information literacy (questions 1–44) and, in addition, demographic factors (questions 45–48), such as gender, age, and date of graduation. Thus, the survey included 48 items. Participants answered questions concerning self-perception of their information literacy on Facebook and assessed their information literacy levels on a scale from 0 (“information illiterate person”) to 3 (“expert”).

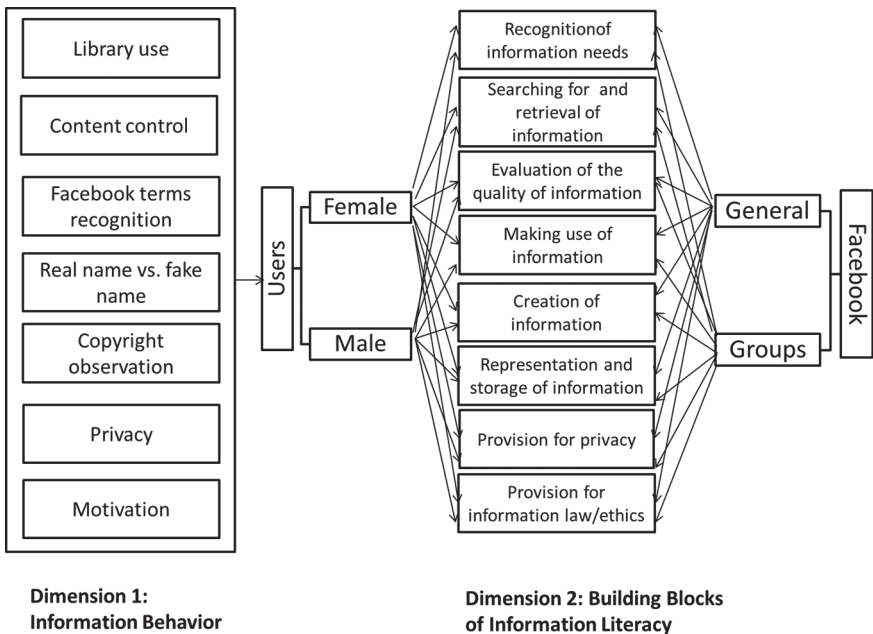


Figure 2: Our Research Model.

As noted, the questions were designed to cover each building block of the information literacy model. Typical questions were “How often do you share/post new

content (e.g., post, link, etc.) on Facebook?"; "Who can see your private data and your posts on Facebook?"; "Are you satisfied with the Facebook privacy settings?"; "Facebook has a save function. Do you use it?"; "How often do you use Facebook?"; and "Are you satisfied with the search function generally in Facebook and with the search function in Facebook groups?"

The total number of participants was 975. Of these, 742 (76.1 %) completed the survey. Cases that were incomplete and in which the participants answered only a few questions were removed from the analysis. Data analysis was conducted using IBM SPSS Statistics 21 and Microsoft Excel 2010. Mean scores, standard deviations, and significance tests (*t* tests) were used for data analysis. In addition, a reliability analysis was performed to check the reliability and validity of the given data. We distinguish among four levels of statistical significance, namely, the 95 % level (marked by one asterisk "*"), the 99 % level (**), the 99.9 % level (***), and all other cases as "not significant" (*ns*).

Facebook Users' Self-Perceptions of Information Literacy

Of the participants, 51.5 % are women, 47.3 % are men, and 1.2 % of participants did not specify gender. Most of the participants (43.4 %) are between 18 and 24 years old. A total of 31.2 % spend more than 3 hours a day on the Internet, and 30.6 % spend between 11 and 30 minutes a day on Facebook. This is consistent with previous research (e.g., Ellison, Steinfield, & Lampe, 2007). More than half of all participants (52.4 %) have the general qualifications for university entrance, with 29.1 % having graduated from university.

We present Facebook users' self-perceptions for the different building blocks and over all building blocks (see Table 2). Additionally, we calculated mean values with regard to gender. We found Facebook users' self-perceptions of their information literacy were not very high – the arithmetic mean is 1.71 (on a scale from 0 to 3). We can identify very low competency values for the buildings blocks of creation of information (1.37), representation of information (1.43), recognition of information needs (1.45), and searching (1.48). In social media, abilities in creating and representing information are essential. In this category, our participants scored at the novice level. Recognizing information needs and searching are the first steps for successful retrieval; and again, our participants scored at the novice level.

Table 2: Facebook Users' Self-Perceptions of Information Literacy.
 All: $N = 742$; Female: $N = 382$, Male: $N = 351$; *SD*: Standard Deviation.

Building Blocks	Female Mean (SD)	Male Mean (SD)	All Participants Mean (SD)	Significant difference between genders?
Recognition	1.39 (0.83)	1.46 (0.99)	1.45 (0.85)	ns
Searching	1.48 (0.41)	2.00 (0.43)	1.48 (0.42)	**
Evaluation	1.50 (0.74)	2.23 (0.83)	2.19 (0.79)	*
Making Use	1.33 (0.68)	1.62 (0.91)	1.51 (0.73)	**
Creation	1.30 (0.75)	1.39 (1.10)	1.37 (0.84)	ns
Representation	0.75 (0.68)	1.44 (1.10)	1.43 (0.87)	**
Privacy	2.17 (0.78)	2.20 (1.10)	2.11 (0.92)	ns
Law/Ethics	2.17 (0.78)	2.18 (0.83)	2.17 (0.79)	ns
Over All Building Blocks	1.51 (0.71)	1.82 (0.91)	1.71 (0.77)	**

We observed statistically significant differences between female and male participants over all building blocks. Men (mean: 1.82) estimated their understanding at a higher level with regard to information literacy than women did (mean: 1.51). Both can be categorized at the “problem solver” level. Men estimated their information literacy higher than women did for several levels: searching (2.00 vs. 1.48), evaluating (2.23 vs. 1.50), making use of information (1.62 vs. 1.33), and representing (1.44 vs. 0.75). In nearly all building blocks (recognizing, searching, making use, creating, and representing), female participants ranked themselves at the “novice” level, whereas males ranked themselves as “problem solvers.” It remains an open question whether men really are more information literate or whether their self-perception is inflated.

Over all building blocks, we found a small, but significant difference between general Facebook use (1.74) and behavior concerning Facebook groups (1.58) (see Table 3). Minimal differences were observed as regards recognizing, searching, creating, and representing. Facebook group users fail to make use of information compared with general Facebook use (0.75 vs. 1.41). Obviously, information found in groups is not as useful as information retrieved outside groups. Providing for privacy in the groups is much lower than observed in Facebook in general (1.53 vs.

2.24). In groups, especially closed groups, privacy seems to be more unimportant than in general Facebook use.

Table 3: General Facebook Use and Behavior Concerning Facebook Groups.
N = 742

Building Blocks	General Facebook Mean (SD)	Facebook Groups – Mean (SD)	Significant?
Recognition	1.84 (0.81)	1.91 (0.87)	ns
Searching	1.64 (0.66)	1.69 (0.71)	ns
Evaluation	1.82 (0.73)	1.95 (0.71)	*
Making Use	1.41 (0.71)	0.75 (0.76)	*
Creation	1.89 (0.99)	1.91 (0.98)	ns
Representation	0.76 (1.07)	0.81 (1.06)	ns
Privacy	2.24 (0.76)	1.53 (1.07)	**
Law/Ethics	2.33 (0.65)	2.10 (0.65)	*
Over All Building Blocks	1.74 (0.79)	1.58 (0.85)	*

We present the distribution of different knowledge levels regards participants' self-perceptions of their information literacy (see Figure 3). The first circular chart (a) shows the distribution for all participants. Our participants estimated themselves as “problem solvers” (59.0 %) at a higher rate than they did as “novices” (41.0%). The values for “information illiterate person” and “expert” were each 0.0%. Circular charts (b) and (c) depict the distribution as regards gender. Men estimate themselves to be “problem solvers” (69.0 %) much more often than as “novices” (31.0 %). In addition, most women estimated themselves as “problem solvers” (54.0 %) and 46.0 % as “novices.” Concerning Facebook groups (59.0 % problem solvers) and Facebook use in general (65.0 % problem solvers), the differences over all eight building blocks are not very high. On the one hand, it is satisfying to note we found no information illiterate persons, but on the other hand, it seems alarming that no single participant believes him- or herself to be expert at information literacy.

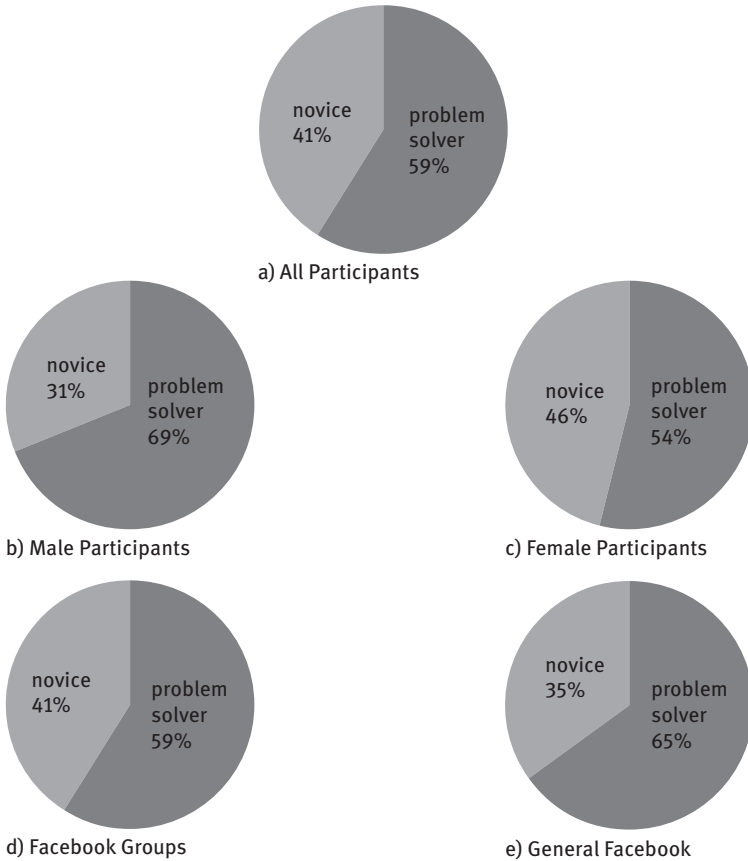


Figure 3: Participants by Information Literacy Level ($N = 742$).

We show information literacy levels for all eight building blocks (see Figure 4). There are only two levels, namely, “novice” and “problem solver.” On average, we found no “information illiterate persons,” but also no “experts.” We could identify more problem solvers than novices for evaluating information quality (73.0% problem solvers), providing for privacy (86.0%), making use of information (53.0%), and providing for information laws and ethics (88.0%). For all other information literacy building blocks, our participants estimated themselves to be only at the level of novice. In particular, two knowledge representation building blocks display very high values of novices (creating information: 84.0%; storing and representing information: 89.0%). Our respondents judged themselves to be mostly novices in terms of recognizing information needs (62.0%), and searching for information (58.0%).

Concerning *recognizing information needs* (see Figure 4a), participants answered questions about recognizing their own information needs on Facebook (e.g., “In what way do you recognize your information needs on Facebook, e.g., through posting or reading new posts?”) Only 20.8% of participants recognize their information needs while posting on their timeline, and 20.9% believe they recognize their information gaps through Facebook groups. Furthermore, 34.7% specified they recognize the need for information while reading new posts on their News Feed. Again, about 33.0% recorded they recognize this need while reading posts on Facebook groups. Users can recognize their information needs when they formulate a question because they are thinking about how to pose it appropriately. Of participants, 52.3% have worried about their phrasing when they want to post something in a Facebook group. Similarly, 47.6% of participants worry about their phrasing while posting in general on Facebook.

Concerning *searching for and retrieving information* (see Figure 4b), our study’s findings confirm results of previous studies (e.g., Head & Eisenberg, 2011). Online information sources are preferred, with favorite sources being Google (75.3%) and Wikipedia (53.4%). Participants do not often use Facebook as a tool for searching (18.9%), and offline sources, such as libraries, are only rarely visited (7.2%).

Of participants, 51.4% *evaluate* the content they found (see Figure 4c), with 48.6% stating they do not evaluate any content on Facebook. The majority (85.3%) believe they can distinguish between relevant and irrelevant content. More than half (52.7%) compare the information found on Facebook with that found on other sources.

Of participants, 55.4% specified they can effectively *use the information* in Facebook (see Figure 4d), with less than half of participants believing they are not able to do anything with it.

Many participants estimated they are not very advanced while *creating information* on Facebook (see Figure 4e). Of participants, 45.1% responded to the question “How often do you post new content on your timeline?” with “less than once a week”; in addition, 11.7% stated “never.” Of participants, 21.0% noted they had created a “survey on Facebook,” 23.4% had created new questions on the site, 49.3% created new posts, and 23.2% had left comments on Facebook posts “daily.” The survey also offered some interesting findings concerning sharing: 24.3% of participants shared a new video, photo, or link on Facebook “daily,” but 39.1% stated “less than once a week.” Of participants, 38.9% stated they are in Facebook groups because they like to comment on posts, while 37.2% join groups because they want to share new content. With regard to creating surveys on Facebook, 12.0% have created a survey in Facebook groups (here, questions

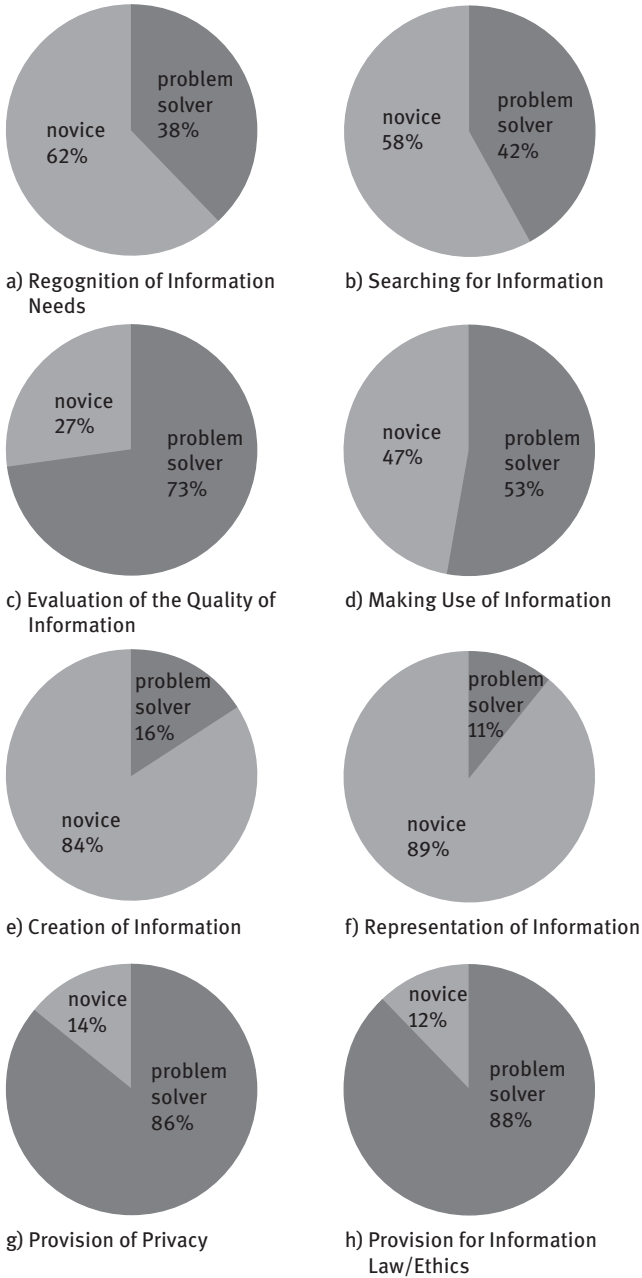


Figure 4: Participants by Information Literacy Level for All Building Blocks ($N = 742$).

had predefined answer options) “several times a day,” and 11.7 % say they do this on their personal timeline.

Of participants, 63.9 % are aware of Facebook’s functionalities to store and to represent information (see Figure 4f), 42.7 % specified they “always” use the “saved folder,” 17.7 % use the “notice,” and approximately one-quarter (23.2 %) apply the files option for storage.

Of our participants, 69.3 % know Facebook offers *privacy settings*. The question of this building block covered three areas: photos, wall posts, and personal data. Of participants, 74 % set their photos on Facebook to “public.” Obviously, these participants believe they have nothing in their images to hide. However, the majority is more cautious, with more than half (59.9 %) having changed the visibility of their photos to viewing “only by friends.” A scant 7.8 % share specified its wall posts are visible to everyone (“public”), with a much higher share, 54.9 %, setting it to “only friends.” Of participants, only 10.3 % set personal data to “public” (e.g., “details about you,” “family and relationship,” “contact and basic info”); and 37.9 % check privacy settings “once a week” or “several times a week.”

We found 62.3 % is satisfied with Facebook’s privacy settings; furthermore, 62.3 % knows and uses the function “View as specific person.” This lets users see how their timeline appears to either the public or a specific friend. They understand how to control the visibility of their status updates. These findings confirm the results of a previous study on Facebook’s privacy settings: “The majority of Facebook users report having an understanding of privacy settings and make use of their privacy settings” (Debatin, Lovejoy, Horn, & Hughes, 2009, p. 93).

Do our participants make a provision for *information laws and information ethics*? Of participants, 64.4 % answered “yes” to using a real name on Facebook, however, 15.4 % has created more than one personal account. The majority (65.8 %) knows copyright law forbids posting foreign content without permission, 85.7 % specified it does not post forbidden content (e.g., hate speech or pornographic content), and pays attention to the law; and 90.7 % answered “no” to defaming other Facebook users.

Information Behavior and Information Literacy on Facebook

Is there a relation between users’ general information behavior and their state of information literacy on Facebook? We identified seven dimensions of information behavior (library use, content control, Facebook terms recognition, real

name vs. fake name, copyright observation, privacy, and motivation) that might trigger information literacy.

Given a certain information need, where do users search? On Facebook or in libraries? The act of searching on Facebook (without visiting any library) will be compared with searching in libraries (see Table 4). There are high and significant differences between Facebook users who prefer Facebook for searching (1.80) and users who decide to travel to libraries (2.16). Additionally, users who search in libraries estimate their information literacy level to be higher in recognition than those who reserve their searching for Facebook (1.69 vs. 1.47). Additionally, it should be noted we observed big differences in building blocks seven and eight (providing for laws/ethics (1.76 vs. 2.481) and privacy (1.83 vs. 2.91). Thus, library users are more familiar with the search function and are aware that all Facebook users can search and find personal data. Hence, they are experts concerning privacy and information laws/ethics. Additionally, “library searchers” also used their found information more than nonusers did (2.28 for making use vs. 1.92 for searching in Facebook). They probably have a targeted search for a particular topic and know how to make use of it. Overall, Facebook users who search in libraries estimate themselves to be much more information literate than users who prefer searching on Facebook alone.

Table 4: Searching on Facebook Versus Searching in Libraries.

Question: *Which Source Do You Use for Your Search?* Facebook $N = 137$, Libraries $N = 25$.

Building Blocks	Searching in Facebook – Mean (SD)	Searching in Libraries – Mean (SD)	Significant?
Recognition	1.47 (0.89)	1.69 (0.98)	**
Searching	1.98 (0.86)	2.12 (0.95)	ns
Evaluation	2.61 (0.56)	2.65 (0.64)	ns
Making Use	1.92 (0.99)	2.28 (0.96)	**
Creation	1.01 (0.77)	1.18 (0.76)	*
Representation	1.89 (1.00)	1.95 (1.06)	ns
Privacy	1.83 (0.73)	2.91 (0.85)	***
Law/Ethics	1.76 (0.63)	2.48 (0.61)	***
Over All Building Blocks	1.80 (0.80)	2.16 (0.85)	**

Table 5: Checking Content on Facebook.Question: *Do You Check the Content on Facebook?* Yes, I Do: $N = 388$, No, I Do Not: $N = 352$.

Building Blocks	I Check the Content – Mean (SD)	I Do not Check the Content – Mean (SD)	Significant?
Recognition	1.29 (0.99)	1.31 (0.98)	ns
Searching	1.75 (0.56)	1.61 (0.61)	ns
Evaluation	2.83(0.76)	1.91 (0.86)	***
Making Use	1.98 (0.66)	1.77 (0.54)	**
Creation	1.37 (0.96)	1.87 (0.86)	***
Representation	2.18 (0.81)	1.98 (0.87)	ns
Privacy	2.43 (0.78)	2.45 (0.63)	ns
Law/Ethics	2.26 (0.98)	1.99 (1.01)	**
Over All Building Blocks	2.01 (0.81)	1.73 (0.79)	**

We present the relation of critical assessment of posted content and information literacy (see Table 5). There are significant differences between Facebook users who check content (2.01) and users who do not (1.73). It is striking that participants who answered the question with a “no” estimate their information literacy in creating at a higher rate (1.87) than do participants who answered with a “yes” (1.37). Members from the first group obviously create arbitrary new content without reflecting on what they do. According to their self-perceptions, users who check content score higher in both evaluating (2.83 vs. 1.91), and making use (1.98 vs. 1.77) than users who do not check. Additionally, the building block of providing for information laws/ethics (2.26 vs. 1.99) for users who check content is higher than for users who do not. Users who perform an evaluation know which information can also be used effectively and is suitable for further processing. Furthermore, they adhere to laws and ethics because they know which problems and consequences may arise in the future if they do not.

Table 6: Facebook Terms and Privacy Settings.

Question: *By the Terms, I Learn that in Facebook There Is a Privacy Setting*; Privacy Setting
 Known: $N = 501$, Privacy Setting Unknown: $N = 170$.

Building Blocks	Privacy Setting Known – Mean (SD)	Privacy Setting Unknown – Mean (SD)	Significant?
Recognition	1.47 (0.56)	1.33 (0.61)	ns
Searching	2.43 (0.69)	1.97 (0.75)	***
Evaluation	2.75 (0.77)	1.99 (0.86)	***
Making Use	2.52 (0.81)	2.37 (0.92)	*
Creation	1.54 (0.57)	1.36 (1.00)	**
Representation	1.89 (0.51)	1.81 (0.67)	ns
Privacy	2.54 (0.89)	2.45 (0.75)	ns
Law/Ethics	2.97 (0.74)	2.43 (0.70)	***
Over All Building Blocks	2.26 (0.69)	1.96 (0.78)	**

We next investigated the perception of the terms of Facebook with special regard to privacy settings (see Table 6). The majority of our participants (67.5%) has known from the beginning about the privacy settings. However, we found a significant difference over all building blocks (2.26) versus people who know about Facebook's terms and privacy settings (1.96). Users who know about the privacy settings estimate their information literacy level at higher rate for searching (2.43 vs. 1.97), evaluating (2.75 vs. 1.99), and providing for laws and ethics (2.97 vs. 2.43).

What differences are apparent between users who publish using their real names on Facebook in contrast to those who prefer a fake name (see Table 7)? In all, such differences are not very great, but we can observe significant differences concerning creating (0.76 vs. 1.71), representing (1.47 vs. 0.77), and providing for laws and ethics (1.63 vs. 1.25). Users with fake names pay only minor attention to privacy (level "illiterate") and to laws and ethics, but exhibit high scores in creating information. Covered by their fake name, they obviously feel free to publish "creative" content.

Table 7: Real Names Versus Fake Names.

Question: *How Do You Indicate Your User Name on Facebook?* Real Name: $N = 427$, Fake Name: $N = 91$.

Building Blocks	Real Name – Mean (SD)	Fake Name – Mean (SD)	Significant?
Recognition	1.17 (0.46)	1.16 (0.51)	ns
Searching	1.01 (0.78)	0.98 (0.75)	ns
Evaluation	1.25 (0.56)	1.19 (0.54)	*
Making Use	0.82 (0.80)	0.79 (0.82)	ns
Creation	0.76 (0.79)	1.71 (1.00)	***
Representation	1.47 (0.76)	0.77 (0.69)	**
Privacy	1.47(0.65)	0.72 (0.74)	**
Law/Ethics	1.63 (0.79)	1.25 (0.91)	***
Over All Building Blocks	1.01 (0.69)	1.07 (0.74)	*

Table 8: Considering Copyright.

Question: *Do You Know That You Must Specify the Source When You Post Foreign Content on Facebook?* Copyright Considered: $N = 494$, Copyright Not Considered: $N = 248$.

Building Blocks	Copyright considered – Mean (SD)	Copyright not considered – Mean (SD)	Significant?
Recognition	2.15 (0.78)	1.81 (0.88)	ns
Searching	2.45 (0.56)	1.28 (0.71)	***
Evaluation	1.89 (0.77)	1.31 (0.78)	***
Making Use	2.45 (0.99)	2.62 (0.96)	**
Creation	1.76 (0.57)	2.01 (0.76)	**
Representation	1.21 (0.85)	2.34 (0.96)	***
Privacy	2.56 (1.10)	2.51 (1.01)	ns
Law/Ethics	2.85 (1.01)	1.93 (0.99)	***
Over All Building Blocks	2.17 (0.82)	1.97 (0.88)	**

Do users respect the copyright of someone else’s content? The difference is very high between Facebook users who know they must specify the sources (mean: 2.17) and users who do not know it (mean: 1.97) (see Table 8). There are significant differences for nearly all building blocks. According to users’ self-perceptions, it is obvious that both users who answered with “yes, I consider the copyright” and users who do not consider copyright can be categorized at the “problem solver” level. Users who consider copyright estimate themselves in searching (2.45 vs. 1.28), evaluating (1.89 vs. 1.31), and laws/ethics to be more information literate than users who do not consider it. In contrast, users who do not consider copyright estimate their information literacy to be remarkably higher in creating (1.76 vs. 2.01) and representing (1.21 vs. 2.34) information. Does this finding mean members of the latter group feel free to “create” and represent both their and other users’ content on their timelines?

The next information behavior is concerned with Facebook users’ privacy settings. We only compared “public” and “custom” settings (see Table 9). Are there differences between users who publish their information as “public” and users who customize their settings? Does either choice have any effect on users’ information literacy? The difference observed in favor of public settings (2.18 vs. 1.77) over all building blocks is significant. More than half of the building blocks exhibit statistically significant differences. The differences in recognizing (2.49 vs. 1.79), searching (2.98 vs. 1.07), and evaluating (2.12 vs. 1.91) are high or even very high. We found it particularly notable there are high values and significant differences in providing for privacy (2.97 vs. 2.45). Users with public privacy settings are obviously well aware of this “publicity” of all their content (their privacy is at the “expert” level). Additionally, such users are the better searchers (recognizing and searching are on the “expert” level as well).

Table 9: Privacy Settings on “Public” or “Custom.”

Question: *Do You Set Your Data on Facebook on Public or Custom?* Public: $N = 122$, Custom: $N = 323$.

Building Blocks	Public – Mean (SD)	Custom – Mean (SD)	Significant?
Recognition	2.49 (0.96)	1.79 (0.99)	***
Searching	2.98 (0.63)	1.07 (0.70)	***
Evaluation	2.12 (0.77)	1.91 (0.86)	**
Making Use	1.66 (0.88)	1.77 (0.91)	ns
Creation	1.11 (0.57)	1.16 (1.00)	ns

Tab. 9 (continued)

Building Blocks	Public – Mean (SD)	Custom – Mean (SD)	Significant?
Representation	1.44 (0.51)	1.52 (0.67)	ns
Privacy	2.97 (0.89)	2.45 (0.75)	***
Provision	2.67 (1.11)	2.53 (1.04)	ns
Over All Building Blocks	2.18 (0.82)	1.77 (0.86)	**

Why do users join Facebook groups? Do “cool” users have a different state of information literacy than those who are not (see Table 10)? Over all building blocks, we observed a statistically significant difference (1.71 vs. 2.03) in favor of the “other reasons” group. Users who answered our question with “I join Facebook groups because I feel cool” have lower values for all building blocks. Especially for creating information, they rated themselves as having too little information literacy (1.10 in contrast to 2.16). There are also some interesting findings on providing for privacy – with a significant difference, users with a specific purpose scored well (2.45). Users who answered “I join Facebook Groups because I feel cool” (1.89) do not observe as much privacy. Facebook users who set out to accomplish a specific purpose estimated themselves to be more information literate than users who are in groups just for fun and because they “feel cool.”

Table 10: Motivation for Joining Groups.

Response to the statement: *I Join in Facebook Groups Because I Feel Cool*, “Cool:” $N = 151$, Other Reasons: $N = 527$.

Building Blocks	“Cool” – Mean (SD)	Other Reasons – Mean (SD)	Significant?
Recognition	1.69 (0.95)	1.89 (0.98)	**
Searching	1.92 (0.75)	2.07 (0.71)	*
Evaluation	2.02 (0.76)	2.41 (0.86)	***
Making Use	1.61 (0.98)	1.77 (1.01)	ns
Creation	1.10 (0.97)	2.16 (1.01)	***
Representation	1.48 (0.81)	1.52 (0.87)	ns
Privacy	1.89 (0.72)	2.45 (0.65)	***

Tab. 10 (continued)

Building Blocks	“Cool” – Mean (SD)	Other Reasons – Mean (SD)	Significant?
Law/Ethics	2.01 (1.01)	2.03 (1.04)	ns
Over All Building Blocks	1.71 (0.89)	2.03 (0.89)	**

Conclusion

Our survey demonstrated Facebook users are simultaneously looking for and publishing information on the SNS. In order to search for and publish information efficiently and effectively, prosumers need to possess two kinds of literacy skills: information retrieval and knowledge representation. The purpose of this chapter was to present our findings on Facebook users’ self-perceptions concerning their abilities and behaviors relevant to information literacy. We defined a research model of information literacy with eight building blocks and four literacy levels (“illiterate,” “novice,” “problem solver,” and “expert”). We outline our main results below:

- On average, our participants estimate their information literacy competency (on a scale from 0 to 3) at a level of medium high (1.71). We found rather good scores in providing for laws and ethics, privacy, and evaluating information. We found very low scores for competencies in creating and representing information as well as for recognizing information needs, searching, and making use of information.
- Men estimate their information literacy capabilities to be higher than women do.
- General Facebook use fosters information literacy more than using Facebook groups does. Facebook group users fail to make use of information.
- On average, Facebook users are at the “problem solver” level (59.0%), with a further distribution of 69.0% for men and 54.0% for women.
- Users’ general information behavior strongly influences their information literacy levels on Facebook.
- Library users scores are higher than those of users who rely only on Facebook’s content for confirming information. Nevertheless, this group rates itself at the “expert” level concerning privacy as well as laws and ethics.

- Users who (a) check content on Facebook, (b) have knowledge about privacy settings, (c) respect copyright, (d) set their privacy setting to “public,” and (e) join groups with a specific purpose are more information literate than others who choose differently.

Our study confirms the analyses of Witek and Grettano (2012; 2014) who theorized that Facebook offers many helpful functions in relation to fostering information literacy. In using Facebook, people can find numerous simple ways for handling information. According to our findings, participants apply these Facebook functionalities in very different ways and from different levels of information literacy.

This study has some limitations. An online survey is only a first step into this research area. Further methods, such as qualitative interviews with Facebook users would deepen our knowledge concerning information literacy. Additionally, our study only refers to participants’ self-assessments and not to any actual assessed information literacy competencies. Here, the application of an information literacy test (e.g., Beutelspacher, 2014) would be very useful. Future studies should separate participants according to educational levels as well as – which may be even more important – user groups (e.g., age cohorts), cultures, countries, and so forth.

To our knowledge, this endeavor is the first empirical study of Facebook users pertaining to information literacy. Our results are only descriptive. We lack any theory and any explanation as to why Facebook users handle information so differently. Why do men estimate their information literacy level to be higher than women do? Why do people act in a more information literate way, when pursuing general Facebook use than they do in Facebook groups? How does users’ information behavior (e.g., library use or their consideration of copyright) influence their information literacy? We must leave these questions unanswered, but believe much room for further study exists.

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Chapter 6. Privacy in Social Networks After the Global Surveillance Disclosures

Abstract: In May 2013, Edward Snowden disclosed U.S. federal government information to the media, highlighting global surveillance activities concerning operations conducted by the National Security Agency, in addition to other secret service operations regarding the monitoring of most parts of the Web, especially social networks. Privacy concerns on the Internet have thus been highly affected because of his actions. Investigating the consequences of this behavior as regards users of social networks is of primary interest. Do users care about their online privacy? Are they honest about the data they post? Do they believe their online data are safe? If not, what actions do they take to minimize the risks of privacy violations? Does a “pushback” phenomenon exist?

To answer these questions, we conducted an empirical study between 22 July and 11 August 2014. The method used was an online questionnaire (in German) that was spread across German web-forums and social media networks. There were 304 people who participated in this study. Participants were grouped by sex, age, and educational background, and asked about their behavior in online social media networks and their subjective feelings toward online privacy.

Most results of previous studies concerning self-revelation on social networks could be verified: for example, the differentiation between more and less intimate personal information. On the one hand, results demonstrate most users willingly share their real personal information. Furthermore, a strong correlation was found between the level of self-revelation on social media and age, as well as sex. On the other hands, educational background does not seem to affect the participant’s behavior concerning self-revelation. An awareness of the problem toward privacy violations does slightly correlate with age and education. The most common method to protect one’s online privacy is to limit the range of information spread to special groups (e.g., close friends). Only very few participants stated they are using encryption in their online communications.

“Pushback” behavior in direct context with these global surveillance disclosures could not be documented. Users know about the risks but seem willing to ignore them when weighed against the benefits gained from using social media. This study therefore concludes that a need does exist to act on the growing aware-

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ness concerning privacy matters on the Internet, especially as it pertains to young people.

Keywords: privacy; social media; surveillance disclosures; NSA; push-back.

Introduction

On June 9, 2013, U.S. federal government contractor Edward Snowden posted a video interview on the Internet site YouTube in which he outlined his motives for disclosing internal federal government documents of the U.S. National Security Agency (NSA) to the public. These documents were subsequently analyzed and published in both the British *Guardian* and the *Washington Post* newspapers. Over the next several months, until 2014, new facts concerning the extent of NSA's monitoring capabilities regarding public conversations, over the Internet and the telephone lines, continued to emerge.

By exposing the agency's use of PRISM, a tool whose existence was confirmed by NSA itself (Thoma & Greis, 2013), came the knowledge that the agency is and had been systematically monitoring large segments of the Internet. The largest Internet companies in the United States, including social networking services (SNSs), such as Facebook and Google Plus, were also involved in the project (O'Harrow Jr. et al., 2013). Thus, it also came to be known not only how NSA collects social network metadata, but also the communication content within these data (Eiermann, 2013).

A representative study conducted between May and April 2014 in Germany (DIVSI, 2014) concluded a majority of Germans (56 %) indeed believe that everyone is being wiretapped, but only 9 % of respondents note they are being "much more careful" on the Internet. This chapter aims to empirically examine whether changes have occurred regarding the handling of privacy in social media resulting from Edward Snowden publishing information about NSA actions undertaken to monitor private individuals' data, as well as similar actions conducted by other intelligence agencies.

Privacy

The Definition of Privacy

We ask, first, what is privacy? Alan F. Westin defines privacy as follows: “The claim of an individual to determine what information about himself or herself should be known to others” (Westin, 1967; 2003, p. 7). This definition contains two important aspects. First, an individual’s privacy must be divided into and distinguished from the concept of private and non-private information. Second, each person decides on an individual basis how to make such a distinction. Rössler (2001) states: “The dividing line between what is designed as public, and what is to be considered private is not fixed; the boundaries are up for debate, even in liberal societies.”

Privacy therefore does not mean to keep all information to oneself or to foreclose on society’s ability to learn about an individual’s life. Rather, it concerns controlling the use of one’s own data and determining to whom one might reveal such information, and under which terms others may own or make use of another person’s specific personal information (Schenk et al., 2012).

Privacy can be separated into four dimensions (Burgoon et al., 1989): *physical*, *interactional*, *psychological*, and *informational*. Physical privacy means the “freedom from surveillance and unwanted intrusions upon one’s space by the physical presence” (Burgoon et al., 1989, p. 3). Interactional (also social) privacy describes the control an individual or a group takes concerning with whom, about what, and when social exchange processes occur. Psychological privacy means the right to control which and whether data will be made public. Type and volume of information matter in this context. It is also important to protect one’s own thoughts from outside influence: “Psychological privacy is particularly relevant and endangered on the social web” (Schenk et al., 2012, p. 40). Informational privacy is described by Burgoon et al. (1989) as the control about whom and under which circumstances someone’s private information is collected, used, or distributed. Rössler writes: “A piece of information is considered private if you can regulate the access to it” (2001, p. 23).

Both Burgoon et al. (1989) and Cho and Larose (1999) note interventions in all areas of privacy are perceived by individuals during which “infringements on informational and psychological privacy are the most offensive” (Cho & Larose, 1999, p. 422). Westin (1967) further describes the concept of people’s privacy having four major functions: 1) it allows personal autonomy, 2) it provides emotional relief, 3) it offers an important part of self-evaluation, and 4) it enables sharing of intimate information within a private circle.

A person can feel she has too little or too much privacy. Someone whose private life is discussed in public may feel he has too little privacy, whereas someone whose possibilities to inform other people are constrained may feel she has too much. “The regulation of privacy is neither static nor rule governed but instead takes place depending on the immediate social context” (Schenk et al., 2012, p. 41). In one study, it was shown that individuals regulate the amount of privacy they perceived as pleasant, ranging from “Openness” to “Closedness” by constantly adapting this range due to internal and external influences (Altman, 1977). Openness or even self-revelation by one party in a conversation can lead others to behave more willingly and open themselves in return (Cozby, 1973).

According to Petronios’ “Privacy Management Theory” (2002), every person has a “Rule-Based Management System” regulating the degree of openness or closedness. Individual rules are created, depending on context, and these are influenced by culture, gender, motivation, and a cost-benefit analysis. Once a piece of information is shared, however, there is at least one co-owner. From the perspective of the original owner, certain liabilities also apply to the co-owner. These liabilities are negotiated as rules between the two participants. Especially in social networks, complying with these rules – by both other users and the operating company – is particularly important because users rely on such mutual compliance for protecting their private data.

Privacy Characteristics in Social Networks

Having clarified the notion of privacy in general, we turn to the specific characteristics of privacy within social networks. Studies of Joinson in 2001 and Taddicken in 2008 indicated an increased openness and willingness to provide information in online communication compared with direct, face-to-face communication: “Due to anonymity and the lack of gestures, facial expressions, and voice in primarily text-based online communication, users compensate for the information-poor environment through increased disclosure” (Schenk et al., 2012, p. 43). Furthermore, there are five differences in “network publics” (Boyd & Marwick, 2011) compared with face-to-face communication:

- Persistence: online expressions are automatically recorded and archived.
- Replicability: content made out of bits can be duplicated.
- Scalability: the potential visibility of content in networked publics is great.
- Searchability: content in networked publics can be accessed through searches.
- Invisible audiences: not all audiences are visible when a person is contributing online, nor are they necessarily co-present (Boyd, 2008).

Because of these differences regarding offline communication, in particular, for Points 2 and 3, self-revelation on the social web can be taken out of the context in which such a decision was originally made. This effect is called “recontextualization” (Taddicken, 2010).

“Publicity by default” is another characteristic of social media. Most SNSs, such as Facebook, by default make all user-created profiles and accompanying information available to “the public,” means anyone can view another’s data. Users who upload data to the SNS must take action to change the public availability of their personal data by using privacy settings. Via these settings, an individual’s privacy can be secured to a certain extent. The user, however, must maintain a continuous vigilance over their information and choose between qualities of being open or closed to participate in the social media sphere: “Maintaining a degree of privacy, or ‘closedness,’ will often require disclosure of [one’s] personal information or whereabouts” (Palen & Dourish, 2003, p. 3).

It remains that even if a piece of information is revealed only to a limited circle, for example, to one’s closest friends, an invasion of privacy may still occur. This occurs when co-owners of the information fail to follow the agreed-upon rules and spread the information, knowingly or unknowingly. This can cause problems in some situations (Margulis, 2003, p. 247 f.).

According to research from the United States, different users perceive such threats in different ways, with researchers separating them into three categories: “privacy fundamentalists” who feel privacy is very important; the “unconcerned,” who feel little or no worry about their online privacy; and “privacy pragmatists,” who feel online privacy is important and therefore attempt to protect it. Surveys reveal the third group makes up a 64 % share (Wildemuth, 2006).

Dealing with Privacy in Social Networks

In recent years, many empirical studies have discussed how users deal with their privacy in social networks. Being active in any social network means being willing to share some amount self-revelation as a necessary condition to belong (Taddicken & Jers, 2011). Most studies of self-revelation in social media focus on the information provided by users of these networks in their respective profiles. Research has revealed most users offer more information about themselves than usually occurs in face-to-face conversations (Christofides et al., 2009; Haferkamp, 2010). Information provided in the profiles can be ordered by intimacy: data often revealed, such as a person’s first name or gender, are considered less intimate than, for example, a personal telephone number or an exact address (Boyle & Johnson, 2010). Among the data most often released are the last name

and a photo of the user (Prommer et al., 2009). Most users do not provide direct contact information (Taraszow et al., 2010) because it results in an increased risk of abuse by publishing more intimate data (Taddicken, 2010).

There is a correlation between quantity of the revealed data and level of intimacy. A user who shares a greater amount of information also usually shares a more intimate type (Nosko et al., 2010). Studies on gender with regard to the veracity of social media profiles concluded men use social networks more openly than women do (Prommer et al., 2009), and men are also more likely to share their contact information (Taraszow et al., 2010).

Overall, it can be stated that “the personal profile in a social network is an important aspect of online self-revelation” (Schenk et al., 2012 p. 49). Nevertheless, it should be noted that creating and maintaining custom profiles is a reflective action, which usually takes place on first entering a network when the user is made aware of deciding which data he wants to publish or which to keep (partially) private.

Profiles are not the only spaces where private information can be revealed on social networks. Additional features, such as tagging of people in uploaded photos, organizing posts or photos into groups, writing on other peoples’ profiles, and linking of organizations or individuals are also part of one’s online identity and these spaces can also lead to increased opportunities for further self-revelation. Such so-called “dynamic contents” becomes even more important as it forms part of how others perceive a given individual on the social web (Boyd & Marwick, 2011). Information such as accepted friend requests and “likes” are less active parts of self-revelation and potentially less obvious to the user.

In addition to the amount and degree of intimacy of published information, accessibility plays an important role: “Self-representation does not take place without context, but always in response to an audience” (Schenk et al., 2012, p. 50). The user establishes her audience by the particular privacy settings she turns on or off within the network. A 2011 study from the United Kingdom demonstrated users rarely review their privacy settings, even if the SNS changes them. Furthermore, a user’s desired settings often do not match those he actually sets (Butler et al., 2011). Another study shows students keep their profiles mostly private, if they are female, very active, and have friends who have adjusted their privacy settings to be restrictive (Lewis et al., 2008). In general, user experience on the social web seems to be strongly influenced by the active use of privacy settings. In 2006 and 2007, Patchin and Hinduja conducted a longitudinal study of privacy behavior on MySpace.com and concluded that within one year, the share of those who kept private their profiles had risen significantly (Patchin & Hinduja, 2010).

Most of these studies draw their data from the United States and the United Kingdom, and, due to cultural differences, their findings cannot be transferred to users in Germany. One study of BITKOM (a federal association for Information Technology, Telecommunication and New Media), from 2011 shows the German people take their privacy in social networks extremely seriously: 86 % of survey respondents have dealt with privacy settings in the past, with 77 % changing them. Only 11 % did not treat the issue of privacy settings (BITKOM, 2011). The same survey also showed young people (under 30) find their privacy very important. Indeed, an awareness for online privacy within the past few years seems to have increased rather than decreased (Utz & Kramer, 2009). This trend can be observed in the United States as well (Boyd & Hargittai, 2010).

The Privacy Paradox

The *privacy paradox* is a term coined by Susan B. Barnes (2006) to describe a phenomenon she has observed in surveys. While most users (in Barnes' study, adolescents) set a high value on protecting privacy on social media sites, they do not always behave accordingly, putting their personal information voluntarily in front of the public eye (cf. Butler et al., 2011). One can assume that almost all users are by now aware of the dangers of online self-revelation, yet do not want to give up the advantages of social media, whether from peer pressure or for other reasons.

One possible explanation for the privacy paradox is users may split their privacy into two parts when it concerns online privacy (Schenk et al., 2012): privacy within their social environment and privacy toward foreign persons and companies or institutions. The former relates to social privacy; the latter, to the informational. The user might underrate the risk of interventions in informal privacy by the provider of the social network.

Threat to Privacy by Providers and Secret Services

In centrally managed social networks, informational privacy is already jeopardized by the very existence of a provider, on whom users must rely. Facebook and other social networks have extensive rights to the use of all uploaded data, stipulated according to their terms of service. The use of these services is usually free, and the provider earns money by including advertising on users' site pages. Especially in the United States, networks operate under extremely lax privacy policies compared with those of Europe (Stiftung Warentest, 2010). In addition,

it is in providers' best interests that users are encouraged to enter the maximum amount of data or information about themselves and their activities, interests, and so forth. The more data is available to the network, the better and more precisely targeted advertisements can be, which in turn increases the company's or network's advertising revenue.

With regard to wiretapping by government agencies or secret services, as introduced at the beginning of this chapter, it must be assumed that, at a minimum, users' informational privacy is being actively violated. This intervention of people's privacy should not be taken lightly: "The autonomy of a person may be injured, damaged in ways that do not affect the rights of freedom itself immediately: and because of these opportunities, people, in their autonomy, must rely on the protection of the private sphere" (Rössler, 2001, p. 26).

Empirical Investigation

Research Questions

Having described the importance of privacy in general, and particularly within social networks, and also the treatment thereof due to the potential for surveillance by government intelligence services, as well as presenting the state of scientific knowledge and current studies about it, we present our research questions (RQs) on which we base our empirical study. The overarching question is "Have the global surveillance disclosures by Edward Snowden led to changes in using social media?" This leads to the first RQ:

RQ1: To what extent do users reveal themselves on social networks and if so, do they enter their data truthfully?

The risks of self-revelation on the network have been established sufficiently in the previous sections of this chapter. By using the services and accepting the related agreement of terms and conditions, the user submits his informal self-determination to the provider and its advertising partners, and by extension, government intelligence services.

To investigate the extent to which the privacy of users is at risk, we must first ascertain whether such risk exists at all. On the one hand, social media users who falsify their data partially or completely, in which they have neither name nor address or other personally identifiable information, such as photos and videos, will experience little to no risk of privacy violations. On the other hand, choosing to upload little data makes it difficult for them to enjoy a meaningful online social

life (Taddicken & Jers, 2011). In this context, we found it interesting to examine which kinds of information are treated more openly by users or which remain strictly private. This leads to the following two RQs:

RQ2: Do users care about privacy settings in social networks?

RQ3: Do users check these settings prior to uploading data?

These two RQs are directly related to studies made by Lewis et al. (2008) and Butler et al. (2011). It is especially interesting to learn if the results from these studies can be transferred to German users or if the results of the 2011 BITKOM study, which revealed an increasing skepticism about online self-revelation, correspond more to this empirical investigation. We come to our fourth RQ:

RQ4: How safe do users feel their data are on the Internet?

This RQ examines whether there is an awareness among participants concerning any danger posed by published information on the Internet, and refers to studies such as that by Wagner, Brüggem, and Gebel (2010) and many others. Stemming in part from the security breach of Snowden and his subsequent publishing of NSA data, one can presume that users have a more limited trust in Internet privacy. This leads to our fifth RQ:

RQ5: Which methods do users apply to secure their online privacy?

Users have some methods at their disposal to protect their privacy while on social networks. Studies have shown many users are aware of the dangers of self-publication (e.g., Christofides et al., 2009) and act at least, in part, accordingly. This RQ is aimed at the mechanisms that are used to achieve it. Five common methods were listed on the questionnaire to choose from; in addition, a free text field was available to add further methods or information. We next offer our sixth RQ:

RQ6: Do users apply encrypting tools to make it difficult for others to monitor them?

Software for SNSs, such as Facebook, is available that uses encryption algorithms to secure information from wiretapping. However, these tools are exclusively linked to private communications within the networks (e.g., private messages, chats) and offer no protection for public information that applies across the network, even if the data are available only to a small circle of friends via privacy settings. For private communication within networks, which is monitored automatically (Pauker, 2012), these programs offer protection against wiretapping by both the provider as well as intelligence services. We present our seventh RQ:

RQ7: Is there a pushback movement due to Snowden's leaks?

Are privacy violations a cause for pushback behavior (Morrison & Gomez, 2014)? It is interesting to learn whether any participants in our study canceled their membership on social networks because of publications about surveillance conducted by government intelligence services. If so, which memberships are subject to this effect? This leads to our ninth RQ:

RQ8: Are there any differences concerning privacy protection on social media sites with regard to age, gender, or educational background?

A 2010 study by Wagner, Brügger, and Gebel showed that age plays a role when dealing with the risks of social networks. The results reveal younger users are less concerned with sensitive information than older users are. Gender plays an interesting role as well: men are often more open to share information than women are (Lewis et al., 2008; Prommer et al., 2009). It will be interesting to examine, over the long term, if and to what extent Snowden's disclosures affect self-revelation. As a further feature, educational level can be used. It is expected that better-educated users act more prudently when it comes to privacy. All three demographic dimensions were polled during this study and thus flow into our evaluation.

Methods

To answer these research questions, a quantitative data acquisition method was used. An online questionnaire was created with the help of online tools from umfrageonline.com. This questionnaire was then distributed over a link in various ways on the Internet to obtain the largest possible number and range of participants. A disadvantage must be cited: As with all online surveys, only participants who are also Internet users could enroll in the survey. This disadvantage is not significant for this study because participants who use social media must by definition be Internet users.

Because of its scope and number of responses, this study cannot be considered as representative for all of Germany. However, it can indicate more than certain tendencies and confirm or refute results of previous studies. The survey ran from 22 July to 11 August 2014, and completed a feedback index of 326 responses, although only 304 participants answered all the questions. Incomplete questionnaires were excluded from the analysis, so the study was carried out with a group size of $n = 304$.

Participants

As noted, the survey was distributed throughout various Internet channels to obtain a widest possible participant field. The link to the survey could be found on various Internet forums, chat rooms, and social media sites, like Facebook and Twitter. There was no payment offered for participating. Of the 304 participants, 75 % (229) were male, 23 % (69) female, and 2 % (6) did not specify gender (see Figure 1). The average age was 28.49 years (within a range of 14–71 years). In order to incorporate age as a criterion in evaluating the records, participants were divided into three age groups, with the breakdown distinguishing between “digital natives” and “digital immigrants.” Participants are considered digital natives if they are between 14 and 29 years old, were born after 1985, and therefore grew up during or after the spread of the Internet ($n = 203$). Participants older than 35 years or older are digital immigrants, were born before 1980, and spent a youth absent of the Internet or other kinds of online information technology services ($n = 53$). The third group is a buffer or buffer group. It includes all participants between the ages of 30 and 35. These users have experienced the rise of information technology, but are not necessarily strongly influenced by it.

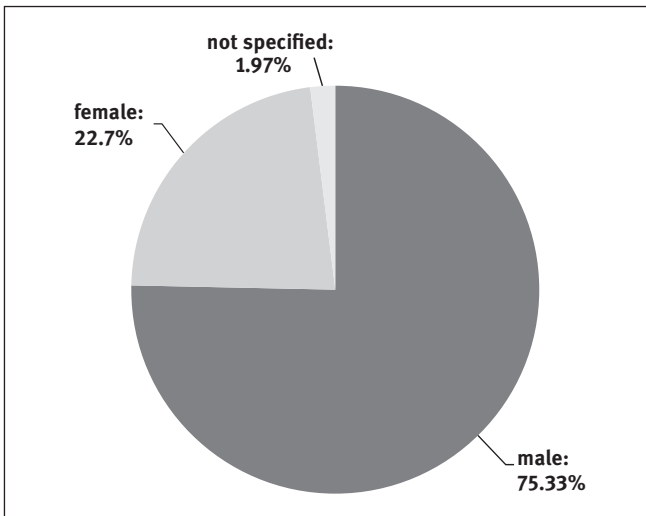


Figure 1: Distribution by Gender.

The education level shows the following distribution (see Table 1). It should be noted that students who are currently attending school may have selected “no degree” category.

Table 1: Distribution by Educational Level.

Distribution by education level		
	Number (n=304)	Percentage
Without graduation	19	6,3
Certificate of Secondary	12	3,9
Junior high school	38	12,5
University-entrance diploma ('Abitur')	123	40,5
Academical grade	86	28,3
No answer	26	8,6
Total	304	100,0

Results

Distribution of Social Networks Among Participants

The first question of the survey asks about the participant's membership on the different social media sites. The results reinforce the dominant position of Facebook.

Table 2: Distribution of Social Media Sites.

Distribution of social media portals		
	Number (n=304)	Percentage
Facebook	230	75,66
Google+	69	22,70
Twitter	108	35,53
Xing	50	16,45
linkedin	8	2,63
Flickr	25	8,22
Youtube	184	60,53
Tumblr	10	3,29

Tab. 2 (continued)

Distribution of social media portals		
instagram	4	1,32
VK	3	0,99

Degree of Self-Revelation by Sex, Age Group, and Educational Level

The next question is concerned with the degree of self-revelation within social networks. The participants were asked how they revealed four characteristics (name, photo, date of birth, place of residence), which are present in all social networks. They were informed to solely count truthful declarations. These four pieces of information can be divided into two categories: name and photo are considered not very intimate, while the date of birth and place of residence as part of the address can be regarded as intimate information (see Boyle & Johnson, 2010).

These data confirm the results of Boyle and Johnson in 2010 (see Figure 2). Both the name and a picture are significantly more often revealed truthfully than are the date of birth and place of residence.

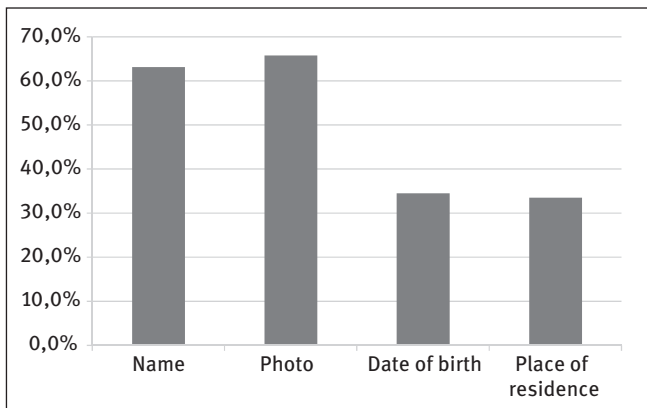


Figure 2: Self-Revelation on Social Media.

By analyzing the self-publication by gender, we observe female users divulge more information in each category than men do (see Figure 3). This contradicts

previous studies that women are less willing to self-publish in social networks than men are (see Lewis et al., 2008; Prommer et al., 2009).

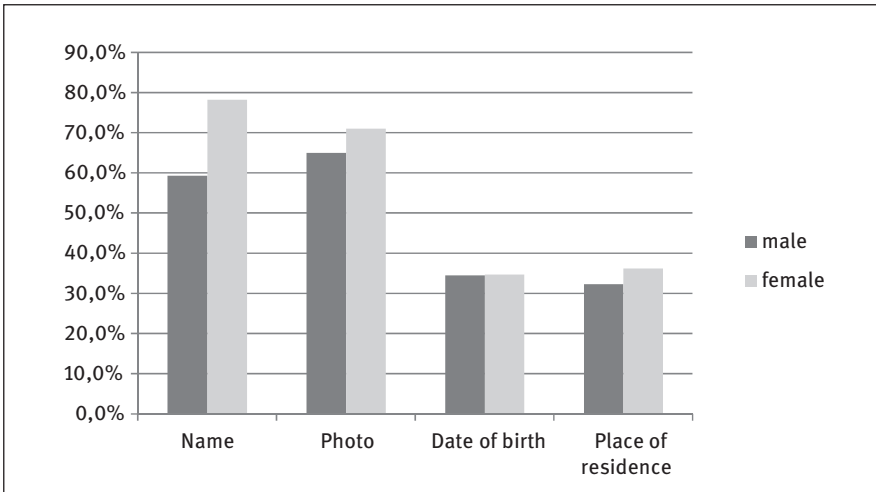


Figure 3: Self-Revelation by Gender.

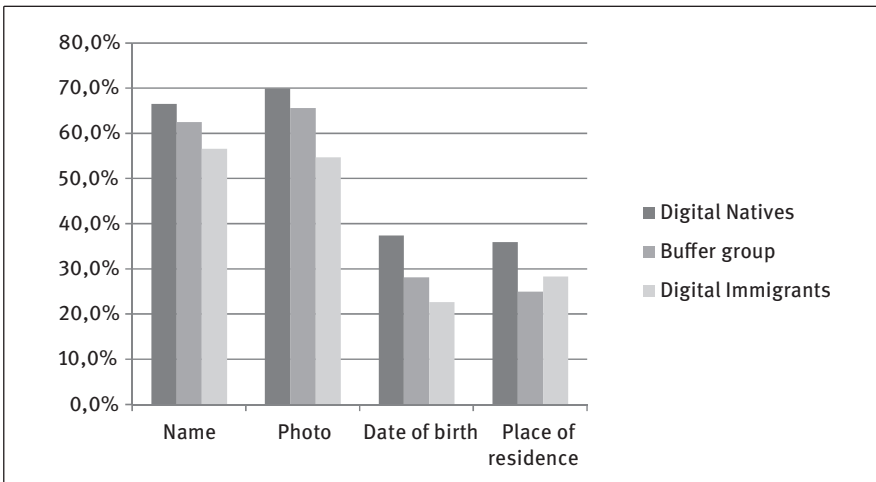


Figure 4: Self-Revelation by age groups.

In each category, women supply their personal information more truthfully than men do. It should be noted, however, that comparing the results can only

be done relatively because of gender inequality in the number of participants. Broken down by age group, the data display a gradient of young to old (see Figure 4). Thus, it is likely awareness concerning the dangers of online self-expression increases with age. This gradient also confirms the results from a 2012 study by Schenk et al. (cf. Schenk et al., 2012, p. 144).

To investigate further research hypotheses, the questions regarding self-revelation were summarized in an index. The binary data from the questionnaire (1 = “information divulged,” 0 = “information not divulged”) were summed to a single value (hereafter, self-revelation or SR index). The span of the self-revelation of the SR index is therefore between 0 and 4, where 0 means the participant did not divulge any information, while 4 means he or she shared all information.

Examining the SR index with respect to participant age, the results indicate a strong negative correlation (see Table 3).

Table 3: Correlation of SR Index and age. **. Correlation is significant at the 0.01 level (two-tailed).

		SR-Index	Age
SR-Index	Pearson Correlation	1	-,159**
	Significance (2-tailed)		,007
	N	304	288
Age	Pearson Correlation	-,159**	1
	Significance (2-tailed)	,007	
	N	288	288

The degree of self-revelation stands in an inverse relationship to age.

The negative correlation is significant in this case and shows that a willingness to self-reveal declines with age. The correlation can be found by exact age as well as by age group.

Education level also was summed to an index. The range is from 1 to 5, where 1 means no degree, while 5 stands for an academic certificate. Participants who did not state their educational level are not included in the educational index, since there may be several reasons they did not disclose this part of information.

The degree of self-revelation is not related to the education level.

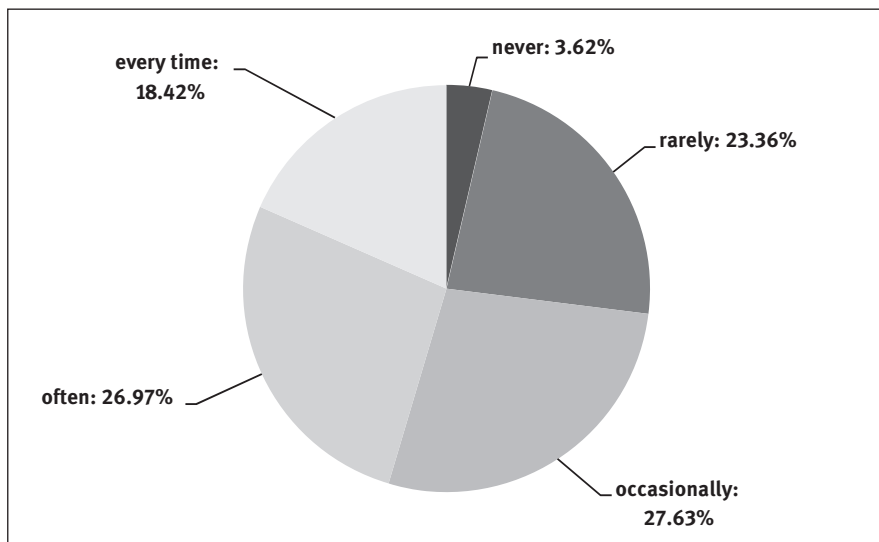
However, the underlying data but does not indicate a correlation between the level of education and self-revelation (see Table 4). This is surprising, because previous studies have shown highly significant correlations in this area (cf. Tad-dicken, 2011, p. 293).

Table 4: Correlation of SR Index and Education Index.

		SR-Index	Education-Index
SR-Index	Pearson Correlation	1	,004
	Significance (2-tailed)		,946
	N	304	278
Education-Index	Pearson Correlation	,004	1
	Significance (2-tailed)	,946	
	N	278	278

Privacy Settings and Their Use

When asked how intensively they deal with the privacy settings of social media services, most participants stated they deal at least occasionally with the matter (73%). Of participants, 27% state they are often concerned with the privacy settings, and 18.4%, allegedly, all the time. On the opposite side, 23.4% are rarely and 3.6% are not at all concerned with these settings (see Figure 5).

**Figure 5:** Privacy Settings' Usage.

The answer to the question about reviewing visibility settings before posting offers a similar result: the vast majority of participants check the settings before each post (77 %); with 16.8 % reporting not doing so, and 6.3 % indicating they do not know how to do so. For these data, we created a corresponding index (Privacy Settings or PS index). It is designed to investigate correlations with age, sex, and education. Our results demonstrate the PS index correlates positively with both age and level of education (see Tables 5 and 6).

The use of the privacy settings is positively related to age.

The use of the privacy settings is positively related to educational level.

Table 5: Correlation of PS Index and age. **. Correlation is significant at the 0.01 level (two-tailed).

		PS-Index	Age
PS-Index	Pearson Correlation	1	,194**
	Significance (2-tailed)		,001
	N	304	288
Age	Pearson Correlation	,194**	1
	Significance (2-tailed)	,001	
	N	288	288

Table 6: Correlation of PS Index and Education Index. **. Correlation is significant at the 0.01 level (two-tailed).

		PS-Index	Education-Index
PS-Index	Pearson Correlation	1	,259**
	Significance (2-tailed)		,000
	N	304	278
Educa- tion-Index	Pearson Correlation	,259**	1
	Significance (2-tailed)	,000	
	N	278	278

There are no correlations between the PS index and gender (see Figure 6). Only the two extremes reveal tendencies toward female participants being more concerned about their privacy. Here again, we note these data should be considered in light of the unequal participant distribution and therefore can hardly generate relevant statements.

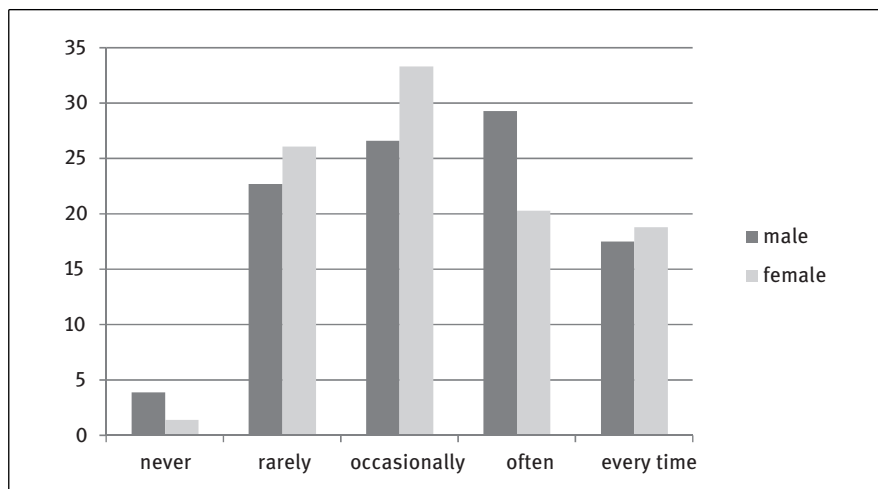


Figure 6: Privacy Settings' Usage by Gender.

The question of whether the participant has changed his privacy settings within the last 12 months (which corresponds approximately to the period between Snowden's releases and the start of our survey) found 65% of respondents answering "yes" and 35% "no." This coincides roughly with the previous figures: "rarely" and "never" were stated, in the aggregate, by approximately 27% of respondents. The difference of 35% can be explained by varying interpretations of the word "occasionally."

Encrypting Communication

One way to protect against surveillance and thus an invasion of privacy is to encrypt data. This refers, as mentioned above, only to direct communication between two individuals within a social network and not to information that is available within the profiles and as a consequence across the SNS. Of respondents, 87.5% stated they never used encryption within social media services, 6.9% have tested encryption tools at least once, 2% use them occasionally, and 3.6% report regular use. When asked about their encryption tool, most of those who did use one declared they used the Off-the-Record (OTR) protocol. Due to the low response rate for this question, it is not worthwhile checking for correlations with other factors.

Subjective Perception of Data Security by Respondents

In the following question, participants were asked to decide how safe they perceive their data are on the Internet and provide their answers using a scale ranging from 0 to 100. The question was deliberately left open-ended, and at this point in the questionnaire, Edward Snowden and intelligence services had not yet been mentioned. We wanted users to be influenced in their answers as little as possible.

The distribution of all participants can be seen in Figure 7. Regarding gender, there are hardly any differences. It must be stated, however, that most respondents perceive their data as very uncertain on the Internet (arithmetic mean: 26.22 on a scale from 0 to 100 from “unsafe” to “safe”). The mean absolute deviation is 17.64; the standard deviation, 22.81.

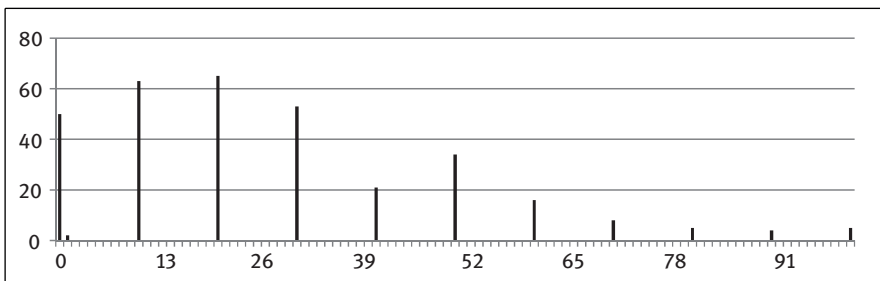


Figure 7: Distribution of experienced Data Safety on the Internet.

With respect to previous data, we found interesting results: They do not correlate significantly with the SR index, although they do correlate slightly negatively with age and the educational index.

It can be stated an awareness concerning privacy exists among participants. This also increases with age (see Table 7) and with educational level (see Table 8). In connection with self-revelation, no significant correlation could be found. One can presume a certain amount of self-revelation is regarded as somewhat necessary for membership in social networks. Our results confirm the widely established privacy paradox (see section above, this chapter).

The perception of low data security in the Internet is in a slightly negative correlation to age.

The perception of low data security in the Internet is in a slightly negative correlation to education.

The perception of low data security in the Internet is not related to online self-revelation.

Table 7: Correlation of Data Security Index and age. **. Correlation is significant at the 0.01 level (two-tailed).

		DS-Index	Age
DS-Index	Pearson Correlation	1	-,117*
	Significance (2-tailed)		,047
	N	304	288
Age	Pearson Correlation	-,117*	1
	Significance (2-tailed)	,047	
	N	288	288

Table 8: Correlation of Data Security Index and Education Index. *. Correlation is significant at the 0.05 level (two-tailed).

		DS-Index	Education-Index
DS-Index	Pearson Correlation	1	-,154*
	Significance (2-tailed)		,010
	N	304	278
Education-Index	Pearson Correlation	-,154*	1
	Significance (2-tailed)	,010	
	N	278	278

Methods to Secure Privacy

Having established there is a strong awareness of the dangers of self-revelation among participants, one should examine whether the risk of monitoring directly affects respondents' behavior. In total, just over a quarter of respondents (27.3 %) stated they had changed their behavior at least somewhat due to Snowden's revelations regarding online social media. The remaining users felt either little (54.3 %) or no (18.4 %) reason to take any action (see Figure 8).

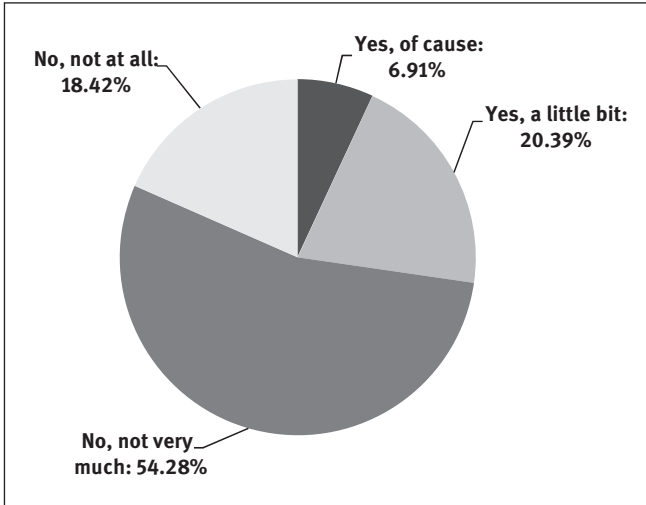


Figure 8: Changed Behavior in Social Media due to Snowden Disclosures.

The numbers for changed behavior (CB index) correlate significantly with neither age nor education (see Table 9). In this case, this can be justified by the small number of positive responses.

Table 9: Correlation of CB Index to Education Index and age. **. Correlation is significant at the 0.01 level (two-tailed).

		CB-Index	Education-Index	Age
CB-Index	Pearson Correlation	1	-,048	,064
	Significance (2-tailed)		,428	,280
	N	304	278	288
Educa- tion-Index	Pearson Correlation	-,048	1	,322**
	Significance (2-tailed)	,428		,000
	N	278	278	268
Age	Pearson Correlation	,064	,322**	1
	Significance (2-tailed)	,280	,000	
	N	288	268	288

Change of behavior regarding social media is not related to age.

Change of behavior regarding social media is not related to education.

Participants who responded “yes” to the question on changing behavior were asked in the subsequent question how doing so manifests itself (multiple answers were possible). Of participants, 56.1% reported they upload less data, and 40.2% have limited the visibility of their personal information to friends only. The latter is a popular but deceptive method. It aids only against privacy attacks from other users and even then, only if one has chosen one’s friends wisely. Against the network provider and intelligence services, it has no effect. Furthermore, there is always the risk of privacy violation by co-owners: 34.1% have had their data deleted, wholly or partially; 26.8% have falsified their data; and 39% stated they contact friends via different communication channels.

No Increased Pushback Behavior

When asked whether the participant had canceled any social media memberships in direct connection with the surveillance disclosures, only 19 people (6.3%) answered in the affirmative. Of these 19, 10 declared they had closed their Facebook account, and 2 closed all but the Facebook account.

Even within this relatively small study, this group can be considered marginal. In addition, it also repeatedly comes down to fluctuations in the number of members on Facebook, regardless of surveillance disclosures. There has been some discussion in media in general and on Facebook in particular about a general decline in the site’s membership, particularly among very young users (Spiegel Online, 2013). These results in connection with the data described in section above, this chapter, illustrate once more the privacy paradox effect.

Challenges and Prospects

The most difficult part of conducting the study was distributing the questionnaire. It was not easy to find participants. In social networks, such requests tend to go unseen due to the constant flood of information. In forums, such “beggar-posts” are unwelcome. Many of the posts soliciting participants for this survey were quickly deleted by moderators. The target of securing at least 500 respondents was missed. Some participants thus came from the immediate environment, as well as from their friends and acquaintances.

The reason for gender inequality is that most thematically appropriate forums were those that are very technology oriented. Experience has shown these forums are frequented more often by men than by women. To compensate for this occurrence, we also took care to visit forums with a high proportion of women (e.g., kleiderkreisel.de). Unfortunately, the response rates were lower in these environments. As a consequence of this unequal distribution, a satisfactory examination of the individual criteria by gender was possible; however, due to the small amount, it was often hardly meaningful and therefore useless ($n < 50$).

As part of the evaluation, it was observed that some questions in the questionnaire ought to have been more detailed, for example, Questions 2 and 4. Instead of querying the answers as Boolean values, scales (maybe 1–5) would have allowed for an even deeper analysis. The danger is that more questions deter ever more potential participants, which in turn leads to even less representative results.

It would have been interesting to procure a longitudinal study with a similar or the same survey immediately after the first publications of Snowden's disclosures. Such results compared with those found in this study could have indicated a trend. A future study, however, may be equally interesting and enlightening.

Conclusion

In the recent past, the self-revelation behavior of social media users has been extensively investigated by scientists. New in our present study is the investigation of a direct link between the acute danger of data espionage by intelligence services and users' subsequent reaction to that danger. Using the available data, our core question asking have users changed their behavior in response to the Snowden disclosures about social media surveillance can be denied with a high probability. However, these data can retrace the results of other studies: The distribution of personal information via intimate and less intimate information has been confirmed (cf. Schenk et al., 2012).

Furthermore, significant correlations between the degree of self-revelation and the age of the users were noted, but not between levels of self-revelation and education (cf. Taddicken, 2011). In addition, correlations were found between the subjective perception of data safety, and age and educational level. The share of users who enter their data truthfully is surprisingly high. It is presumed that social media providers encourage their users toward high levels of self-revelation.

The danger to which an individual faces exposure to the possibly of breaches and thievery, as a user of social media services, is mostly known. Nevertheless,

this study confirmed the privacy paradox with respect to online self-revelation, which states that although users are aware of the hazards of self-revelation, they do not adjust their actions accordingly. Younger users publish more information on the Internet than older ones do. Gender differences showed women reveal more information than their male counterparts do (see Prommer et al., 2009).

The confirmed slight correlation between awareness of data security and educational level can be explained: Higher education may be accompanied by a higher level of information literacy, leading to a better assessment of privacy risks. To protect their privacy, most respondents stated they will reveal less information in the future. Furthermore, others want to ensure their information is only shared with specific circles. This method is popular, but it runs the risk the assumed audience differs from the actual one (especially for a large circle of friends).

Overall, the results suggest the necessity for increased political action to protect users' privacy. Our goals should be to teach everyone more advanced skills in how they can work securely with their online media, and also to determine ways we can form the necessary statutory framework allowing us to protect sensitive personal information from future exploitation – by advertisers or by any government.

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Chapter 7. From Cooperation to Compassion: Death and Bereavement on Social Networking Websites

Abstract: Online elaboration of mourning is a kind of technospiritual practice, a typical area of which involves communication with the deceased and post-mortem profile management via community pages. This chapter compares the results from the international literature investigating the connection between online elaborations of mourning and community pages that include posts and comments regarding the topic of death. We focus on messages that appear in Hungarian on Facebook. This corpus-based study confirms claims that concern similar messages found on English-language social networking services (SNSs). Along with the obvious emotive function, mourning texts occurring in social media may fulfill referential (information on the funeral, circumstances of death), appellative (notification, marketing), phatic (condolence to the living; last farewell to, or continuous contact with, the deceased), metacommunicative (adequacy of online mourning), and aesthetic functions (quotations from poetry or prose, pictures, montages, presentations). With respect to the phatic function, we also examine the issue of legitimacy/illegitimacy of mourning (death tourism, trolls). The occurrence of religious themes is relatively infrequent in the digital corpus studied here. The Facebook feature “Like,” in this context, means a special manifestation of sympathy and commemoration rather than whether a message’s content pleases the reader.

Keywords: online mourning; elaboration of mourning; online grief; post-mortem social networking; thanatology.

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Cooperation or Compassion: Object and Purpose of Examination

Social networking services (SNSs), such as Facebook and Twitter, are changing the ways in which human beings demonstrate public grief: death is no longer taboo, but instead, a topic for public dialog (O'Rourke, 2013). "The mass adoption of SNSs has also resulted in an increasing number of profiles representing individuals who are no longer alive. However, the death of a user does not result in the elimination of his or her account nor the profile's place inside a network of digital peers" (Brubaker & Vertesi, 2010, p. 1). "Grieving [over] a loved one's death – once limited to the physical world – now extends to the social networking profiles of the deceased. Following a user's death, friends often express their shock and grief on the deceased's profile page" (Brubaker, Kivran-Swaine, & Taber-Hayes, 2012, p. 42). "Today, social network sites are key sites for public displays of connection and grieving" (Marwick & Ellison, 2012, p. 378). "It is reasonable to ask whether, and if so how, the Internet changes the experience of dying, and of grieving" (Walter, Hourizi, Moncur, & Pitsillides, 2011).

As the above quotations from the international literature demonstrate, in the course of the past decade, researchers have discussed the Internet's role as an intermediary agent for dealing with grief (with the topics of online grieving and digital heritage having been increasingly covered by the press as well). However, we have found no linguistically oriented paper produced on this topic in relation to Hungary. Our study aims to describe digital bereavement on social networking websites in the widest possible sense from a linguistic perspective. To this end, we will first examine the relevant linguistic, communications (and, to some extent, psychological) literature, and then we will discuss the empirical research conducted on the SNS Facebook, relying on the established theoretical background. The analysis is based specifically on Hungarian texts written by Hungarian users, making it possible to reveal similarities to and differences from international samples.

Theoretical Background

Death as Taboo: Thanatology

"In civilized societies, the entire concept of death is considered taboo. It is unseemly to speak of it or even to refer to it by name. And what one cannot speak

of, neither can one think of.”¹ Thus wrote the Hungarian writer Antal Szerb in 1937 (Szerb, 2013, p. 269). “Today, when the dominant approach to life is to reach the highest possible level of material welfare” (Havas, 2012), when youth is cherished as the most important value, “it has become common in Western culture to exclude death from public thought to the fullest possible extent” (Sümegeh, n. d.). This trend is further reinforced by humans living longer and – from the 20th century onward – primarily dying in hospitals rather than at home (O’Rourke, 2013). In his book *Death, American Style: A Cultural History of Dying in America*, Lawrence R. Samuel writes about this topic: “[It is] this horrible little secret we have, instead of being the most natural thing in the world. Denial became the operative word, because death is oppositional to our culture’s defining values, like youth, progress, and achievement” (Samuel, 2013).

Addressing death is also important from a psychological aspect. “Grief is necessary for the wound of loss to heal. If grieving is avoided, it can have a negative psychological impact. Today, psychology clearly takes the view that funerals and remembrances of the deceased person are necessary for those left behind to maintain their own mental health, if done through rites and symbols with emotional involvement and for an adequate period of time” (Sümegeh, n. d.).

Thanatology – which derives its name from Thanatos, a figure in Greek mythology thought to be the son of Night and brother of Sleep – is the scientific study of death, primarily dealing with examinations on death, dying, and grieving. It takes a holistic and interdisciplinary approach, combining relevant findings from the fields of medicine, psychology, theology, philosophy, ethnography, anthropology, bioethics, and cultural history (Pilling, 1999a, 1999b). Our present examination aims to contribute to this research field by analyzing *bereavement* as it appears on social networking websites by applying sociolinguistic tools to the process. The objective is not to merely elaborate on the topic from a psychological aspect, but to analyze texts (and to a certain extent, images and video content) shared on Facebook from a linguistic perspective.

Social Media and Social Networking Websites

According to results from the Pew Research Center’s Internet and American Life Project (Brenner & Smith, 2013), 72% of online adults use social media. While

¹ The original: “...a civilizált társadalomban a halál egészben véve a tabu-fogalmak közé került. Nem illik beszélni róla, a nevét körülírják [...]. És amiről az ember nem beszél, arra nem illik gondolni sem” (translated by A.P. and Á.V.).

social media may be dominated at present by younger generations, the share of users aged 65 and older has been continuously increasing. Certain analysts predict that if Facebook survives and follows its present development pattern (trends of late 2013 and early 2014 depict declines in young people quitting or not even joining Facebook), then the number of Facebook profiles of the deceased will outnumber those belonging to the living by 2060 or, according to other estimates, by 2130 (Condcliffe, 2013). (It is an ironic twist as the website was born on a college campus to serve its student population.) It is partly believed this decline will occur because of both the increased presence of advertisements and the waning of the site's novelty, along with an increased registration presence of older community members, parents, grandparents, teachers, and so forth; this decline will end Facebook's marketplace dominance (Alter, 2014; Kiss, 2013). Such prognostications notwithstanding, we turn our attention to the present and focus on the current content shared on Facebook.

Digital Heritage

Researchers are paying ever more attention to the concept of digital heritage, that is, to what will happen with users' online content, social media profiles, and Internet registrations after they die (Cacciottolo, 2010; Jefferies, 2009). A thorough and scientifically founded investigation was conducted on the topic by the independent website Digital Heritage (W2). Its research investigated, among other topics, copyright issues relating to photos and texts, as well the managing, sharing, and possible destroying of digital property (emails, websites, photos, social media accounts). For example, the search engine Google has been involved with this process. Its Inactive Account Manager is specifically designed for this purpose, allowing users to stipulate that their Google account be deleted after a certain period of time (3, 6, 9, or 12 months) of inactivity (W5).

Technospirituality: Death Observed on Social Networking Websites

American cultural historian Lawrence R. Samuel argues the growing culture of narcissism, as fostered by digital communication, and the sharing of personal information are making death a topic for discussion once again (Samuel, 2013). Brubaker and Vertesi (2010) – based on Bell (2006) – examine technospiritual practices, putting communication with the dead on social networking websites

and postmortem profile management into this category. Pawelczyk (2013) emphasizes the written nature of online grieving and notes that expressive writing can have a healing effect, which helps with the bereavement process.

Initially, online bereavement took the form of creating memorial websites, but doing so required significant information technology (IT) (programming) skills in the early days. With the advent of Web 2.0, more specifically the emergence of SNSs, digital content production has been made available to a much wider public, which has given rise to *postmortem social networking* (Brubaker et al., 2012, p. 43). On SNSs (in particular, on Facebook), death as a topic may penetrate our consciousness in the form of (pseudo)wise sayings warning us about mortality and encouraging us to live more fulfilling lives. Such websites also provide fora for people who are dying or suffering from terminal illnesses, who, along with their relatives, can use the sites to share experiences, possibly easing their situations as they cope with treatment and possibly trauma. The postings may even offer aid to others in similar situations. Social networking websites can also function as the medium for announcing a death or informing others about the date, time, and place of funeral ceremonies. Therefore, they may be gradually replacing obituary notices in newspapers or used as parallel channels of information.

Another technological object, the quick response (QR) code, can be placed on tombstones. A visitor to a cemetery gravesite can scan the code on the object using a mobile phone, which will then lead the living to a memorial website (W6). The profile page of a deceased member may have its original form preserved, or friends or family can turn it into a personal memorial page. On Facebook, we can also find memorial pages with community-building power. *Gyertyaláng* (Candle Light), for instance, is a Hungarian memorial website with social media features (W4). We will elaborate further on this topic in the next section.

Good Advice, Words of Wisdom, and Truth

The sharing of texts (quotations), images, image/text combinations, and videos in the spirit of *memento mori* is perhaps the least directly related activity in this field. Such content (by either well-known or unknown authors) tends to undergo a process of folklorization: With digital technology, such ephemera can be easily forwarded, and even modified or customized. Texts that spread throughout electronic media, some of which may undergo a process of mutation, are referred to as *electronic folklore* or *e-folklore* (Balázs, 2006). Content recommended with Facebook's "Like" button will be displayed (subject to the user's privacy settings) to friends through his or her message wall, which facilitates disseminating such

texts and images. Examples of the latter make up a segment of so-called “like” folklore (Veszelszki, 2011a). Applying speech act theory to such e-folklore texts, we find the propositional content in these texts is only secondary; illocutive and perlocutive forces (i.e., the user’s intent and the intended effect) are more significant. Forwarded messages usually aim to maintain relationships, to surprise, to entertain the receiver, or to inspire thought.

“Like” folklore on death-related topics includes “bucket list” compilation challenges (a list of things to do before dying), “dying last words,” and “five pieces of advice before you die” types of lists (which may be continued with “1,001 films/albums you must see/listen to before you die” types of articles and books), as well as quotations from Paulo Coelho, Buddha, or Gandhi, which regularly appear and disappear as a linguistic fashion.

Dying in Social Media

As a novel strategy for handling and processing traumatic events, people with a terminal disease, or their relatives, can now regularly report on their health status – often on the process of dying itself – through social media. Doing so blurs the boundaries of private and public spheres and lets strangers take a look into the intimate life of an individual (or family), an activity formerly unthinkable. Naturally, this self-exposure in social media is bound to spur debates (e.g., as in the case of American journalist Scott Simon who live-tweeted to 1.3 million followers the experience of sitting at his mother’s deathbed in 2013; Bisceglia, 2013; O’Rourke, 2013). Those who advocate sharing such experiences argue that “online networks often help those suffering serious illnesses face down death in some of their darkest moments” (Bisceglia, 2013). On the other side, skeptics note that dying people are more disturbed than comforted by the involvement of social media. O’Rourke (2013) opposes this view, reminding us that death, dying, and funerals were never private issues until the early 20th century: they took place within the smaller community (family, residents), so public communication on the subject perhaps should not be considered strikingly exhibitionistic, even in such a modern form.

“The point, I believe, is not that we should just be talking about death or tweeting about it [for its own sake], but that a fuller awareness of one’s death makes life more meaningful. The best use of the technology is to share stories and to reach out to other people in real time. Death is one of the few universals that we have. It brings us together,” writes Samuel, who studies the sociological history of bereavement (cited in Bisceglia, 2013).

Announcement of Death

When examining death announcements on social media sites, we believe it is reasonable to distinguish between news about world-famous/regionally known people and people known only locally or within a smaller community. People who enjoy (international or national) fame can include, as a sampling, entertainers, athletes, and politicians due to their very public professions. Celebrities or those who live with some amount of fame, unfortunately, are liable to become the subject of death-hoaxes, that is, when the Internet community spreads fake news about their death. Legitimate deaths notices of famous individuals often are released by sharing a website address (URL) or a video noting dates of birth and death.² These messages generally feature the English abbreviation *RIP* (*rest in peace*), even in a Hungarian context.

Sometimes, people become famous in the wake of their disappearance or death (which happened in 2013 with a young boy and a psychologist in Hungary, in two separate incidences in one month). Following the searching process online and joining forces to find the missing builds community: After sharing news about a disappearance and staying up-to-date with the related events, users may have gained the impression they have come to know the missing person. Many people also share death news of such quasifriends. Our present examination, however, focuses on messages that relate to personal acquaintances. Reactions to sharing death news and funeral information are mainly condolence messages (less often with the abbreviation *RIP*), but sometimes, users respond by recalling common stories and experiences. We will offer numerous examples of the latter type further on in this chapter.

Memorialization of a Profile Page

Several respondents reported about the embarrassing or even painful experience of receiving a deceased person's birthday announcement or game invitation on Facebook. (To prevent this from happening, Facebook started to develop a software application that would automatically memorialize accounts in which the expressions "Rest in peace" and "I miss you" occur repeatedly (Wortham, 2010). There are no data, however, on whether this software was actually finished and

² In 2013, the Hungarian Facebook community was mainly interested in the deaths of musician Lou Reed and actor Paul Walker, and in the disappearance of Hungarian mountaineer Zsolt Erőss.

released.) According to communication scholar and philosopher James E. Katz, the incidence of a user's death and the challenge of what to do with websites previously maintained by the deceased is a phenomenon that will only grow with the passage of time and in line with the increasing number of site users, as "so many of Facebook's early users were young, and death was rare and unduly tragic" (Katz, cited in Wortham, 2010).

The following can happen with a Facebook account after its owner dies: The website page remains unchanged; a death announcement is posted on it; it is memorialized; or it is completely deleted. If family members do not have access to the account, they can send a message to Facebook's administrators, who will make the requested action (W7). Memorializing an account means that status updates will no longer be available, all group memberships will be deleted, and the account will be visible only to friends.³ Thus, while Facebook allows friends to use the account in remembrance of the deceased, the account may also be deleted on request (Jefferies, 2009; Wortham, 2010). When memorialization takes place, the account may still need moderation or supervision to filter out improper or inappropriate comments.

An alternative to memorial pages are tribute pages that more resemble fan pages than personal profiles. Admirers or fans typically create tribute sites for those who were celebrated or famous, with the site's title usually incorporating such expressions as *In memoriam* or *RIP*. The content of such pages is usually public, that is, visible to both nonfriend and friend users. The page itself can be liked, so others can follow the page and receive notifications about new content (funeral information, tribute concert, donation requests, etc.) Fan pages differ from memorialized accounts in that they are prepared postmortem, while personal accounts are created while the user is alive (Brubaker et al., 2012, p. 43).

Online memorial pages can alter people's attitudes toward deceased relatives and friends, and this trend results in ever more forms of (linguistic) behavior in relation to online bereavement. For example, when "a person dies, and the

³ Pursuant to Facebook's terms and policies, as updated in February 2014, public accounts will remain public even after the death of the user. "The new policy," Facebook states, "makes it easier for friends to remember the deceased, as they can revisit the account and recall his or her days and months any time. Facebook respects the choice of users (including public profiles) and will not change this approach even after the death of the user.... This is only part of the effort the largest social networking website makes to support, in its own way, grief and bereavement, and in the following months, more innovative solutions will come to help people decide how they remember their deceased loved ones. By the way, this is quite a real problem [...] as currently there are more than one [1,65 in April 2016] billion Facebook users, [and] the issue of death cannot be ignored" (W3).

social networking [web]site remains open to [his/her] friends; it's a very interesting phenomenon where ... people use the site to talk directly to the dead person using the first-person pronoun: "Do you remember when we were walking in the park?" (sociologist-communication scholar Michael Arnold, cited in Kwek, 2012). Marwick and Ellison (2012) state that "the replicability, scalability, persistence, and searchability features of networked publics influence both how mourners grieve and their control over depictions of the deceased" (p. 378). Brubaker and Vertesi (2010, p. 1) argue that social networking websites allow for *technological identity persistence*. Identity created on social networking websites is not an isolated abstraction but instead is the result of intersubjective relations: friends contribute to it with, for example, comments, "likes," and photos. This *collaborative authorship of the self* is also changing with online grieving because the deceased can no longer choose which type of identity-building content is published on his or her profile page (Brubaker & Vertesi, 2010, p. 2). This conscious process of identity creation (sharing content that strengthens or hiding content that weakens the image of the ideal self) becomes evident when the person dies (cf. Veszelszki, 2011b). Social networking websites also function as a kind of social archive (Brubaker & Vertesi, 2010, p. 2).

Memorial Social Networking Websites

Online grieving is an increasingly common phenomenon, which also is reflected in the growing number of social networking websites specifically designed for this purpose.⁴ Initially, this took the form of placing *cyber (or web) memorials* in *virtual (or web) cemeteries* (Brubaker et al., 2012, p. 43). De Vries and Rutherford (2004, p. 6) refer to these memorial websites as a "postmodern opportunity for ritual and remembrance," and explain their existence and popularity as related to the greater mobility of the North American population: If geographical distance makes it impossible to visit cemeteries or memorial places physically, virtual cemeteries may provide a good alternative as they are accessible anytime, anywhere (De Vries & Rutherford 2004, p. 7–9).

In Hungary, the largest and most famous memorial website is *Gyertyaláng*, or Candle Light (W4). The site, which is connected to Facebook, promotes the idea of lighting a virtual candle for everyone (its official motto states: "Light a candle for your lost loved ones, or for people you hold in your heart!"). The website gam-

⁴ An international example is MyDeathSpace.com. Virtual cemeteries are Garden of Remembrance, World Wide Cemetery, Dearly Departed, and Virtual Memorial Garden.

ifies (cf. the rich literature on gamification) the process in a way by encouraging competition to reach the highest “candle light value,” a combination of the number of candles and special candles (several types are available) received and the total burning time of candles⁵ (cf. *cheerleading*, Marwick & Ellison, 2012). In addition, the site offers two top lists celebrating remembrance: “Latest people with a special candle” and “People with the most candles.” The profile-like page of the deceased includes a photo, personal description, descriptions of professional and private lives, and often the time and manner of death. The website also offers an opportunity to select and share relevant quotations. A detailed linguistic analysis of the website may be subject to separate studies, for example, methods from the disciplines of psychology, sociology, the graphic arts, or symbolism could be applied to allow for appreciating different perspectives on such websites and their content.

Material and Methodology

Methodology

Due to the difficulties of data collection, the examined linguistic sample is not representative and stratified. What were these difficulties? First, the age distribution of Facebook users: more and more users registering are from the 35-plus age group, while an increasing number of teenagers are deciding to delete their profiles (Naughton, 2014). In fact, the main cause of deleting profiles is precisely the changing demographics of Facebook users: young people do not want to be in a virtual community with their parents and teachers (Kiss, 2013). While in past years, a growing number of middle- and older-aged users are observed on the website (the age of the average Hungarian user was 47 years in 2014, while globally, the most dynamically growing age group was that of users aged 65 and older; Straub, 2014), we still can note that adolescents and young adults remain the largest share of Facebook users, spending up to several hours on the website, sharing their thoughts, feelings, and information about life events. For this reason, most data were obtained from them. Second, due to the dominant presence of young users, the percentage of deceased users remains relatively low (at

⁵ Basic website functions are free of charge. Registration, adding names of the newly deceased, and lighting candles are free. However, for a fee, users may buy special candles that are different in design or color and have a longer expiry period (W4).

least for now), though their number still is between 10 and 20 million worldwide (W9).

As mentioned above, future prospects predict deceased user profiles will actually outnumber those belonging to living users by 2060 – if Facebook itself still exists then (Cannarella & Spechler, 2014). Third, as also noted above, deceased users' profiles either are deleted by administrators at a relative's request, or if preserved, are not always set to remain public. When this occurs, only those users who were confirmed friends of the profile owner in his or her lifetime can continue to view posts on the messages' wall along with further details (personal data, images).⁶ Even so, indirect data collection made the task easier as it excluded the observer's paradox: users writing to a profile of a deceased individual were definitely unaware of being the subject of a linguistic examination.

Due to the above-described difficulties, one way of extending our research scope would be requesting that Facebook users, grouped by different social aspects, complete a form we compile, based on this research study's findings. This would allow for a stratified, quantitative sampling.

General Characteristics of the Corpus

The corpus was built by random sampling and comprises more than 1,000 posts and comments (the last one from February 2014), including messages posted on profiles of both the deceased and the bereaved, sometimes dating back several years. Names and data revealing personal identification were removed from the corpus and were, if necessary, replaced by the following codes: [full name], [given name], [nickname], and [geographical name]. We reproduce herein the texts of these messages, preserving their original syntactical and stylistic elements (i.e., without making any changes or corrections to punctuation, grammar, spelling, etc.). The text examples include “emoticons,” the symbolic elements that serve as a shorthand version of emotions, which employ punctuation marks and symbols in a textual manner. These are separate symbols, and not mere punctuation in the context offered.

We were able to categorize verbal posts into the following types: 1) messages posted by the new administrator of the profile (e.g., the deceased's relative or close friend), mainly with referential or conative function; 2) messages posted

⁶ We would like to thank the following persons for indirectly supplying data for this research: Katalin Erős, Anita Heizinger, Ildikó Huszárík, Tünde Szendi, and Regina Tóth. The Hungarian text examples have been translated by the authors.

directly on the deceased's message wall, (mainly with expressive function); and 3) messages posted by grieving or commemorative users in which they mention the deceased user's name. Such users may be marked by a tag to make messages written by or about them visible to all Facebook friends of both the poster and the deceased. In addition, we considered further features offered by the website: images, videos, and audios. Images could be classified into categories similar to verbal posts (images uploaded by the administrator, shared on the deceased's message wall, or on the profiles of friends and relatives by a grieving or commemorative user after the death that mentioned the deceased's name).

Findings

Communication Functions

Marwick and Ellison (2012) examined from a linguistic perspective how the technical features of social media (especially Facebook) can change the public communication methods of grieving individuals. We will read that emotional expression is in no way the only function of comments posted by administrators of the memorial page or by the bereaved.

The Marwick–Ellison study was preceded by Dobler's 2009 study analyzing teenagers' comments to their deceased friends on the social networking website MySpace. According to Dobler, these comments resemble roadside memorials erected to people who died in car accidents, which are characterized in the following ways: expressions of sorrow, expressions of thanks to the deceased for "signs" or "warnings" sent like a "guardian angel" (e.g., the radio was playing a song they both liked), and expressions of the desire to meet again in the afterlife. Similar types have been identified by Williams and Merten (2009) and Carroll and Landry (2010) after examining Facebook comments. Williams and Merten (2009) collected posthumous comments from 20 profiles whose adolescent user-owners had died between 2005 and 2007. Themes observed included comments posted to the deceased on his or her profile page, memorial posts linking current events and memories, comments about the act of commenting, comments from remote or unknown peers, religious beliefs, and attending the funeral. Researchers found that online social networking not only prolongs an attachment with the deceased and maintains the relationship, but also gives grieving teenagers a means to cope with the situation in a way that grants them unlimited freedom and opportunity to reflect on their relationship with the one who has died (Williams & Merten, 2009).

Rarely, negative comments may also appear on memorial pages, from both real friends and posters with no real personal attachment (trolls). This phenomenon is also present in condolence cards and funeral guest books, as reported by undertakers (St. John, 2006, cf. on moderation: W2). The Hungarian corpus did not include any examples of this phenomenon, only references to the (former) appearance and subsequent deletion of such posts by moderators. In their detailed analysis, Marwick and Ellison (2012) identify further types that not only serve the obvious purpose of expressing emotions but also all the remaining traditional communication functions described by Roman Jakobson. In the following sections, these functions will be allocated to only those types listed by Marwick and Ellison (2012), with examples brought to them from the Hungarian corpus.

The profile page of the deceased is suitable for sharing information concerning the cause of death and the funeral, often supplementing or even replacing announcements published in the newspaper or sent by mail. If the death occurred under unknown or uncertain circumstances, the quick exchange of information may also help the police. In this case, communication of the bereaved has a referential or conative function.

Posts evidently have conative function when, for example, they draw attention to a social problem (alcohol, drugs, drunk driving, shootings, etc.). In this case, the motivation behind the post is to raise awareness of the issue.

As a separate group, certain posts welcome an increase in the number of followers of the memorial page and encourage others to join (*cheerleading*). In this approach, the number of “likes” on the page serves as a measure of love directed toward the deceased (cf. candle-lighting on the Gyertyaláng website mentioned above). As opposed to this usage, other posts warn that liking the Facebook page of the deceased should not become a competition. Sometimes, memorial pages are created and promoted by people who did not know the deceased well or even at all, with the indirect aim being to increase the grieving individual’s own popularity by directing toward him/her the attention that accompanies grief (*status motivation*) and to achieve the feeling of being part of “one big family.” (Facebook users can view the posts and events of unknown friends and relatives of their confirmed friends on their timeline.)

According to Marwick and Ellison, quite frequently, posters “legitimize” their presence on the memorial page by making at least one post be about from where they know the deceased – usually being a resident of the same city is enough. Examples from the study: “He went to school with my niece” or “I believe my brother worked with his father.” If the cause of death was not an unexpected tragedy, but was well known to friends and relatives (e.g., a prolonged disease), questions in this regard suggest the poster is an outsider and are often criticized

by the family members. Knowing the cause of death, thus, can provide further ground to join the page legitimately.

These so-called *grief tourists* may also be motivated by the desire to ease their bereavement process through joining the virtual community of strangers going through the same process (e.g., the grief tourist lost his/her child in circumstances similar to those of the parent who created the memorial page). Comments made by unknown “grievers” are often refused by family members (even by deleting the posts or banning the user), but in other cases, strangers who created the memorial page achieve immense popularity among the deceased’s friends (and other strangers). Here, the primary function of messages is engagement and only to a lesser extent emotional expression.

Marwick and Ellison also found examples of comments posing a question to the deceased, specifically: “How did you die?” A family member’s comment: “wow seriously? what did u want him to answer u or something, there isnt wi-fi in heaven.” The function of this remark is more metalinguistic. Messages addressed directly to the deceased are not rare at all. In addition to the “Rest in peace” type of sentence, Marwick and Ellison also found that people say farewell to the deceased by recalling common experiences. “RIP love, I hope that wherever you are there’s a 24-hour Starbucks and the lattes are always free.” Messages in which posters blame themselves for the death or lament over being unable to apologize for something while the deceased was still alive form a special category of remorsefulness, such as “im sooooo sorry plz forgive me.” The function of sending messages to the deceased – mainly during the grieving period but sometimes, even years later – is to maintain a relationship with the deceased and other grievers.

Finally, in the digital world, grief may take other forms than those noted by Marwick and Ellison (2012), for example, virtual cards, audios, and videos that are used not only for boosting popularity but for aesthetic purposes as well: to a certain extent, they satisfy their creator and viewers, which thus helps them cope with their grief. These post types serve phatic functions as well: they are used to maintain a relationship with the deceased and the bereaved.

In the following section, we will provide own Hungarian examples to illustrate the various functions of bereavement-related posts in digital media, divided into typical subcategories. Due to the vast amount of posts collected, each function will be illustrated with only the most representative examples.

Expressive function. The expression of feelings is the most evident and primary function of death-related and condolence messages. Other functions can merely accompany or complement it. Practically all of the examples below demonstrate this function; thus, it seemed needless to repeat them.

Referential function. One of the aims of announcing death is to inform others, for instance:

We've lost our most precious treasure. The most wonderful husband and father. Rest in peace dear [nickname]. We will always expect you home.

In certain cases, family members report on the event in vague, almost secretive messages dominated by the expression of emotions. In one of the posts recorded in our corpus, a young girl informed her relatives and friends that she had lost her father in the following way:

This is one of the hardest and most horrible days of our life. I'll never be the same... that was too much for me... I hate losing someone forever.

The desire to communicate and ask for help publicly is mixed here with a social taboo. An example of reactions to such informative but at the same time concealing messages (this is a response to the message that preceded, the one above):

What's the matter, Dear?? :(My dear [nickname], we all love you so much, and whatever has happened, you have to hold out, we are standing by you and will help you in whatever we can. Million kisses.

Due to such vagueness, people informed outside the social media may post more legitimate comments (in the sense used by Marwick and Ellison (2012); see more details below), compared with those “outsiders” who only ask questions.

Sometimes, the media also cover the death. In such cases, those in mourning inform their friends by posting a relevant online news article instead writing words of their own. Death news shared in the entire settlement or even across the country is more likely to attract grief tourists. A post about the details of the funeral ceremony or an anniversary-related commemoration may supplement or even replace the announcement of death in the printed press.

Dear Relatives and Friends, We are sad to announce that we will accompany [full name] on his last journey in the New Cemetery of the Reformed Church on [date] at 11:00 a.m. The bereaved family.

This is to sadly inform you that our much loved one, [full name] is expected to be laid to eternal rest in six weeks, as he passed away in the Netherlands.

Dear Dancers and Family Members, Let us remember to [nickname] and share in the Family's sorrow by lighting a candle before our home. Join us at 18:00 at the [geographical name] bus stop.

Conative function. The type mentioned in the study of Marwick and Ellison (2012) and categorized under the conative function in this present study also is represented in our corpus. The following example raises awareness of a social problem brought to light by a death event.

Another sad morning has dawned on the residents of [name of settlement]. Two young boys died after being hit by a car, and a third one is in hospital in a critical condition. The driver was a local man, perhaps even a good friend of the victims. What has happened cannot be undone. It's a thing of the past. But we can do something to prevent similar accidents in the future. We should not allow people to sit behind the steering wheel when drunk. Take more care, everyone!

We only found examples for cheerleading, which refers to encouraging others to join a grieving community in posts meant to be forwarded (however, this does not exclude other forms of usage among Hungarian users). These messages do not relate to grieving over a specific person, but to the general pain felt by the bereaved (on All Soul's Day or Christmas Day, for example):

I don't need no angel on my Christmas tree. I already got a few in heaven watching out for me! Put this as your status if there's someone that you wish could be there for Christmas!
 :(:(:(:(:(:(but I don't only miss him during Christmas but on every single day!!!!...
 :(:(:(:(.

A rarer and more unique example for the conative function – not mentioned by Marwick and Ellison – is the use of the deceased's profile for disclosing an advertisement. Selling items from the estate is easier this way, with the idea that invoking emotions might persuade members of the grieving community to buy an item from the estate:

[Nickname]'s [brand name] alloy wheels are now on sale. As the car has been furnished with bigger brakes and stronger wheels, with five bolts, the default wheels and brake system are no longer needed. If you are interested drop me a line in private.

Phatic function. Most grief-related posts on Facebook seek to establish or maintain a personal relationship. In the following, we will discuss the various subtypes of this function, touching on such inherent peculiarities as grief tourism and legitimacy.

Preserving the profile page of the deceased may serve as a forum for maintaining a relationship with him/her in the days after the death:

Rest in Peace [given name] I didn't want to believe when they told me

I wanted to call you today to tell you I loved you but your number is no longer available. The operator said this name does not appear in the phone book. I visited your place but you no longer live there and the postman could not give me any other address. I think it's because heaven is too far away. I love you, I miss you, you'll always be in my heart.

Or even years later:

I send a message every day, hope you can hear it..

I often ask Her: "What's up, up there?"

No matter what I do, there's no way I can ever get you back.. I'll always love you, and you'll stay in my heart forever, Mom!! <333

Another month, another year, another smile, another tear, winter will come again, then another summer, but I'll find no other friend like you were to me! Post this to friends you love so much... ♥♥♥.

We can even find examples for the declaration of love addressed to the deceased:

...I miss you. I want to be with you! I want you to embrace me, hold me tight and never let me go. To feel your heart beating. I want you to whisper in my ear "I'll never leave you! I love you!", to finally make me smile. I want to be with You and be happy with you. I want to embrace you and make you happy...I miss you! My lips are asking for a kiss. The first one from You. I miss you so much... If only I could hear your voice. That odd smile in your voice when you think I'm silly, or say: "my dear." I wish you always held my hands, because I love You... I miss you and I'm so afraid without You.

A special form of maintaining a relationship is observed when widow(er)s keep their relationship status as "married," (even though Facebook offers "widow(er)" as an option). The desire to maintain relationships becomes particularly strong on the name day (a tradition in Hungary and some other countries that consists of celebrating a day of the year that is associated with one's given name), birthday, or death anniversary of the deceased, on Mother's and Father's Days, and generally during holiday seasons. Examples for each of these types follow:

Name day, birthday:

Let a candle burn in memory of [full name], the sweet big girl. She may not be among us physically but she'll always be there in our heart...

My dear [nickname], I wish You a very happy name day, with the love only a mother can feel! I miss you all the time, in every minute!

My dear Godson, We wish you a happy birthday there in the distance!

God bless you...

Anniversary:

Dear Son, It's been four years now that you've gone, your memory is still painful in our heart. I LOVE YOU!

Mother's Day, Father's Day:

Dear Father, you are not with me anymore, / Still I beg you to hold my hands. / Look down to me from the great distance, / Oh, if only I could share all my worries and delight with you. / I miss you much, and what I've never said before: / I love you, I love you, your absence torments me. / And when the time comes to see You again, / I'll embrace you to hear every single beat of your heart. / Father's Day, the first one without you...!!!!

My Dad will certainly not escort me to the altar, but one thing I know, that he will be the proudest Father up there!

Christmas:

Merry Christmas, Brother! I brought you some Christmas candies :Q

The first Christmas without Dad!!!! :(This used to be our dearest season but now it's painful without him!!!

Merry Christmas, Dear Sister! I miss you so much :((((On many days I just can't exist without you :(((but you're watching over me from above :((((

New Year:

I wish you the happiest new year ever, bro! :((I miss you much and we would be so much better if you were here with us :(((((((I love you with eternal love! <3.

Earlier studies (DeGroot, 2008; Dobler, 2009; summarized by Brubaker et al., 2012: p.43) found that posters on the deceased's profile page rarely interact with each other; instead, they address, directly, the deceased (or his/her family). We performed no qualitative examination in this respect (the sampling method excluded this option), but the examples in our corpus did contain examples of interaction, primarily in smaller communities whose members knew each other offline as well. Communication becomes two- or multidirectional, especially when family members announce the death or share funeral information (it is irrelevant from this aspect whether they use the profile of the deceased or their own). A subtype of grieving messages having a phatic function is saying thanks to participants of a funeral ceremony or anniversary commemoration for their sympathy, support, or even birthday greetings sent to the deceased, for example:

I want to thank you all for accompanying my husband [full name] on his last journey!!

Thank you all for coming to the funeral of my father to accompany him on his last journey. This clearly shows how many people loved him. We will always remember you [such posts invite further comments of condolence]

I thank you all for participating in the commemoration for [nickname]! Your attitude is exemplary. Yesterday evening was both heartbreaking and elevating! [Nickname]'s mother.

Thank you all in [nickname]'s name for the felicitations!!!! Though I would be happier if he was here to say thanks instead of me.. :((((((((.

Consolation within the bereaved community can be considered as a form of keeping in touch. The expression of shock and attempts to ease the pain of the closest relatives or of each other can indeed create the feeling of being one “big family,” as mentioned by Marwick and Ellison (2012).

My dear little girl, I'll always be here for you and will never leave you alone!!

I want to help you so much, just let me do so. I'll help you anytime

No day passes without me thinking of you, I'm so sorry

Our deepest sympathies!!!!!!

I miss you bro!

Following are additional examples [en dashes (–) indicate separate posters]:

– It nearly kills me!!!!!!!!!!!! – I share your feelings, and I think this indeed will only heal with time! – [Nickname] is watching over you from above, believe me. I think of you all the time. Love, [given name]!

– Rest in peace, Mom ♥†♥ – <3333333 – she is already up there but she will always watch over you! – she is watching over You! – we will take care of her and love her with all our heart!

Friends not only write to the deceased or the bereaved family, but interact with each other as well:

– unbelievable.. – it is :s but unfortunately it's true and we must accept it

– It's been an honor for me to call him a colleague. We have lost a worthy MAN from whom I wanted to learn so much. Incomprehensible. Rest in peace and love [full name]! – That's

really nice what you've written [nickname]!! I agree with you. I'm awfully sorry. – [nickname], this is exactly how I feel too. I desperately miss him... I believe that the love of so much of us is with Him.

A recurrent form of consolation in online social communication is when posters wish strength and persistence to the bereaved in enduring the pain of loss. For example:

Hold out, [nickname]! You will need a great deal of strength for this! I'm so shocked!!!

Be strong [nickname] show what a tough girl you are!

You'll need much strength for this, but you are tough folk.

Our corpus also featured an example of the appearance of grief tourists among the messages of condolence and consolation, that is, people who joined the grief-stricken as a stranger or a distant acquaintance.

I don't really know you.. But rest in peace [given name]!

– What happened to him??? May he rest in peace [post on the deceased's profile page] – He had a car accident and he did not survive it [comment] – Oh my God, I'm so sorry. Where did the accident happen? [comment from the poster] – between [geographical name] and [geographical name].

The poster in the following example also seems to be a grief tourist who, in response to the news link posted by the deceased mother's daughter, asked in a comment – among the posts expressing condolence – where the town is, where the accident happened. The reaction here also emphasizes the illegitimacy of the poster and the legitimacy of the one who replies.

well, is it really relevant here? perhaps you could afford more respect to the family. besides she was my best friend and a mother.

It is worthwhile to continue reading the conversation (taking place under the orphaned griever's post):

I don't think I did anything wrong by asking where this village is, or town or city... – NEXT TO [geographical name] SORRY BUT THERE ARE SO MANY ILL-MANNERED COMMENTS – OK, I understand, thank you. and I'm sorry.

We feel beholden to mention the activity of unknown users (sometimes using fake user names) – also termed “trolls” – who post indecent or irrelevant comments to the death announcement or its commentary (John, 2006). Because such comments are usually subject to moderation and deleted, we did not find any specific examples, but could deduce from certain reactions they do exist:

I don't understand how you could make fun out of this whole thing!! not to mention stupid comments. PERHAPS HE DESERVES AT LEAST SOME RESPECT!! think before you post!!!

I don't know who make fun out of what but neither am I interested. I don't want him to go through what the family is going through now but I'm nevertheless curious whether he would make funny comments in that case, too. If he can't be respectful, at least he could be silent.

The corpus featured comments addressed to the deceased or the bereaved that were driven by – as termed by Marwick and Ellison (2012) – the desire for legitimacy, that is, the desire to be admitted to the grieving community by using sentences, images, or music referring to kinship or friendship with the deceased, and this way, legitimize participation in the grieving process. Such posts may appear at any stage of bereavement: when death is announced, when the deceased is commemorated on anniversaries, festive days, or otherwise, spontaneously. The quality of the relationship between the deceased and the griever (and maybe the degree of legitimacy of the grieving?; cf. in addition, De Vries & Rutherford, 2004) ranges from close kinship to passing acquaintance:

You'll be my BROTHER forever and I'm really proud of the time we spent together.

By the way, you know that BLOOD REMAINS A BOND FOREVER

We'll meet again my little godson! Because that's what you stay for me forever!

We went to the same preschool for three years and were classmates all along primary school. Rest in peace [nickname]! You were a good man

REST IN PEACE MY DEAR FORMER CLASSMATE, [nickname]

You are still the greatest form teacher of all! Rest in peace.

Posts describing common experiences are characterized by a sense of close personal intimacy:

I'm sorry that we will never be able to drink wine lying on a soft carpet, that we planned – at least not here on Earth

I'll never forget when you told me to bet on number nine in the casino because that was the date of your birth... :(and it turned out to be a good bet and what we did after that remains a sweet memory forever too... :(sweet memories of the mischief we did...

When we last talked you asked me to pray for you. Let this song be played as a last prayer for you.

Finally, another common ground for grieving (legitimizing online participation) is knowing the personality or fields of interest (e.g., favorite music) of the deceased:

You had an incredibly strong will to live, when others would have given it up, you were still smiling and looking on life positively... rest in peace, [nickname]!

We loved your ever-smiling, joyful face

[full name] was his favorite skateboarder, he had a good style.) :) :

yesss, he loved this [music]

I would sing it aloud for you alone on the crowded Main Street if that would make the wind blow you back to us.

Metalinguistic function. We found only one example in the corpus for the metalinguistic function, that is, when the message refers to the communication itself. The debate between unknown posters making fun of memorial pages (RIP trolls or memorial trolls), also covered by the media, and authentic, grieving friends or family was settled by the following opinion:

I think the whole story should be excluded from Facebook, or even from the Internet, but the latter would be difficult to achieve... family things should be kept in family and should not be disclosed here, if we want to avoid things like what's happened, I'm sorry that's what I think (by the way, please accept my condolences for your mother).

This comment was only liked by 3 users – the girl who owns the profile, grieving over her mother, was not among them.

As we observe, users sharing their grief and pain online may sometimes encounter messages that disturb them. Inappropriate comments (whether left by benevolent grief tourists or malevolent trolls) may become sources of conflict among grieving family members, sympathetic posters, and illegitimate others. In such cases, those grieving live with the above-mentioned option of moderation (deletion) and keep on posting their difficulties with processing the trauma. An examination into Facebook users' linguistic attitudes could get us closer to the background of this controversy, but this is outside the scope of our present study.

Aesthetic function. Due to its diversity and importance in online communication, the aesthetic function of messages between members of the bereaved community will be detailed and illustrated with images in the next section.

Visual and Audiovisual Elements in Posts

Vincent and Fortunati (2009), who study the relationship of infocommunications and emotions, observe that electronic (i.e., ICT-mediated) emotions are usually described verbally (Vincent & Fortunati, 2009, p. 14). This observation, however, must be expanded to include visual and audiovisual elements (especially if we want to apply it to grief-related comments).

Written online communication is commonly accompanied by *emoticons*, symbols that stand for the nonverbal signals used in face-to-face communication (cf. Bódi & Veszelszki, 2006; Veszelszki, 2015). They appear with remarkable frequency in death announcements and messages in the early stages of bereavement (the duration of which varies by person), probably due to psychological reasons. Quite often, friends of the deceased react to news of a death simply by posting emoticons expressing sadness or crying [:(;:(:(:(], surprise, or love [<3]. Digital technology makes it possible to insert religious-themed iconography into death-related messages: a cross icon (†) or a combination of characters depicting a haloed angel [O:) or its symbol variant]. Many times, comments posted under information about the death, the funeral ceremony, or subsequent commemorations resemble a long chain of emoticons. Verbal messages are also accompanied by at least one but typically multiple emoticons:

I'm so sorry...beyond comprehension! Rest in peace, [given name]:'(

Rest in peace:'(

I love you and we all miss you :((((((((((((((((((((

My deepest sympathies :-(

Rest in peace, unbelievable, a precious one has gone, may angels watch over you <3<3<3.

Images shared in connection with bereavement fit into two categories: the first one contains photos taken of the deceased (from birth to death, often in the form of a photo montage), the other contains virtual postcards sent to the deceased, generally including words of wisdom or poetic quotations. These cards usually

depict heaven as imagined by artists or typical images related to grief (e.g., candle, teardrop, darkness or light, etc.).



Images 1, 2, and 3: Virtual Condolence Cards.

One unique solution from the photo collages combined a photo of the deceased with a handwritten letter sent by the deceased ten years earlier. Comments added to photos offer further material to analyze as verbal posts. The following dialogue

of comments between members of the bereaved community can be fully interpreted only in conjunction with the related photo.

– hmmm maybe we were drunk a little but I have never been able to find out what we were staring at like that :)))) – Well, ask me, I know the answer...we were celebrating my birthday and listening to [song title] and you were singing it to me! It's me you were staring at like that – NOOOOOO WAY, now that's a surprise, though it's still possible I can't deny, still I would be singing it with that guy standing by me on this photo.

Photos that had been uploaded by the deceased before death (and the related postmortem commentary) may also be interesting to examine.

Family members, but more commonly friends, often make videos in memory of the deceased (on special occasions or on the anniversary of the death) and share them on their profile page, on that of the deceased, or both. The video is usually a collection of photos showing the deceased alone or together with the video maker or other friends, accompanied by background music. Less often, it is a clip of video recordings made earlier about the deceased, so it recalls the deceased's voice as well. Background music chosen for videos and other music shared as a YouTube link on the deceased's profile page may be the dead friend's favorite song (including music that recalls past experiences or marks a specific life phase), or songs suitable to the mournful, melancholic mood. Mourners or the grief-stricken not only share videos about death or the deceased, but also offer observations about things the deceased had found dear or meaningful. The following are typical of messages attached to videos:

I'm sending you this video about your favorite skateboarder [accompanies birthday wishes]

This [music] instantly reminded me of you, I miss you

Dear [nickname]... This song always reminds me of you... ;(<3.

Nonverbal Interaction Among Bereaved Community Members: “Like” as a Gesture of Condolence

One of the most pronounced functions of *postmortem* messaging is maintaining a relationship with the deceased or the family and others who are grieving. In sections above, this chapter, we discussed both verbal and nonverbal forms of such messages.

A novel form of nonverbal interaction, specifically related to the SNS Facebook, is “liking,” which, on the site, means to express an appreciation for or

“like” virtual content. This is accomplished by clicking on the “Like” button (the English word became a loanword in Hungarian, adapted phonetically as *lájk*). For example, one comment, accompanied by a sentimental image, was liked by 48 other users (“In memory of my dear Father. Keep on, keep on flying.....”), in relation to another post on which 91 users had expressed their condolences with a “like” (“No matter what I do, there’s no way I can ever get you back..I’ll always love you, and you’ll stay in my heart forever, Mom!! <333” [91 persons like this.]).

Although the following example is not linked to a personal acquaintance (as are other messages in our corpus), because it relates to news of the death of Hungarian poet Miklós Radnóti’s widow, it still calls attention to the peculiar connection between “liking” and death news: “I mean, naturally, I don’t ‘like’ that she is dead.” Despite its original meaning, the word “like” (in Hungarian also used as “kedvelés,” “tetszikelés”) is not always used to express preference on Facebook. Depending on the context, on the relationship between the poster of the content and the commenter, and on other factors not detailed in this study, it may also express agreement or even condolence, as in the case of comments relating to online bereavement.

Addressees and Forms of Address

A special form of managing digital heritage occurs when family members log in to the deceased’s social media account and (less often) write a farewell message in the deceased’s name in first-person singular, as in the following example:

Dear Friends, Today, on [date], I left this world for a better and more beautiful one. I’m already watching you from above and take care of my family. Don’t cry for me, be happy and remember me with a joyful heart. [given name]

More typically, however, the deceased is addressed in the second-person singular with a conative function as described above. This form is also suitable for saying goodbye, thanks, or sorry. Using the “T” form is more general (Hungarian versions are inserted in parentheses):

Rest in peace [given name]! They’re already waiting for you (rád) up there...

We’ll miss you (téged)...rest in peace.....hard to say anything about this

[given name]! May you (neked) rest in eternal peace! We all think of YOU (rád) with a broken heart. [given name] and [given name]

my eyes are crying for you (érted); rest (nyugodj) in peace my dear and only love

..I miss you (hiányzol) mom, I love you (szeretlek) so much!

Dad! :(Even if I say millions of words, they can't bring you (téged) back to me: I know because I've tried it. Nor if I shed a million tears for you (érted) – I know because I've tried this too.

Dear [given name] thank you (neked) for everything!

who I was then, is partly thanks to you (neked)!

while the “V” form is quite rare due to the intimacy of this form of communication:

I'll miss you (hiányozni fog) much Aunt [given name], rest (nyugodjon) in peace ♥ :(?

Messages posted under the (textual, visual) content by friends on the deceased's profile page are usually written in the third-person singular. The same form is used in messages posted to the profile page (in addition to those written in the second-person singular):

She'll always be our Aunt [given name]!!!

It's impossible to ever forget her!
[given name], this is exactly how I feel too. I desperately miss him... I believe that the love of so much of us is with Him.

Sometimes the grieving family member combines the two forms:

[If] I had three wishes, I would use the first to tell mom how I loved her. the second to kiss her, and the last to say goodbye to her... I miss you so much <3.

One message may simultaneously have two addressees (the deceased and the bereaved family):

7 The V form is more commonly used when saying goodbye to well-known public figures than to personal acquaintances. The following message is addressed to Hungarian actress Zsuzsa Csala who died in February 2014: “Dear Zsuzsa, may your body rest in peace (nyugodjon; teste) and your soul (lelke) up in heaven delight our Lord with your wonderful jokes (poénjaival). Farewell, my dear.”

I miss you [2SG, meaning the deceased] so much.....I think of you [2PL, meaning the family] every day and I'm with you [2PL, meaning the family again], I still cannot believe it.....

Thematic Groups

Examining online memorial pages, Pawelczyk (2013) classified messages into macrotopics or themes that also may be applied to the messages taken from social networking websites in our corpus. One such theme is referred to as “biographical disruption,” expressing that things will never be the same again (keywords: *never* and *forever*), exemplified as follows:

From now on, everything will be a bit harder.

“Idealization of the deceased,” as another theme, is realized linguistically through intensifiers, superlatives, and metaphors:

:(((during my many years in school, he was the LOVELIEST person to me! And I know, how many of us feel like that!!!

– How handsome – beautiful [comments under a young boy's photo]

My boyfriend was such a person Yes, there are guys (men) who will not mislead me, who will call me princess, and who will love me without makeup and with messy hair. Who will tell you off just to bring to your senses, who will understand if you are ill. Who will bring you breakfast in bed, help you when you don't know something without taking you for a fool. Who won't abuse you, who will be worried for you when you are away, and who will not cheat on you because you are the most important person in his life, who lives just for you... and for his children....yes..there is such a man!!!! dad

The pain over a “missed goodbye” may be somewhat eased by sending an online message to the deceased, as in the following example:

I'm sorry there was no final meeting... ;(

Another thematic group established by Pawelczyk is “the presence of the deceased in the lives of the bereaved”:

I don't think he is happy to see you in that condition...

The “if only” and “I imagine” scenarios were labeled as a “fantasy sequence”:

If only I could turn back time, I would prevent this from happening so that you could live on happily in a loving family.

The macrotopic “wisdom-sharing” refers to the strategy that draws a contrast between “us” (the survivors who know the feeling of losing a loved one) and “them” (the outsiders who lack this painful experience):

Only time, nothing else, will ease this pain, and only slowly. Only those who have gone through this know how hard it is to endure.

The hardest days are yet to come. I know it won't comfort anyone. I was about Your age when I lost my husband. I know how to be strong and stand up again.

I know how it feels to lose a parent who you loved and who loved you. I know that it splits your life into two parts: “before” and “after.” No matter how many years have passed by, no matter under what circumstances you have lived, a child will remember the pain forever.

In relation to virtual cemeteries, De Vries and Rutherford (2004, p. 11) distinguish among the following thematic groups: expression of sadness over the death or missing the deceased; cause of death; reference to God; the deceased is watching over the activities of the living; and hope for reunion. The first two thematic groups were illustrated with examples in our discussion of referential and expressive functions, but we also must mention the religious theme that brings the last three groups together. Similar to the findings of De Vries and Rutherford (2004), the messages in our corpus were relatively free from religious content and any explicit reference to God:

When we last talked, you asked me to pray for you.

Dear [given name] A sad and incomprehensible news. I beg the Lord Almighty to give peace to you and comfort to the bereaved. I think of You with love, You the great MAN! “We need a kingdom up there...”

Even though we don't know each other, I wish [for] God's strength and comfort to your family. [The last message was written by a pastor.]

Messages often reflect the religious belief that the deceased watches over the survivors and may even take an active part in their lives:

[Nickname], rest in peace, and take care of your family! My deepest sympathies, [given name]!

she is already up there but she will always watch over you!)

Mom knew you loved her much, and she loved you more than everything, mom always feels your kiss on her face, look up to the stars and you'll see that she's watching over you from there! ; It gives me comfort that you're already in a better place watching over us :)

I know you are happy and that you woke up in a better place

On Sunday, we won 3 points to you, [given name], and I know you saw it! [Directed to the dead fellow sportsman after a match.]

Such messages refer to the idea that the deceased is “active in heaven” (Brubaker & Vertesi, 2010, p. 2–3). This belief makes it possible for those grieving to communicate with the deceased even in an online context. Such a belief may also fit into this category when posters express their hope for reunion.

Dear [given name], On one day will meet up there...

I still cannot believe it... :(There are so many questions I wanted to ask, so many things I wanted to say to you little [nickname]... :(But I'll not say this to anyone here, I'll tell you everything when we meet up there!!!!!! Rest in Peace! :'(.

Further areas to examine in this subject may include mapping the attitude of believers in connection with online bereavement.

Formulaic Language and Unique Forms to Express Farewell

Brubaker et al. (2012, p. 43) examined profiles on MyDeathSpace.com and found that postmortem messages typically use performative and formulaic language. The authors generated a codebook for processing comments from both a linguistic and a stylistic aspect. This codebook made a distinction between “common funerary sentiments” (customary linguistic forms used in relation to funerals) and the manifestation of “emotional distress” (messages exhibiting signs of unhealthy mourning and the potential need for additional support). Based on this system (but not for psychological/psychiatric purposes), we distinguish among quotations, situation-bound, formulaic phrases, and unique texts.

Quotations, that is, texts not authored by the poster but taken from another source, are frequently posted by relatives and friends on the profile page of the deceased or that of their own, often accompanied by visual information or images with grief-related motifs (cf. section above, this chapter):

Mary Elizabeth Frye: Do not stand at my grave and weep. / I am not there. I do not sleep. / I am a thousand winds that blow. / I am the diamond glints on snow. / I am the sunlight on

ripened grain. / I am the gentle autumn rain. / When you awaken in the morning's hush / I am the swift uplifting rush...

It's not when you close your eyes forever that you die, but when you lose the meaning of your life.

"If I'm asked the question: 'How are you?,' I can't say 'I'm sad.' It's not an answer. Though it is the truth. (...) If I think of Him, this sadness becomes less painful. As if that terrible emptiness in me and my life would be filled with something. It's not much it is filled with: a memory of someone... but I never knew it's so important..." ♥A♥

Standard formulae and situation-bound phrases of condolence are mainly addressed to the bereaved family, and – obviously – less commonly to the deceased. Condolence is typically expressed in one of the following forms:

Our deepest sympathies!!

[Nickname] Let me express my deepest sympathies!

My sympathies!

God rest him!

Though his body has been laid to rest, his soul still lives among us! Peace to his ashes.

My deepest sympathies to the Family!

Let us express our deepest sympathies.

My sympathies to the entire family, I share your feelings!!!

He, too, has gone... Peace to him. We'll keep his memories. [Nickname]'s memory will remain in our heart forever!

Rest in peace, [nickname], we are all shaken by your memories. An old colleague of yours.

Quotations and situation-bound phrases may be combined, as in the following example:

"So he's gone, gone forever, his soul taken back by the Savior, what he left here, left behind, is pain and tears nothing more, and emptiness, great emptiness which he..."

"Those who live in our hearts shall not perish! No matter if shadows, dreams, years pass by!" I miss you Dad :(♥♥♥

Another type of example also uses the “feeling” function of Facebook (when users update their status message, they can pick a combination of an emoticon and the corresponding verbal expression of emotion from a drop-down menu):

REST IN PEACE MY DEAR OLD CLASSMATE, [nickname] – :(sad.

Messages exhibiting unique forms of bidding farewell typically reflect on the relationship between the poster or the bereaved community and the deceased. They recall personal traits of the deceased or evoke common habits or experiences, usually referring to the idea that these activities can no longer be continued or repeated:

[Given name]! I was badly shaken by the sad news! We had known each other well for decades, we worked for the same company. I was really pleased to work with you, you were an honorable MAN. [Nickname]! May you have eternal peace.

Don't worry, I won't make a habit out of this. I woke up to this shocking news in the morning, all I could do was crying silently: the “foster” Mother of many of us, the symbol of vigor has given up. We love you [full name].

You won't wave back to me anymore when I'm going to Mom's place. Rest in peace, may God be with you.

Pain over the loss, and condolence and consolation extended to the bereaved are usually expressed in longer individual messages, which are, however, publicly visible:

I didn't want this. But this chaotic world has gone mad. Life was not meant to be like that, to have a strong and loving husband pass away so soon. The pain that hit you can only be felt by you, we can only share in it. Still it hurts so bad.

DEAR [Nickname] I'M SO SORRY THAT THIS HAS HAPPENED, PLEASE ACCEPT MY DEEPEST SYMPATHIES, I'LL REALLY MISS [nickname]'S SMILEY FACE, HIS SOFT WORDS ARE STILL ECHOING IN MY EARS, I WISH YOU MUCH STRENGTH IN YOUR TERRIBLE PAIN :((((MY DEEPEST SYMPATHIES.

[Full name]. This is only a name. But the man behind it will live forever in our heart. The Husband, the Father, the Grandfather. A man who strived to earn a better life for his family. He's gone, but those who he loved and who loved him will never forget him. Because he was a great man, who was blessed with a loving heart. We'll remember you forever. His family, relatives, friends. He is the one who'll never really leave us, who's only gone on a long journey, and who'll be always expected home by us. [Nickname],

I'm really sorry, your dad was indeed a great man, please accept my deepest sympathies.

Summary and Conclusion

Summary

Online bereavement typically takes the following forms: memorial pages; (pseudo)wise sayings about death shared on social networking websites; regular updates posted by dying persons or persons with terminal diseases (or their relatives) concerning their condition; death announcements and funeral information shared on social networking websites; the deceased's profile pages and the memorialization of such profiles; and social networking websites dedicated to the commemoration of lost relatives and friends. This may be linked to so-called "technospiritual practices" (communication with the dead on social networking websites and postmortem profile management).

We reviewed the international literature investigating the relationship between bereavement and social networking websites, and compared these findings with death-related posts and comments shared on Facebook in Hungarian. The conclusion of our corpus-based examination supported the findings of international studies mainly relate to the posts of English-speaking users on social networking websites.

In addition to the most obvious expressive function, grief-related messages posted on social media may also have the following functions: referential (information about the funeral and the circumstances surrounding the death), conative (warnings, advertisement-like messages about selling the deceased's belongings), phatic (expressions of condolence to the bereaved, bidding farewell to and maintaining a relationship with the deceased online, especially during holiday seasons), metalinguistic (questioning the adequacy of online bereavement), and aesthetic (poetry and prose quotations, images with grief-related motifs, montages, and presentations).

In relation to the referential function, we discussed the peculiar case when posters use the concentrated attention surrounding the death event for marketing purposes. In relation to the phatic function, we mentioned the legitimacy and illegitimacy of grief (grief tourists and RIP trolls). The examined comments were mainly verbal, but they often contained nonverbal elements as well (emoticons, embedded images, or videos). They usually addressed the deceased or the bereaved family, but – as opposed to the findings of international studies – we also found examples of interaction among members of the grieving community.

In terms of uniqueness, messages were discussed in three categories: quotations, situation-bound formulaic phrases, and unique texts. Religious topics (apart from the well-known ones, such as angels, heaven, etc.) occurred relatively rarely in our digital corpus. In this context, the characteristic “like” function as observed on Facebook is not used to express a liking or appreciation for the content of messages, but instead to communicate condolence or empathy in a special form.

Desiderata

The examination – being the first one in a Hungarian context – raises several further questions. It would be interesting to analyze the topics we discussed from an even larger corpus using the methodology of computational linguistics. For example, the results of a sentiment analysis performed with this method may provide useful information for emotion linguistics, the subdiscipline of linguistics that studies the linguistic aspects of emotions. In addition to computer-assisted, automated corpus analysis, questionnaire-based surveys and personal interviews could also help reveal linguistic aspects of processing traumatic events, while examinations directed at language attitudes could provide a deeper insight into the matter, placing it into a broader framework of interpretation.

The corpus could be expanded with the texts and images from the Hungarian social networking website *Gyertyaláng* (Candle Light), which is specifically dedicated to the topic. Online grieving over lost pets is often discussed as a parallel topic by relevant international literature from the perspective of losing a loved one (see, for example, De Vries & Rutherford, 2004, p. 9); therefore, the present examination could be extended to include that aspect as well. Further topics to cover in this field include the semiotics of images relating to online grieving; style, composition, spelling, and compliance with various norms of online messages; and observing whether a message of grief or condolence can be considered to violate norms (and if so, from what aspect).⁸

⁸ The following messages violate the rules of spelling but observe the rules expected from the content: “Rest in peace my dear friend...now you walk the path of angels...but we’ll carry you in our hearts forever...my deepest condolence to the parents, brothers and sisters ...R.I.P. [The Hungarian text ignores diacritics and consistently uses w instead of v: “Nyugodj bekeben draga barátom...mostantól az angyalok útját járód...de a mi sziwunkben orokke elni fogsz...oszinte reszwe-tem a szuloknek es a testwereknek...R.I.P.”]. [full name] [nickname]:’-(:’-(:’-(:’-(; Rest in peace [nickname]. [There is a spelling or typing mistake in the Hungarian text: “Nyugodj péképen.” instead of “Nyugodj békében.”]

Online Bereavement: Participation and Sympathy

This study examined the connection between communication and bereavement, as expressed on social networking websites. Reference to digital communication appears explicitly in the following farewell message (in instant messaging programs, in general, a green dot appearing next to the name signals the partner is online): “I still hope that the green dot will appear next to your name, and I can drop a line to you.” Thus has communication across the social media sphere made the following belief even more poignant: “Death ends a life – it does not necessarily end a relationship” (Anderson, 1974).

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Mechtild Stock

Chapter 8. Facebook: A Source for Microhistory?

Abstract: In this chapter, we discuss whether social networking services (SNSs), especially Facebook, are sources for microhistory. It can be shown that SNSs indeed form a valuable source for historical science. Due to the huge amount of data content in SNSs, the greatest problem the researcher faces is being overwhelmed with unmanageably large datasets. We propose to structure the datasets by applying informetrics and statistical methods as a means of producing a quantitative history. We do this by working with a single case study, *Kerpener und Ex-Kerpener*. This Facebook group addresses Kerpen (a small town in Germany) as well as its historical development. The aim of this moderated group is to preserve historical images and videos and to make them publicly accessible. We will informetrically analyze all (nearly 2,000) wall posts of the group during 2014. For each post, we will investigate its type (text, image, and video), category, topic, number of likes, shares, and comments as well as the date (month, day of week) and the author's name. The chapter will conclude with recommendations for cultural heritage institutions to both collect and preserve important Facebook content.


Keywords: History, Local history, Microhistory, History from Below, Written orality, Social Network Service, Facebook, Informetrics, Wall posts, Post authors, Likes, Shares, Comments, Kerpen (Germany).

Introduction

“History is not the sum total of events, nor the course of all things, but a knowledge of what happened. Without this understanding, it is as if the past never happened; it will be lost. Only if remembered by one who has knowledge of it, is it everlasting” (Droysen, 1977, p. 397).¹ With the above quotation in mind, we ask is

¹ “Die Geschichte ist nicht die Summe der Geschehnisse, nicht aller Verlauf aller Dinge, sondern ein Wissen von dem Geschehenen. Ohne dies Wissen würde das Geschehene sein, als wäre es nicht geschehen; es würde vergangen sein. Nur er-innert, soweit und wie es der wissende Geist hat, ist es unvergangen.”

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it possible to preserve “a knowledge of what happened” by studying the content contained in social network services (SNSs), especially the type found on Facebook?

Our chapter is structured as follows. First, we discuss basic ideas about history and its study, particularly historical methodology, sources for historiography, and approaching the research by applying microhistory or *history from below*, which refers to the history of, or life experienced by, the great masses of society rather than the events associated with great personages. Next, we discuss the data contained in Facebook as a source for microhistory. To overcome the challenge presented by huge amounts of data (“big data”), it is necessary to develop specific Facebook metrics derived from informetrics and quantitative history. We describe our quantitative approach in the methods section. We then apply this methodology to the case study known as *Kerpener und Ex-Kerpener*, a public Facebook group dedicated to the history of the town of Kerpen, Germany. In the results section we present our statistical findings, including the distribution of post authors; the number of posts by date; rankings of top “liked,” shared, and commented-on posts; multimedia versus text posts; and finally, posts arranged by content categories. Afterward, we discuss the role of Facebook in cultural heritage. The chapter concludes with recommendations for Facebook (e.g., developing appropriate search and download options) and for local archives.

Facebook and History

How can we achieve a useful remembrance of historical events, creating deeper knowledge and understanding about what happened in the past? Facts in the progress of time become history precisely when memory prevents us from forgetting about the events. Without historical knowledge and without tradition, however, there can be no historiography. Leopold von Ranke, one of the founders of modern historical science, emphasizes the historian’s task is to present “how it actually was” (Ranke, [1824] 1885, p. VII).² Every era has its individual orientation, its own validity. Ranke does not intend to assess history or to explain historical events by generally applicable laws and philosophical derivations. The facts themselves must be placed in the forefront of historiography.

Researching mere facts, however, is not sufficient to justify history as a science. Johann Gustav Droysen has developed a methodology of historical

2 “Wie es eigentlich gewesen.”

science, which clearly differs from the methodology practiced in the natural sciences, with an aim to achieve research objectivity. The first step toward such impartial research starts with the discovery the historian works with material that resides in both the present and the past. Historical research draws on a mental image of a past (created by analyzing and interpreting available evolved facts), “which would be dead and would remain dead, if research does not revive [them]” (Droysen, 1977, pp. 9 f.). The main feature of the historical method is “to understand by means of research” (Droysen, 1977, p. 22), which is most often achieved by interpretation. Droysen’s approach thus characterizes the central thesis of methodological historicism.

Alan Mayne speaks of an interplay between words and things. “The historical value of studying material culture lies in such interweaving of words, things, places, and memories, in order to more fully understand lives and habitats in the past, and their points of connection with the present day” (Mayne, 2012, p. 60). Sources are precious to us, and we assign meaning to them. Historical study therefore is also aimed at understanding the culture of an era. “Culture is a finite segment of the meaningless infinity of the world process, a segment on which human beings confer meaning and significance,” as expressed by Max Weber (1968, p. 91).

Culture consists of a texture of manifold symbols composed and formed by humans. From the vast amount of facts those are highlighted, which seem to be important to people in a certain timeframe. Records of these highlights can be found in textual sources or material objects (such as clothes, pictures, videos, and buildings). Sources are not constructed without any meaning or ideas about values. Accordingly, the science of history must also pay attention to a source’s cultural background. Thus we observe historical and cultural studies are closely interrelated.

Which elements ought historians always consider in the process of their research and examination? First, the historian seeks out sources that can convey knowledge about the past to us. The historian must remain aware of his selective and subjective bias, because the past cannot ever be completely revealed; the past is constructed, however. The selection of sources also is guided by the historian’s cognitive interests. Historical research is an open-ended analysis of earlier source materials.

What are the guidelines a historian uses in studying primary sources? Roughly speaking, *source criticism* describes and checks the source object in terms of language, origin, date of origin, location, and credibility; *source interpretation* is used to analyze and to evaluate the source and place it in its historical context. Furthermore, an intersubjective verifiability should be attained where and whenever possible, such as by linking various sources that connect humans

to the past, including texts, objects, buildings, images, or videos. This is not surprising. “People have always used all five of their senses in their intellectual, affective, expressive, and communicative practices” (Auslander, 2005, p. 1016).

In SNSs, people often write and exchange information about events, persons, buildings, and so forth, frequently posting images and videos besides pure text. Leora Auslander (2005, p. 1019) emphasizes the central role of people handling objects: “(H)uman beings need objects to effectively remember and forget; and we need objects to cope with absence, with loss, and with death.” Objects tell stories about our relationship to the physical environment and to other people. Documented objects can become memory objects. “This kind of ‘information’ would immediately be of interest to friends and family, but if this ‘memory object’ is kept for long enough and passed down through generations (as heirlooms) then it transcends the barrier of personal memory. ... Nonetheless it begins to become reminiscent of a shared family memory or even cultural memory. As time progresses the ‘memory object’ becomes more reminiscent of a time period and its culture, and becomes a ‘heritage object’.” (Pitsillides, Jefferies, & Conreen, 2012, p. 57).

Of course, then, online data can also be considered memory objects. Digital data offer new possibilities for dialogs and contacts, but additionally for constructing “viable, continuous ‘memory communities’ that creatively reassemble fragments from a shared past into a dynamic, reflective expression of contemporary identity” (Silberman & Purser, 2012, p. 16). Joanne Garde-Hansen (2009, p. 136) agrees: “SNSs like Facebook serve to shore up the relationships between already existing, or once-existent friendships in very niche ways. In our fast-paced world of work and play, such sites appear to ensure that personal and collective memories are maintained and preserved.”

Regarding the huge amount of online data, these digital memory objects present challenges when considering storage, accession, and arrangement of them. “It is obvious that developing increased data storage technology is a double-edged sword: it can give us a richer resource of the past than ever before, but it can also overwhelm us and make us too much reliant on technology” (Pitsillides, Jefferies, & Conreen, 2012, p. 66). Indeed, SNSs contain digital memory objects, but the collection may produce an unmanageable stream of such objects. If we do not structure the data and make them manageable, “we could be in danger of losing any understandable personal narrative in favor of the vast collection” (Pitsillides, Jefferies, & Conreen, 2012, p. 64). Corey Slumkoski (2012, p. 159) states, “Facebook has become an increasingly useful tool for mobilizing historians in the digital age.” We understand SNSs obviously are producing rich historical resources, but at the same time, they are difficult to use in sociocultural and historical research.

History From Below

The term *history from below* refers to the accounts of those who comprise the masses of a given society; it is also known as history of the common people, or history from the ground or bottom up. What can we gain by turning our attention toward such microlevels of history? Social change does not happen in the same way all over the world. It is not enough for historians to focus solely on a major global event, such as a world war or global economic crisis. These greater events have often been launched by smaller developments. Thus, we must not forget the little event next to the great.

Such smaller events can play pivotal roles in local history. Raphael Samuel (1976) defines “local history” as “the idea of place as a distinct and separate entity which can be studied as a cultural whole” (p. 197). As James Batley (1973) states, “[the] charm and the significance of local history lies in the particular rather than the general” (p. 359). Therefore, the historian can take different approaches when analyzing historically relevant events in smaller regions. We offer the following subdivisions as examples: local history, history of regions and cities, history from the perspective of common people (in contrast to the perspective of the forceful personalities seen in political leaders). We call history from the perspective of common people “microhistory” (Brewer, 2010) or “history from below” (Thompson, 1966). Such an approach enables one to study the structural development and the concrete destiny of people living at a given place and time. In addition, there is interdependence between microhistory and macrohistory. Max Bauman (1991) states the researcher always must ask “the reverse question as well, whether details influence, change or even form the whole, the superior” (p. 179). Besides professional historians and archivists, lay historians and average citizens especially can ply the tools of microhistory. Lay historians work as citizen scholars cocreating historically relevant content (Sikarskie, 2013). According to Amanda Grace Sikarskie (2013), the “collective intelligence” of citizen scholars is gathered by online communication, especially by social media. Michelle T. King (2012) describes the Internet as an archive of the future: “Beyond the promise of increased access to digitised archival holdings, the greater potential of the Internet is to make ordinary individuals into public archivists of their own histories, by allowing them to post texts, images, blogs, videos – historical documents, in other words – of their own making” (p. 23). Citizens participate in the production of historically relevant knowledge. Their experiences are parts of local history; they are no longer merely observers (Nack, 2012, p. 52).

Wall posts and comments in SNSs are user-generated content. If an archive or any other cultural heritage institution captures and preserves such content, this becomes a kind of “participatory cultural heritage” (Liew, 2014). Huge amounts of

users participating in the cultural heritage domain are characterized as “crowd-sourcing” by Johan Ooman and Lora Aroyo (2011). This process “has the potential to help build a more open, connected, and smart cultural heritage with involved consumers and providers: *open* (the data is open, shared, and accessible), *connected* (the use of linked data allows for interoperable infrastructures, with users and providers getting more and more connected), and *smart* (the use of knowledge technologies and web technologies allows us to provide interesting data to the right users, in the right context, anytime, anywhere)” (Ooman & Aroyo, 2011, p. 147). SNSs, with their well-documented dialog and content, appear to be excellent sources for constructing an account of history from below.

Facebook

The use of Facebook as a source for material does present a challenge for today’s historical science. Cayce Myers and James F. Hamilton (2015) state that “the genre of social media presents a new (post)modern genre within twenty-first century historiography” (p. 222). In contrast to *Historypin*,³ which aims to be a picture story book (Crow, 2010), collections of historically relevant photos (e.g., *Old Pics Archive*⁴), *Flickr*⁵ (van Dijck, 2010), and *Instagram*⁶ (Jensen, 2013), Facebook consists not only of images but additionally of textual posts, comments, shares, and “likes,” which all are components of the numerous dialogs that comprise the majority of the site. Donghee Sinn and Sue Yeon Syn (2014) name Facebook as a source of prosopography (the study of people and their lives): “Facebook content indeed indicates information of self-presentation and personal documentation of everyday lives of users” (p. 95). Joanne Garde-Hansen (2009) adds: “Facebook is a database of users and for users; each user’s page is a database of their life, making this social network site a collection of collections and collectives” (p. 141). For Garde-Hansen (2009), SNSs are a symptom of a need “for identity, for memory, for stories, and for connectedness” (p. 148).

Facebook⁷ is an SNS, an important and popular kind of social media. Danah M. Boyd and Nicole B. Ellison (2007) define SNSs as “web-based services that allow individuals to 1) construct a public or semi-public profile within a bounded

³ <https://www.historypin.org/>

⁴ <http://www.oldpicsarchive.com/>

⁵ <https://www.flickr.com/>

⁶ <https://instagram.com/>

⁷ <https://www.facebook.com/>

system, 2) articulate a list of other users with whom they share a connection, and 3) view and traverse their list of connections and those made by others within the system. The nature and nomenclature of these connections may vary from site to site” (p. 211).

From a global viewpoint, there are SNSs other than Facebook, many of which are also popular and constitute a “standard” (Baran, Fietkiewicz, & Stock, 2015) in a certain world region, for example, VKontakte in Russia and neighboring countries (Baran & Stock, 2015). In Russia, local historians mainly work with VKontakte when exploring SNSs and their content. Since Facebook is (with about 28 million users in Germany in 2014) the standard SNS in Germany, and we are working with a case study from Germany, it will be our study object.

Facebook and “Written Orality”

On Facebook, as with other social media, “people easily can communicate and publish whatever they like. As a result, people are able to create huge amounts of data” (Abbasi & Liu, 2013, p. 441). A crucial aspect is data credibility. “This kind of system provides first-hand data, but one pressing problem is to distinguish true information from misinformation and rumors. In many cases, social media data is user generated and can be biased, inaccurate, and subjective” (Pinheiro, Cappelli, & Maciel, 2015, p. 113). When applying the technique of history from below to material sourced from Facebook, the historian must consider these challenges. Facebook posts are often not written by professional historians but rather by lay-people; the posts as historical sources have not been evaluated. Therefore, we need methods to separate historically relevant information from misinformation and rubbish.

Historical research, especially with constructing history from below and local history, many times makes good use of oral sources. According to Alessandro Portelli (1981), “oral history” is “the use of oral sources in history” (p. 96). The sources of local history are often “heavily biased towards local government” (Samuel, 1976, p. 193). Raphael Samuel (1976) states, “oral evidence makes it possible to escape from some of the deficiencies of the documentary record, at least so far as recent times are concerned (i.e. those that fall within living memory)” (p. 199). Oral sources are narrative sources (Portelli, 1981, p. 98) and may not always be objective (Portelli, 1981, p. 103). The subjectivity of oral sources thus depends heavily on speaker credibility (Portelli, 1981, p. 99).

Facebook and other social media include literal expressions, which are similar to orality. Jörg Kilian (2010) has coined the term “written orality in com-

puter-mediated communication”⁸ to capture this idea (p. 63). One advantage of written orality is its durability, independent of “living memories.” Andrea Hajek (2012b) states, “Facebook reproduces orality in a very similar way as when you’re going through a photo album. The tags and comments, which read very much like spontaneous, real-life or telephone conversations, substitute the pointing out of people or places in an album. This effect is amplified by the use of a wide range of special characters, text symbols and emoticons.”

Facebook Groups and the Study of History

Many public Facebook groups have dedicated themselves to the subject of history. One example mentioned in the literature is the “Beautiful buildings and cool places Perth has lost” Facebook group, an example of an “emotional community of shared values that has been created via social media” (Gregory, 2015, p. 42). Jenny Gregory stresses that such a Facebook site is an attempt at “social curation;” it is an independent and unofficial “from the bottom up” development of cultural heritage. This virtual community consists of people who “*feel* they belong to it” (Gregory, 2015, p. 26).

Deirdre McKay (2010) examines historical photographs of Filipino users on Facebook, stating these digital images enable “users to deploy digital images in new ways and the images themselves become actors, shaping new modes of interaction and norms for relationships from kinship to romance to friendship to ethnic or national belonging” (p. 496).

Andrea Hajek (2012a) studies “the collective sharing of a series of photo albums of the 1977 student movement in Bologna, on the social networking site Facebook” (p. 375). These photo albums on Facebook have a positive effect on collective memory, “as people or events that have been left out of official history are now re-inserted into a collective and alternative history from below, thus allowing for a more inclusive history of the 1970s” (Hajek, 2012b).

8 “Geschriebene Umgangssprache in computervermittelter Kommunikation.”

From Quantitative History via Informetrics to Facebook Metrics

Sometimes, historical research is in need of quantitative methods. According to François Furet (1971), quantitative history relies on “the use of quantitative sources and of calculation and quantification procedures” (p. 151). It is important to work, *inter alia*, with statistical methods. Quantitative history “illustrates the historical narrative with statistical data” (Marczewski, 1968, p. 179). Applying statistical methods, especially to economic history, is called “cliometrics” (Meyer & Conrad, 1957). SNSs and, in particular Facebook, store billions of posts, and further billions of comments associated with those posts. In such a situation, we indeed would need the help of statistical methods for two reasons:

- to understand the behavior of users or of formal user groups, who intend to provide historically relevant data via Facebook, and
- to separate historically relevant topics from the magnitude of Facebook posts and comments.

To manipulate such “big data” and apply calculations from content assembled from information services as Facebook, we apply quantitative methods borrowed from information science. *Informetrics* studies information users and usage, the state and quality of information systems and services, as well as the information itself (Stock & Stock, 2013, p. 445). Because we will analyze Facebook content, our research topic falls under the category of “information itself.” This field of analysis also is sometimes called “bibliometrics” (Pritchard, 1969). “Methods of data gathering in informetrics concerned with information itself comprise citation analysis and publication analysis, including subject analyses of publication. The challenge of ... informetrics is the creation of a meaningful set of search results for analysis” (Stock & Stock, 2013, p. 447). Informetrics originates in scientific communication wherein researchers have applied it to measure the scientific dialog in terms of publications and citations. In SNSs, we find a dialog that can be measured as well. Enrique Bonsón and Melinda Ratkai (2013) write: “The likes, comments and shares of Facebook can be considered dialog” (p. 796). The wall posts function as articles; the likes, comments, and shares are analogous to citations. Furthermore, we will offer descriptions of the wall posts’ content, which then serve as annotations.

In the sense of dialogic theory, “it is not the outcome that is important within the communication, but the process itself. ... It is more about open and negotiated discussion than agreement” (Bonsón & Ratkai, 2013, p. 790). Who initializes a dialog? Are there many different authors who trigger dialogs, or is a group domi-

nated by only a few authors? A well-known informetric distribution is the inverse power law (Stock, 2006), which in our case means there is one highly productive author of wall posts, some additional medium-level productive authors, and a long tail that follows, consisting of authors who contribute only a few posts. Rankings (e.g., authors by their productivity) are a typical form of informetric data processing. Of course, ranking of other items, insofar as reasonable, also is possible. It could be helpful to detect quantitative figures on wall posts, ranked by their number of likes, shares, comments, topics, and single events as well.

Which elements constitute Facebook (or, in general, SNSs) metrics? Basic figures to count and analyze Facebook dialogs are the absolute and relative numbers of wall posts, and the number of likes, of shares, and of comments (Bonsón & Ratkai, 2013, p. 791). An important aspect is the number of posts by authors. To analyze the content of wall posts and comments, one may apply content analysis (Krippendorff, 2004). Whenever possible, calculating rankings can be helpful to detect important wall posts. The following are the challenges of bibliometric analyses of Facebook (“Facebook metrics”):

- to create a meaningful set of wall posts including likes, shares, and comments,
- to count and analyze wall posts (as triggers of dialog),
- to count and analyze likes, shares, and comments (as dialogical responses on or to wall posts),
- to count and analyze wall posts by authors to derive distributions of authors by their entire number of posts,
- to analyze the content of dialogs, and
- to create appropriate rankings of wall posts by numbers of likes, shares, comments, and topics as well as by single events.

One aim of our study is to divide the amounts of posts and comments into two groups, namely, historically relevant items and less relevant or not credible items (see Figure 1). We apply Facebook metrics to a single case study and try to find threshold values in terms of numbers of posts per topic as well as likes, comments, and shares per post, separating historically relevant posts and topics from all other posts.

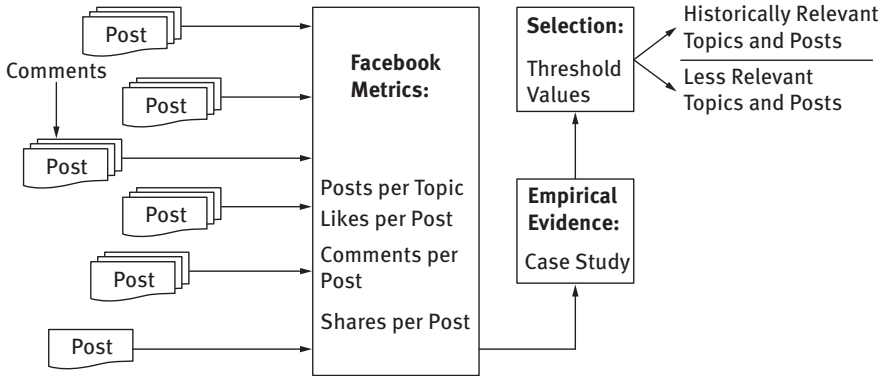


Figure 1: Our Research Model.

Methods

We analyze informetrically all wall posts from our case study that occurred during 2014. For each post, we investigate its type (text, image, video), topic (applying online content analysis), numbers of likes, shares, and comments, as well as the date (month, day of week), and author's name.

On the appointed date of January 19, 2015, we downloaded all wall posts of the public Facebook group *Kerpener und Ex-Kerpener* to an offline hyper-text markup language (HTML) file (about 42 MB in size). We gathered only the visible comments in our offline file, yet all other comments are visible only in the online version. If necessary, we visited the online version of Facebook to read the answers to open questions on comments. We ignored all posts lacking in content (e.g., posts without any text, images, or video due to deleting by administrators). The result was a file consisting of 1,951 total wall posts. As a consequence of the huge amount of comments (26,319), we decided not to evaluate their content. We constructed a database with the following field scheme:

- date (month, day),
- day of the week,
- author,
- type of post: text, image, video, text and image, text and video (intellectually coded),
- shared post (post from external source),
- number of likes,
- number of shares,

- number of comments,
- kind of image and video: current image, old image, current placard, current video, old video (intellectually coded),
- content category (intellectually coded),
- content description (keywords, intellectually coded).

First, we roughly screened the posts to summarize them and to determine content categories. The result of our analysis yielded nine categories:

- caution (warnings),
- curiosity (“what is happening there?”),
- current impression (“current” means “only some months old”),
- news,
- notice (announcements, tips),
- old impression (more than some months old, in most cases many years or even decades old),
- private (all posts of private nature, including recommendations and requests for help),
- report / criticism (complaints, experiences),
- request (questions of general interest).

In contrast to Sergio Davalos et al. (2015), who preferred automatic word counting for content analysis of Facebook posts, we intellectually indexed all 1,951 wall posts in terms of the field scheme as well as the content categories, afterward transferring all collected data into a Microsoft Excel spreadsheet.

Our case study for a local history-from-below type of analysis is the Facebook group *Kerpener und Ex-Kerpener*⁹ (see Figure 2). This Facebook group addresses Kerpen as well as its historical development. Kerpen is a town of 65,000 inhabitants (2012) located in the German Rhineland near Cologne. The aim of this moderated group is to preserve historical images and videos and to make them publicly accessible. It is a perfect case study for our endeavor to analyze Facebook and microhistory. The group *Kerpener und Ex-Kerpener* was founded in 2012 and by the end of 2014 had been successful in attracting 5,455 members to join the website.

⁹ <https://www.facebook.com/groups/kerpener/>

Case Study: Kerpener und Ex-Kerpener

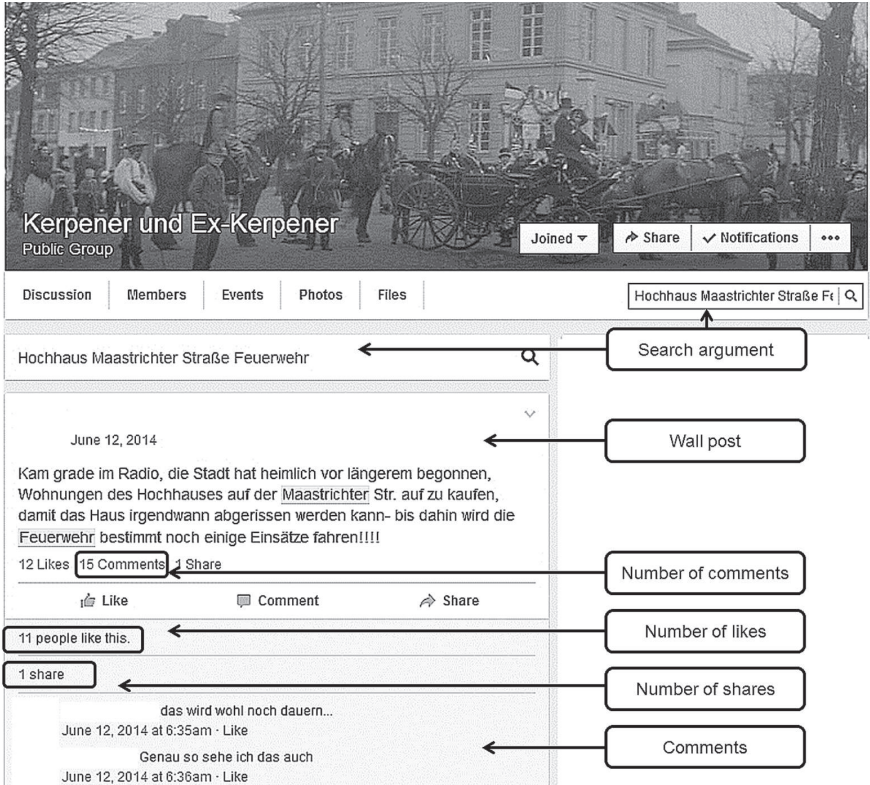


Figure 2: Pin Wall of *Kerpener und Ex-Kerpener*. (All Names Omitted.)

According to the group's founder, the city's historical developments should always be at the forefront of group members' considerations and postings, and the following rules should be taken into account. Desirable posts are historical images and videos, for example, old postcards, impressions of buildings, places and the landscape in and around Kerpen, and old family photos. Not allowed are small advertisements, commercial posts, recommendations (haircutters, doctors, etc.), images, and videos for which the poster does not hold the copyright, vulgar remarks, and offensive postings. Moreover, off-topic posts are not wanted; unauthorized posts will be deleted by the group's administrators. These administrators sort images into topic-related photo albums. In addition to this main group that shares a broad interest in the town, there exist subsidiary groups, for example,

*Kerpener und Ex-Kerpener Smalltalk*¹⁰ and *Sindorfer und Ex-Sindorfer*¹¹ (Sindorf is a district of Kerpen).

Table 1: *Kerpener und Ex-Kerpener*: Basic Figures for 2014.

Basic Figures (2014)	“Kerpener und Ex-Kerpener”
Number of Posts	1,951
Number of Unique Post Authors	582
Number of Top Post Authors (Producing 50 % of all Posts)	24
Number of Likes	25,686
Likes per Post (Average)	13.17
Number of Shares	1,658
Shares per Post (Average)	0.85
Number of Comments	26,319
Comments per Post (Average)	13.49
Number of Images and Videos (in Posts)	1,236
– Number of Current Images	679
– Number of Old Images	427
– Number of Current Placards	111
– Number of Videos	19

In Table 1, we present some basic figures from our case study. We list 1,951 posts written by 582 different members; hence, the share of active members is 10.67%. Only a small segment of members is actively involved in writing wall posts. The majority of members obviously does not trigger discussions. Of course, some people respond to wall posts by liking, sharing, and commenting. Others, indeed, are only “lurkers” and pure consumers. A wall post in the year 2014 has on average 13.17 likes, 0.85 shares, and 13.49 comments. There is a weak correlation (Pearson) between the number of likes and the number of comments ($r = +0.214$). It is valid for some posts: The more likes there are, the more comments (and vice versa). 63.35 % of all posts include images and (to a much smaller extent) videos.

¹⁰ <https://www.facebook.com/groups/kerpen.dies.und.das/>

¹¹ <https://www.facebook.com/groups/960496633967892/?fref=ts>

Distribution of Post Authors

Who are the active members regularly contributing posts? We sorted the entire set of posts by authors. In Figure 3 is exhibited the distribution of all 582 active members according to number of posts. We can identify an extremely leftward-skewed distribution following an inverse power law. This means only few highly productive authors post regularly. Additionally, many authors contribute one or two posts per year.

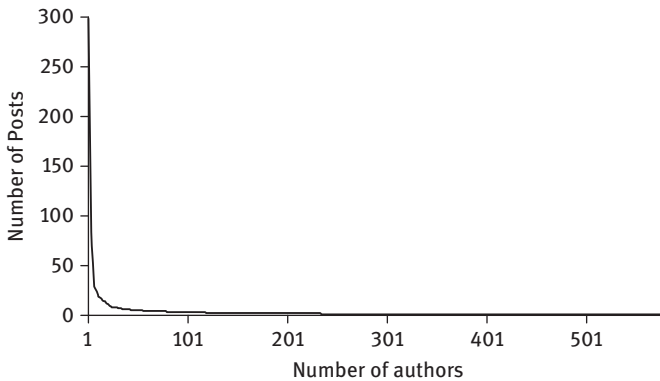


Figure 3: Distribution of Post Authors in 2014.

Next, we calculated the median of the author distribution. There are 24 authors producing 50 % of all posts (see Figure 4). The most productive author, “A,” alone is responsible for 15.27 % of all posts. Thus, the group of interest relies on the activities of only a very few highly active persons. In this context, many scientists speak of “crowdsourcing.” The “crowd” of our case study consists of just a few people. Thus, for our case study, the term “crowdsourcing” does not appear appropriate in describing author distributions in SNSs.

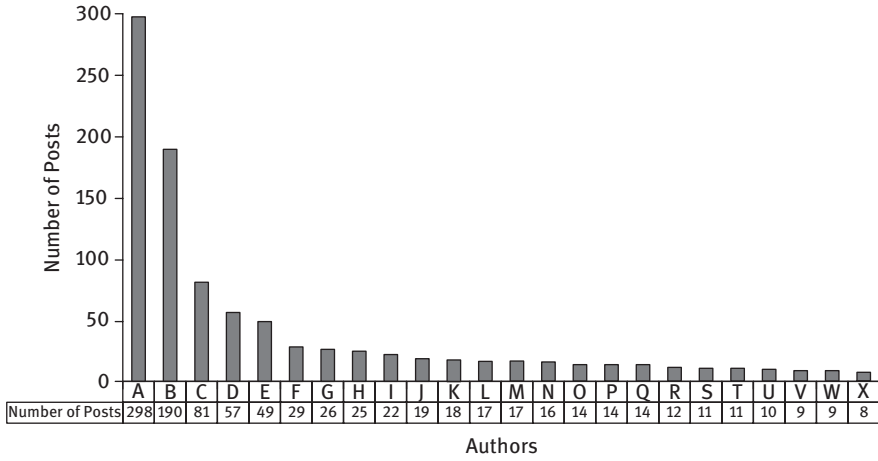


Figure 4: Distribution of Top Post Authors.

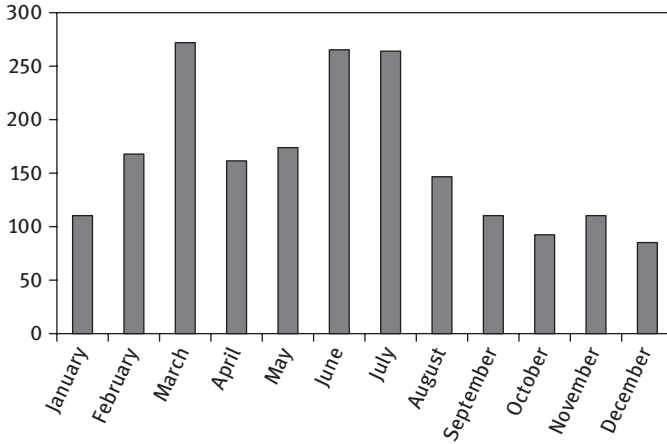


Figure 5: Posts per Month.

Distribution of Posts per Month and Day of the Week

In three months of 2014, more posts were published than in the other nine months (see Figure 5). How can we explain these outliers? In March 2014, Kerpen's inhabitants celebrated Carnival, an important festival in the Rhineland. Also in March, in many posts, Alt-Mödrath (a former part of Kerpen that was bulldozed some decades ago) was mentioned. One group member found old images, scanned them, and published them over the course of March. In June 2014, thunderstorms shocked Kerpen's inhabitants; fires broke out in Kerpen's problematic apartment building at *Maastrichter Straße* (Maastricht Street); and finally, the new railway station in Horrem (a district of Kerpen) opened. It was holiday time in July 2014, obviously leading to many posts with old images. Additionally, in July, Kerpen's citizens celebrated their city festival and the winner of the soccer world championship.

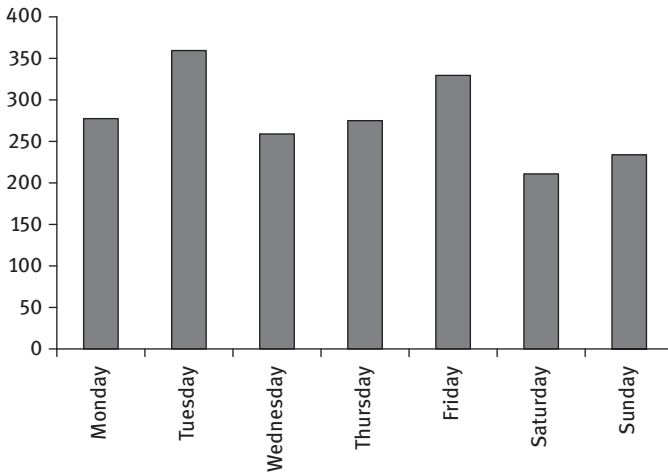


Figure 6: Posts per Day of the Week.

We observe that Tuesday and Friday are the favored posting days (see Figure 6), but lack any explanation for this phenomenon. We found it remarkable there were only few posts made on weekends.

Top Liked, Shared, and Commented Posts

We have ranked our wall posts according to numbers of likes, shares, and comments. The rankings of posts by likes and shares are – similar to the authors' distribution – left-skewed distributions. Only a few wall posts received many likes and shares. In contrast, posts with comments follow another distribution type (the so-called “inverse-logistic distribution”; Stock, 2006), insofar as in this distribution, three posts (instead of only one, which is expected for an inverse power-law distribution) at the top of the ranking received many comments.

In Table 2, one can see the top 10 posts ranked by the number of likes. In most cases, group members like current and old impressions. The top-liked post is an image of a wrong place-name sign at the new motorway A4 (Bergdorf instead of Bergheim). Interest in Michael Schumacher (a world-famous former Formula One champion racing car driver) is understandable, since Schumacher once was a citizen of Kerpen. Moderately highly liked wall posts are impressions of winter in Kerpen, a rainbow, a new indoor swimming pool, and so forth.

Table 2: Top Posts by Number of Likes.

Rank	Likes	Shares	Comments	Kind of Post	Description
1	640	0	114	Current impression	Wrong place-name sign (Bergdorf instead of Bergheim)
2	338	0	23	News	Michael Schumacher awake
3	275	0	61	Old impression	Winter in Kerpen (2010)
4	205	1	27	Current impression	Rainbow
5	198	0	53	Current impression	Indoor swimming pool in Kerpen
6	166	0	14	Current impression	Winter in Kerpen (2014)
7	160	0	26	Current impression	Soccer World Cup – Honking fest
8	155	0	59	Old impression	Kerpen cinema in summer (1986)
9	150	0	15	Current impression	Fountains in Kerpen
10	133	0	92	Old impression	Kerpen Stiftsstraße (1980)

How does the distribution of shares look? Half of the top 10 wall posts by number of shares are private requests and requests for help; the other half are warning notices (see Table 3). One post occupies a high position in the ranking. Of the members, 722 shared the wall post searching for a hit-and-run driver. Two posts

cover the issue of burglary and ask for attention. Six posts are devoted to dogs and cats, for example, dog found, dog poisoned, cat disappeared, and – most horrible – cat halved. On the scale of things, we thus summarize that shares are often used for current events. The more shares, the more historically irrelevant a wall post may, on the surface, seem to be. However, there are exceptions: Posts about burglary are not necessarily historically irrelevant. Shares and likes need little cognitive effort to produce; they represent just one click, a touch of a button, while reading the information on the screen. Contrariwise, producing a comment that might include images and videos along with text requires greater elaborative cognitive effort.

Table 3: Top Posts by Number of Shares.

Rank	Likes	Shares	Comments	Kind of Post	Description
1	58	722	120	Request for help/private	Wanted: hit-and-run driver
2	35	175	205	Caution	Burglary / tramp's sign
3	8	161	33	Request for help/private	Found dog
4	8	92	20	Caution	Poisoned sausages (for dogs)
5	6	87	42	Caution	Dog poisoned in Brügggen
6	24	77	22	Caution	Caution: burglar in Sindorf
7	36	72	35	Report and criticism / private	Sad experience in Kindergarten
8	3	30	27	Request for help/private	Disappeared cat
9	4	27	61	Request for help/private	Cat halved. Offenders wanted
10	1	23	1	Caution	Dog owners! Shots in Marienfeld

The 11 top posts by number of comments include requests, notices, news, one current impression, and one warning (the above-mentioned post about burglary) (see Table 4). A hot topic in Kerpen is an empty apartment tower that has been set ablaze several times. Questions of general interest (e.g., “What do you associate with Kerpen?”) trigger high numbers of comments. The post about the kiosk around the corner describes a shop with an upholstered sofa on the sidewalk in front of the house, which has received many comments. Within the top commented posts, one can identify historically relevant posts (such as the problematic apartment tower) as well as gossip and tittle-tattle (e.g., the kiosk around the corner).

Table 4: Top Posts by Number of Comments.

Rank	Likes	Shares	Comments	Kind of Post	Description
1	23	0	359	Notice	Fire: Apartment tower Maastrichterstraße
2	19	0	353	Request	What do you associate with Kerpen?
3	69	0	299	Current impression	Kiosk around the corner
4	26	0	217	Notice	Fire: Apartment tower Maastrichterstraße
5	16	1	216	Notice	Chinese restaurant closed forever
6	35	175	205	Caution	Burglary / tramp's sign
7	30	0	184	News	Girl gets hit by a car
8	12	0	152	News	Dog feces on lawns
9	5	0	146	Request	Something new? Sindorf station
10	12	0	143	Request	Residential complex at Sindorferstraße?
11	3	0	143	Request	Priority in traffic: Parking lots at Erftkarree

Multimedia Versus Textual Posts

Is there any noticeable difference between multimedia posts (i.e., posts including at least one image or video) and purely textual posts in terms of likes, shares, and comments? In contrast to text, the “right picture tells us what the place really looked like” (Batley, 1973, p. 359).

We divided these two types of posts, and identified 1,261 multimedia posts and 690 textual posts. For each set, we calculated the average number of likes, shares, and comments, and the respective standard deviation, which is a measure for the dispersion of values. A value of 0 implies no dispersion; the higher the value of the standard deviation, the higher the grade of dispersion. To calculate the probability that both sets of posts are indeed different, we applied the method of confidence intervals. In statistics, normally three levels of significance are distinguished: two sets of values are different with a probability (p) of at least 95 %

(marked by one asterisk: *), 99 % (**), and 99.9 % (***). Probability values below 95 % are regarded as “not significant (*ns*).”

Table 5: Multimedia and Text Posts by Numbers of Likes, Shares, and Comments.

	Multimedia (N = 1,261)	Text only (N = 690)	Significant difference?
Average number of likes (SD)	17.77 (30.51)	4.73 (10.29)	***
Average number of shares (SD)	0.24 (5.05)	1.97 (28.85)	<i>ns</i>
Average number of comments (SD)	10.41 (19.71)	19.13 (30.89)	***

SD: standard deviation; *ns*: not significant; ***: $p < 0.001$.

Our results (see Table 5) clearly exhibit highly significant differences (at the 99.9 % level) between multimedia and text-only posts in terms of the average numbers of likes and comments, but no statistically noticeable difference with regard to the average number of shares. Multimedia posts on average received 17.77 likes per item in contrast to only 4.73 likes per textual post. This is nearly four times the amount in favor of multimedia posts. In contrast, text-only posts on average garner 19.13 comments, while multimedia posts only get 10.41 comments. This share is just about double, but this time, favoring textual posts. Obviously, multimedia posts often provoke many likes (meaning “This image pleases me,” and therewith, everything has been said) and only few comments. Text-only posts lead to the opposite type of user behavior. Such posts are moderately highly liked, but also provoke many comments.

Wall Post Categories

We classified each wall post into one of our nine categories. Results of the average numbers of likes, shares, and comments for all categories are presented in Table 6. Outstanding categories according to the average number of likes are *old* und *current impressions*. Both categories received more than 23 likes per post. From this we can deduce people like old as well as new images of their hometown. In contrast to the high number of likes, both types of impressions’ categories only get moderately high numbers of comments (about 11 and 12 comments per post

and actually no shares). Only very few likes per post go to the categories *private* and *request*, but both categories include large numbers of comments (for *private*, 15, and for *request*, 28 comments per post). Private posts and requests of general interest call for answers (comments) rather than for likes.

Only one category received many shares: *Caution*. Wall posts in this category are devoted to current burglaries and to warnings concerning dangerous situations for cats and dogs. Here, rapid information dissemination is vital, and this can be achieved by immediately sharing *caution* posts. Additionally, these posts receive high numbers of comments (29 on average) and moderate numbers of likes (8 on average). All other categories consist of only small numbers of shares or no shares at all.

Three categories attracted out attention concerning the average number of comments: *Report / criticism* (34 comments per post), *Caution* (29), and *Curiosity* (29 as well). *Report / criticism* includes wall posts on vandalism, criticism directed against the city administration, prices of groceries, noise, and so forth. *Caution* posts are about burglaries, electrical failure, threats to one's life, car traffic, radar trap, and so forth. *Curiosity* posts turn on "What is happening?" topics. Posts about the categories *News* and *Notice* receive a sparse number of comments. Users acknowledge news and notices, but do not heavily comment on or share these categories of wall posts.

Table 6: Categories by Average Numbers of Likes, Shares, and Comments.

	Average number of likes	Average number of shares	Average number of comments	N
Caution	8.45	16.31	29.03	29
Curiosity	7.90	0.00	28.93	30
Current impression	23.10	0.05	10.91	330
News	10.03	0.00	6.51	275
Notice	7.88	0.12	9.35	221
Old impression	23.62	0.07	11.80	417
Private (incl. recommendations, request for help)	3.36	2.17	14.82	475
Report / criticism	17.80	1.31	33.83	59
Request	5.10	0.03	27.78	115
<i>All</i>	<i>13.17</i>	<i>0.85</i>	<i>13.49</i>	<i>1,951</i>

Top Topics

Top topics are defined by the absolute number of wall posts, sorted by keywords. We identified three topics as “Top Topics” (see Table 7) and closely considered the content of the appropriate posts. Do these posts provide historically relevant information that can perhaps supplement news articles reported in local newspapers? The top topics reveal moderately high numbers of likes and comments as well as nearly no shares.

Table 7: Top Topics.

	Average number of likes	Average number of shares	Average number of comments	N
Thunderstorm	18.63	0.03	17.67	30
Maastricht Street	21.32	0.04	52.00	25
Highway A4	50.20	0.70	14.95	20
<i>All</i>	<i>13.17</i>	<i>0.85</i>	<i>13.49</i>	<i>1,951</i>

On the topic *thunderstorm*, we found 30 wall posts. Yet in the local press (*Kölner Stadtanzeiger*; June 10, 2014), we found only one article about it. In the wall posts, we read people’s reporting on subjective feelings, concrete impressions of vested interest, and offers of help. In one instance, a person posted about his emotional state on June 9, 2014 at 9:59 pm:

Not again, please. I am totally afraid.

Another person triggered a conversation about a fallen tree:

Post (June 9, 2014 at 10:20 pm): *My friend the tree is dead. Am really sad. Liked my tree.*

Comment (June 9, 2014 at 10:21 pm): *ok chainsaw needed yet.*

Comment (June 9, 2014 at 10:22 pm): *I take the wood.*

After the problem was published, in the next two minutes, part of the problem was solved. One finds many wall posts offering help, for example:

Post (June 9, 2014 at 9:33 pm): *If someone needs help can get in touch because of cellar full of water or so.*

Comment (June 9, 2014 at 9:34 pm): *that’s very nice, X (poster’s name) I’m on hand.*

Comment (June 9, 2014 at 9:38 pm): *I do not live in Kerpen but I’ll gladly help in Quadrath.*

Kerpen's citizenry obviously comment immediately on recent events, and offer help and are willing to prepare for further actions. Such up-to-the-minute information one will never find in printed newspapers.

There are 25 wall posts devoted to the topic "Maastricht Street." This subject is frequently reported in the local press as well, because there are many fires and there is popular discontent on this "eyesore." The *Kölner Stadtanzeiger* covered, among other things, arson attacks on the unoccupied building (June 2, 2014), actions taken by the city administration of Kerpen (June 6, 2014), and security problems experienced by the town's residents (June 26, 2014). In contrast, wall posts concentrate on offenses, personal experiences and hints to handle problems. Here, we describe only one wall post ("our house burns yet again;" June 10, 2014 at 11:15pm), which triggered an intense discussion. One comment documents an offense to some of Kerpen's citizens:

Comment (June 10, 2014 at 11:21pm): *always after 11pm ... what about the people getting up early ??? it is too loud to sleep.*

In another comment, the author presents a detailed assessment of the situation:

Comment (June 11, 2014 at 12:23 am): *However, it is quite annoying that the fire department has to march out. the house is empty and nobody is in danger. every time where this house will be extinguished, human life could be in danger elsewhere, and help comes too late, while this house burns once again. and at present the fire department has to do enough because of the thunderstorm.*

A "nice" piece of advice is offered in the following comment:

Comment (June 11, 2014 at 1:03 am): *then no one should just call the fire department. then it will have burned down faster. if the fire is always put out, however, you have to try it more often.*

It is obvious that one will not find such a comment published by the local press, but such a posting certainly demonstrates the mood of some of Kerpen's citizens. These all provide excellent examples of the type of material a historian might draw on when crafting a narrative that includes elements of history from below.

One wall post on the topic *Highway A4* reports the wrong place-name sign *Bergdorf* instead of *Bergheim* (our top-liked post). This post was in fact the source of an article published in *Kölner Stadtanzeiger* (September 16, 2014):

The new sign with the misspelling ... appeared in Facebook at the weekend and received more than 600 likes within the group "Kerpener für Ex-Kerpener" [the group Kerpener und Ex-Kerpener is meant].

These wall posts and comments share a common thread: they represent subjective estimations of “average” people rather than published news of professional writers or journalists. We believe these statements can be a wonderful starting point for the historian who, when examining events from the perspective of history from below, wishes to include them in her or his research.

Facebook and Cultural Heritage

In a couple of wall posts, group members exchange memories and experiences relating to their native country, region, and city. Often, these posts include images that encourage dialogs among circles of interested readers. We turn to some examples. In Kerpen and the surrounding region, lignite (brown coal) is once more being mined, with some districts being totally eliminated. Inhabitants are being forced to leave their ancestral homeland, and while they receive compensation for a new home, it must be located in a different place. Whole areas (including buildings, streets, and forests) are being dredged and become large lignite mines. Even cemeteries are not immune, with graves exhumed and their contents reburied in new plots in new cemeteries. One bright spot: After exploiting the coal, revegetation of the disturbed land is resumed. *Tagebau Frechen* is a former lignite mine located between Frechen and Kerpen. It is not surprising that old and new images regarding this topic have been posted and have received comments repeatedly. On July 25, 2014, a wall post showed an image of Frechen’s open cast mine in 1994, which applies to that area where the newly created *Marienfeld* is located now. The post has received 100 likes and 21 comments, the latter of which are diverse.

On the one hand, some people rather wistfully remember the lost home in which they were born. On the other hand, the current revegetation is regarded as truly beautiful. Another person wonders at which location a Starfighter crashed in the 1960s. In response to this question, a timeline is begun, and the crash site of the former maneuver in flight and the names of the four dead pilots are provided in a following comment. As further contributions to the discussion ensue, the wall post’s author adds an image around 40 years older than the first one. The photo from the 1950s shows roughly the same location, but this image includes a street with houses, a bridge, cars, and two people visible. On October 19, 2014, someone posts a current picture of the referenced area. It is an aerial photograph illustrating the revegetated landscape. We see many wall posts that are even now historically relevant because the images presented bear witness to a sunken or

altered cityscape. In one instance, former citizens of Alt-Mödrath (i.e., a destroyed city before resettlement) tell their stories and reminisce together.

Concerning cultural heritage, one must identify at which location and at which time an event described by a textual post or even a photo happened. What follows is a paradigmatic example. On July 11, 2014 at 11:01 pm, an author posts two images and mentions in the text:

Cardinal Frings in Kerpen. I don't know the year.

A day later, another person offers a first idea:

Comment (July 12, 2014, at 2:41 am): *approximately 1950 I think.*

In another comment, the date stamping becomes more exact:

Comment (July 14, 2014 at 1:47 pm): *Yes that's right [name of the first commenting author], at this time I was about 6 years old, on the left image beside the priest.*

Based on the two comments, an accurate time stamp has been determined: the photos were taken in 1950.

As regards the current talking point, such dialogs contribute experiences, ideas, and solution possibilities intragroup. These interactions may lead to enrichment and innovation. Individual group members remember former events, tell personal stories, and share their knowledge with other (perhaps not personally known) people. Not every wall post or comment includes historically relevant aspects; many simply touch on Christmas greetings or private interests, notices, and requests. We always must consider that these contributions to a discussion are not being made by professional historians, but rather by laypeople. We are thrilled to witness, however, the rich networked exchange of images, videos, and ideas, that is, activities accomplished by the “crowd.”

How shall we go about identifying and preserving historically relevant Facebook content? The conservation of Facebook data is important, especially in the long run, “when Facebook is gone” (McCown & Nelson, 2009, p. 251). The retrieval functionality of Facebook is suboptimal. Although one can search for keywords from inside Facebook groups, there are no elaborated search functionalities, such as Boolean operators (and, or, not), brackets, proximity operators, or algebraic operators, for example, dates (Stock & Stock, 2013, ch. D.1). There is no sorting function, which meant we could not sort posts according to their numbers of likes, comments, or shares. Additionally, Facebook fails to offer a function for output and download of posts and comments. Archivists are thus forced to intel-

lectually gather and manually download desired sources. To accomplish this, we think the decision criteria for assembling historically relevant and credible sources should include the following conceptual markers:

- a high number of posts per topic in a given time interval (e.g., a year) (one must know which topics are relevant – we performed our searching by indexing all posts via categories and keywords),
- a high probability of historical relevance exists for the categories *old impression*, *current impression*, and *news*; additionally perhaps selected posts from the *notice* and *report / criticism* categories,
- historically relevant multimedia posts (images, videos) have a moderately high number of comments and a high number of likes,
- some wall posts of historical relevance exhibit a high number of comments,
- high numbers of shares seem to be indicators for rapid requests and warnings that are seldom historically relevant.

There are different ways to download wall posts and comments from Facebook (McCown & Nelson, 2009, pp. 252 f.):

- copy and paste screenshots or text and images into a word processing program,
- import even large quantities of data into an HTML file (this was our approach – but nearly all comments will be missed in this way),
- apply the Facebook Application Programming Interface (API)¹² or any other API working with Facebook content (e.g., restfb).¹³

Due to Facebook's insufficient retrieval and output functionalities, we have determined at this point, archivists no doubt will find it a considerable challenge to process and store posts and comments from this SNS, at least from our experience working with our dataset.

Conclusion

Does Facebook provide sources to use for historical science? Sources and objects common to material culture, such as texts, events, objects, buildings, images, and videos, connect humans to both their present world and the past. Professional

¹² <https://developers.facebook.com/docs/graph-api>

¹³ <http://restfb.com>

historians describe, verify, analyze, and evaluate historically relevant sources and place them within their historical context. When practicing historical science, we must remember to be inclusive in choosing source material; we should not train our focus solely on global events because greater events often depend on many smaller developments. History from below or the practice of microhistory must include the development of smaller regions, cities, or people living at a given place and in a particular time. On Facebook, non-experts or, sometimes, amateur historians publish digital sources about all of the above-mentioned regional aspects. We think two challenges exist if one hopes to use Facebook posts in historical science, namely, the huge amount of the data and its very credibility. To manage the increasingly huge datasets, methods of quantitative history in terms of Facebook metrics are essential.

In our case study, we were able to demonstrate that specific distributions of posts per topic, as well as likes, comments, and shares per post can help in selecting historically relevant topics and posts from among all other less relevant topics and posts. The data's credibility can be detected by analyzing and evaluating dialogs occurring between posting and commenting authors. For example, we could demonstrate how Facebook users might approach verifying the correct date stamping of a photo. In sum, Facebook can be an important historical source record that complements other historical sources. On Facebook, one can find information that would rarely will be found elsewhere: first-hand impressions, images, and comments from the “common people.”

Since we worked with only one case study, further scientific investigations must analyze other Facebook groups whose members demonstrate an interest in historical aspects of their environment. Additionally, the application of Facebook metrics should be broadened and calibrated. Taken together, however, we think this combination of two academic disciplines – information science and history – proved successful as a research method, one that can be expanded to include other SNS groups whose postings and observations may help produce a fuller historical record of both our time and place, along with those in the future.

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Chapter 9. Social Media as Channels for the Public Communication of Science: The Case of Spanish Research Centers and Public Universities

Abstract: Currently, the Web is valued as a key channel in the informal teaching of science. Despite that, studies on using social media's tools for the public communication of science are still scarce. The objective of our research is to analyze how Spanish research centers and public universities used Facebook, Twitter, and YouTube to communicate their scientific results to society. Three aspects were assessed: presence (if these institutions registered a profile on social media), connectivity (followers on their public profiles), and intensity (this latter element referred to the number of publications registered on their profile during a one-month period for three consecutive years).

The methodology includes the design of an ad hoc checklist, making it possible to compile and analyze data relating to the three above-mentioned aspects. The analysis was carried out in December 2012, 2013, and 2014. From among the principal results, note that the presence of the analyzed Spanish research centers and public universities by way of channels specializing in disseminating science on these three social media websites remains incipient. Nevertheless, the general tendency is for such institutions to use these channels to disseminate their scientific production to the general public. Approximately one-third of the centers analyzed do make use of Facebook and Twitter to transmit knowledge specializing in science; approximately one-sixth do the same on YouTube.

Keywords: Scientific Communication, Digital press, Science Journalism, Social Media, Facebook, Twitter, Youtube.

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Introduction

The emergence of the Web has returned science to the public sphere by opening a channel of interactive communication allowing for disintermediation in the conversation between scientists and society. Given the current sharp decline in scientific vocations in Europe (European Commission, 2012), social media is offered as the most prominent way to bring science closer to digital natives (Prensky, 2001). Prior to 1998, academics had not focused their studies on the Web as a channel for disseminating scientific knowledge (Eveland & Dunwoody, 1998). Its capacity to generate debate and discussion about scientific issues, however, has encouraged researchers, chiefly British and American (Delborne et al., 2011; Triunfol, 2004) to fix their attention on this source of knowledge exchange.

Currently, the Web is valued as a key channel in the informal learning of science (Eveland & Dunwoody, 1998; Lederbogen & Trebbe, 2003; Weilgod & Treise, 2004) due to its capacity to transform the process of understanding from passive memorization to active involvement (Weilgod & Treise, 2004). The research objective offered in this chapter is to study an analysis of how Spanish research centers of Consejo Superior de Investigaciones Científicas and public universities used Facebook, Twitter, and YouTube and other tools such as web logs (blogs) or news channels to communicate their scientific results to society. Essentially, three aspects have been assessed: use of the tools (if these institutions registered a profile on social media), connectivity (followers on their public profiles), and intensity (this latter element refers to the number of publications registered on a university's profile during a one-month period for three consecutive years). The methodology used includes the design of an ad hoc checklist, making it possible to compile and analyze data relating to these three aspects.

Social Media and the Dawn of the Digital Age

Tim Berners Lee has observed the emergence of the Web in the 1990s changed the way people communicate and exchange information (Pinger, 2015). It has evolved as a living universe in which the survivors have been the fittest and best adapted to the profound change introduced by this new media (Asensi, 2013). This process of survival has been defined as “digital Darwinism” (Schwartz, 1999) and has been accentuated starting with the change from Web 1.0 to social media (or Web 2.0). During the earliest period, the Web functioned as a reading vehicle, a digital forum where information prevailed and communication was one-way. It has evolved into a socialization platform (Turkle et al., 2006), which holds a vast

store of knowledge deriving from the large amount of research and innovation produced through the talent, imagination, audacity, and intelligence of the network's users (Flores, 2009).

Castells (2001) states that with social media, the Web has globalized and encompassed the planet. Others go even further (Sáez-Vacas, 2004) and point to the emergence of the social web as the start of the digital age and of the universal digital network. The social media concept began in a brainstorming session between O'Reilly and MediaLive International in 2004 (O'Reilly, 2007). The bursting of the technological bubble and the collapse of the dotcoms in the autumn of 2001 led the companies that had survived to raise the possibility of a crucial change in the direction of the Web. With that possibility, it made sense to issue a call to action such as that entailed by social media. The response was positive, and in 2004, the social media concept began to claim an identity of its own at the *Web 2.0 Conference*. Only 18 months later, the term *social media* had become rooted in society, as observed by 9.5 million Google hits (O'Reilly, 2007).

O'Reilly (2007) gave definition to social media with the establishment of seven constituent principles: the Web as a platform, the harnessing of collective intelligence, the management of databases as a basic competence, the end of the software release cycle, the search for simplicity, software above the level of a single device, and rich user experiences. Cobo-Romaní and Pardo-Kuklinski (2007) distill these seven principles even further; they perceive them as forming an architecture of participation, intercreativity, collective intelligence, and intelligent multitudes.

Other, more simplistic definitions of social media that – while agreeing on the difficulty of putting limits on such a mutable concept – explain it by starting with three basic values: interaction, participation, and exchange. Furthermore, and in contrast to Web 1.0, social media is characterized by the services it offers rather than by the software employed, and its platforms include all the devices that can be connected to the Web, instead of only personal computers (Chen, Yen, & Hwang, 2012).

Thus, with social media, the Web was transformed into an open universe of ideas (Acord & Harley, 2013), which generated a new public space (Castells, 2001; Middaugh & Kahne, 2013; Papacharissi, 2002) for citizen participation. The idea of the network converted into a social space has also been influenced by Fumero and Genís (2007) who value its capacity to create a true society of information, communication, and knowledge.

It is a mass phenomenon (Flores, 2009) that has brought about a revolution in the field of communication (Mansell, 2002; McChesney, 2007), a space where speaker and receiver exchange roles and participate in a mutual dialog (Kiouisis, 2002). In this regard, Castells (2001) speaks of the appearance of a new concept

associated with social media, “mass auto-communication”: *auto* because an individual can generate the message, define the receivers, select the content, and choose the channel, and *mass* because it reaches a global audience.

Interactivity and the exchange of information are part of social media’s nature as mentioned above. Interactivity describes the essence of this new media, wherein communication is a dynamic process. Also, it can be defined as the degree to which a communication technology can create a mediated environment in which participants can communicate (one-to-one, one-to-many, and many-to-many), both synchronously and asynchronously, and participate in reciprocal message exchanges (third-order dependency) (Kioussis, 2002). McMillan and Downes (2000) highlight the same concept when referring to interactivity as the possibility an individual can perform the roles of speaker and receiver simultaneously. It is participation encouraged by the possibility of producing content, whether individual (blogs) or shared (wikis), generating tags to catalogue different content, and personalizing sources of information (Alonso, Lafuente, & Rodríguez, 2008).

Christakis and Fowler (2010) broaden the definition of the concept and assert that, thanks to the Web, interacting with others is translated into enormity (referring to the vast number of people who can be reached), communality (sharing information and contributing to collective efforts), specificity (an increase in the particularity of the ties that can be formed), and virtuality (in the sense a person can have two identities – one online and another offline).

For his part, Cover (2006) insists audiences’ inhabit active and creative roles. To illustrate, he draws an analogy between the function currently served by the Web and that of the theater in ancient Greece. In both scenarios, the user is an active party, with a capacity to transform the message and give it new meaning. Thus, we arrive at the creative audience of whom Castells (2001) speaks when referring to the new mass communication media whereby the dialog is horizontal. In effect, the speaker-channel-receiver process ceases to be vertical and transforms into a circle in which all roles become interchangeable, and a person finds not one but rather multiple channels, which favors information exchange (Castells, 2001).

Tools of Social Media

Social media offers tools that can be grouped around four areas (Cobo-Romani & Pardo-Kuklinski, 2007): 1) social media sites, 2) tools for generating content, 3) social and intelligent organization of the information, and 4) applications and

services. At the same time, we find simpler classifications (Fumero & Genís, 2007) that synthesize social media tools around three areas: 1) blogs, 2) social media sites, and 3) applications, including proposals (Flores, 2009) that emphasize only social networks and blogs as the principal symbols of sociability.

Social Networks

This area includes tools that facilitate configuring communities and social exchange. With them, the Web is a means to consume information, but also a way to communicate, to entertain, to share experiences, content, and values, or to remain up-to-date with current information (Java et al., 2007).

In Spain, social media erupted in 2008 but did not consolidate until 2010, the year in which such sites began to form part of day-to-day use of the network and became another tool for communication. Currently, such sites rank third among the services most popular with web users, at 61.2%, behind email and instant messaging (*Asociación para la Investigación de Medios de Comunicación*, 2014).

Of the multiple social media that exist in the Web 2.0 universe (e.g., Messenger, Tuenti, Twitter, YouTube, Skype, MySpace, Flickr, Badoo, Google Plus, and LinkedIn, among others), Facebook has achieved the greatest success. This social media site created by Marc Zuckerberg in 2004 is the second most-popular site in the world, behind only Google in the rankings of Alexa (2014) and Comscore (2014). It has more than 1.3 billion users in the world (ABC Tecnología, 2014) and 18 million in Spain (Comscore, 2014), making it in both Spain and internationally, the website with the second largest audience, close behind Google.

In the context of specialist social media, YouTube has secured the highest level of social acceptance. It is the third most-visited site in the world behind Facebook (Comscore, 2014). YouTube was created by Steve Chen, Chad Hurley, and Jawed Karim in 2005, and it is the most-visited website in Spain with more than 20 million users (*Asociación de Investigación de Medios*, 2014).

The microblogging network Twitter, founded by Jack Dorsey and Evan Williams in 2006, is notable for the important role it has played in social movements and cultural transformations over the past decade. It is one of the 10 most-popular sites on the Web and saw its definitive expansion following the June 2009 election in Iran. After the news blackout ordered by the Iranian government, Twitter became the main source of information inside and outside of Iran. It already has more than 220 million users throughout the world, and reaches 10 million followers in Spain (Comscore, 2014).

Since its inception, Twitter has stolen the limelight from blogs, which had been one of the most important communication tools of social media. Twitter dic-

tates a more condensed means of communication (Java et al., 2007) and attracts more users than blogs because its use requires less of a time investment. In addition, tweets are more active because they cannot exceed 140 characters, forcing authors to choose words carefully to rapidly update content at frequent intervals. This is in contrast to the more typically measured composition of a weekly or even monthly posting schedule, which in general has applied to blogs or longer-form web posts.

Content: Blogs

This area consists of the tools that favor online reading and writing, as well as the distribution and exchange thereof. The blog, shortened from *web log*, is the tool par excellence of social media (Fumero & Genís, 2007). Blogs quickly became a key element of online culture and are considered as a chief element of knowledge exchange (Chen, Yen, & Hwang, 2012). With a popular subject, a blog can attract attention and exercise considerable influence on society. Notable examples of topics that found blog audiences include the “war against terrorism” after 11 September 2001, arguments concerning the war in Iraq, and the 2004 U.S. Presidential election (Hsu & Lin, 2006).

The success of blogs is due to several factors, for example, they are easy to use, they involve little or no cost, they are interactive, they put a human face to organizations, and they combine qualities of credibility, immediacy, directness, and “infectiousness.” Furthermore, blogs are unobtrusive, can be consulted by any level of the public readership, bestow authority and influence, allow for reaching audiences who have abandoned other media, create community, contribute to increase an organization’s network visibility, reinforce organizational culture, and can help keep communication flowing in times of institutional crisis.

This has boosted the development of what is known as *blog culture*, the most remarkable facets of which are the wish and the desire to share ideas and experiences (Fumero & Genís, 2007), the growing importance of knowing what others are thinking, the culture of speed, and the need for knowledge. In addition to blogs, other tools that can be integrated in the area of content management and creation are wikis, is a website which allows collaborative modification of its content and structure directly from the web browser, applications for photographs and videos, calendars, and online spreadsheets, among others.

Social and Intelligent Organization of Information

This label includes tools and resources used to tag, syndicate (distribute content), and index information and resources available on the Web, thus facilitating arrangement and storage. Readers for Really Simple Syndication (RSS), Atom (text editor), RDF (Resource Description Framework), OPML (Outline Processor Markup Language), and the search engines as well as the bookmarks of favorites created to store, tag, and share links are deemed tools for the intelligent organization of information.

Applications and Services

These are resources created to offer end-user services with added value; they encompass such tools as project management (used for managing and team-working), WebTop (offering the same functionalities as a desktop including information management, feeds or news readers, and communication channels), web storage (both free and at cost), and music players.

The Web: New Portals for Scientific Communication

Prior to 1998, academics had not focused their studies on the Web as a channel for disseminating scientific knowledge (Byrne et al., 2002; Eveland & Dunwoody, 1998). Its capacity to generate debate and discussion about scientific issues, however, has encouraged writers, chiefly British and American (Delborne et al., 2011; Triunfol, 2004) to turn their attention toward this source to study its potential to function as an inexhaustible of knowledge for the multitudes (Shirky, 2010).

Scholars of public communication in science, such as Weilgod (2001), assure us that for various reasons, the Web has radically changed the relationships between the actors in communicating scientific awareness and understanding. First, the Web allows scientists and their organizations to communicate directly with their audiences. Furthermore, it eliminates time and space restrictions inherent to traditional media. At the same time, it combines the in-depth capacity of the published press with opportunities to interact and communicate with users via social media. Finally, it facilitates instantaneous communication one to one, one to many, many to one, and many to many.

Thus, the Web has returned science to the public sphere. After more than a century of isolation, scientists are back before the public. This time, the process does not involve mere spectators who attend the presentation of science, but rather includes active agents who can learn, evaluate, assess, share, participate, and decide (Brossard & Scheffele, 2013).

The social web has allowed for disintermediating public communication in science, reviving the ideal of the democratization of knowledge, bringing down the scientist from an inaccessible ivory tower and into an agora open to citizens (Baron, 2010; López-Pérez & Olvera-Lobo, 2015; Olvera-Lobo & López-Pérez, 2013a, 2013b, 2014). In the past decade, many writers have listed the possibilities offered by the Web for a communication of science that is not only public, but also academic. In short, the shockwave from the network has permeated the entire research and development system, from brainstorming to scientific production, passing, of course, through assessment and dissemination.

Valued as key channels for informally learning science (Eveland & Dunwoody, 1998; Lederbogen & Trebbe, 2000; Weilgod & Treise, 2004), scientific websites can transform the process of understanding from one of passive memorization to active involvement (Weilgod & Treise, 2004). In this regard, while young people use the Web mainly for entertainment (Ferguson & Perse, 2000), they occasionally do search it to obtain additional information for their academic tasks. Thus, what at first functions as an educational resource can later become a repeat-visit site, provided it is adapted to digital natives' concerns and forms of communication (Weilgod & Treise, 2004).

The Web is put forward as a means to accelerate the urgent need for dialog between scientists and the public (Lederbogen & Trebbe, 2000) and as having the capacity to eliminate belief in the magical abilities of scientists, while achieving greater public support for research through knowledge and mutual trust. Science websites thus constitute important tools in curbing scientific illiteracy, promoting positive attitudes toward science, and fostering scientific vocations (Ebersol, 2000). In this sense, the frontier between professional communication and conversation with the public has been made much more permeable by the Web, facilitating society's access to a course previously private and favoring the "disintermediation" of science (Trench, 2008).

Mainstream media are not the only parties responsible for the scientific culture and education of citizens. Now, researchers and public institutions can accept more easily roles in taking the conversation about science into the public sphere (Batts, Anthis, & Smith, 2008; López-Pérez & Olvera-Lobo, 2015; Olvera-Lobo & López-Pérez, 2013a, 2013b, 2014). Nevertheless, they must do so in an open and accessible way. Although it is true that on the Web, what goes on behind the scenes in science and discovery remains to be revealed, all too often

the process of scientific production is presented as a dialog encrypted in the specialist language of the experts, continuing to be inaccessible to the layperson.

Specifically, results from comparable papers in Germany and Poland (Jaskowska, 2004; Lederbogen & Trebbe, 2003) conclude the majority of universities and research centers use websites more to promote themselves before professional and commercial audiences than to share information with different social groups. Yet it is essential that scientific organizations use their websites to communicate science to every member of the public. A notable example can be observed in the approach taken by the U.S. Aeronautics and Space Administration (NASA) (<http://www.nasa.gov>) and its channels that are specialized, depending on toward which segment of the public the information is aimed – general society, educators, and the media (Weilgod & Treise, 2004).

The Potential of Social Networks: Twitter and Facebook

As opposed to the numerous papers focusing on blogs and their dual function as means of communication *inter pares* and between scientists and society, we found few references to the other worthy tools of social media. Studies analyzing the role of social media sites, such as Facebook and Twitter, concerning the democratization of scientific knowledge (Kouper, 2010; Waters, 2000) are scarce. Indeed, the meager existing scientific literature concentrates principally on Twitter's potential to improve social communication of health-related subjects. In this regard, writers such as Hawn (2009) note the ease with which this microblogging network can be accessed and used, making it a vital channel not only for dissemination but also for citizen participation and the evaluation of research in the health field.

From the point of view of both user and producer of content, microblogging facilitates rapid, daily publication, and requires only a few minutes from the user to read or consume the message. In contrast, the extended temporality of blogs may require greater effort on the user's part and thus can reduce their ability to attract a wider public audience. The microblogging site Twitter contributes to increasing the visibility of scientific production (Shuai, Pepe y Bolen, 2012). It has demonstrated considerable capacity as a loudspeaker for disseminating information and knowledge among experts, such that communication through Twitter makes it up to 11 times more likely that an article will be cited (Shuai, Pepe y Bolen 2012).

In the Spanish case, research into evaluating the Web as a channel for public communication in science has centered on the public itself and the ways its members use the network to inform themselves about the discipline. To date, academic studies undertaken in this field have not addressed how or whether Spanish scientists are using social media tools to explain their research results to citizens.

However, data obtained from the *Encuestas de Percepción Social de la Ciencia y la Tecnología* [Social Perception of Science and Technology Surveys] (*Fundación Española de la Ciencia y la Tecnología*, 2011; 2013) emphasize the value of social media and its tools in communicating science to youth, most of whom – some 75 % in 2010 and around 84 % in 2012 – turn to the Web to inform themselves about science and technology (Vázquez, 2013). Regarding the channels most often accessed to gain information about science through the digital universe, the observed influence of social networks, blogs, and specialist media has increased, while the impact of generalist media has decreased.

This is beneficial for not only the young but also the population in general, whose members point to the Web as their primary source of scientific information. Some 40.9 % of respondents in the 2012 *Encuesta de Percepción Social de la Ciencia y la Tecnología* turn to the Web to learn about the latest advances in research, compared with 31 % who prefer television, which is far removed from the general information dailies turned to by 7.9 % of citizens. As with young people between 14 and 25 years of age, the penetration of social networks, blogs, and specialist media has increased, while that of generalist media has declined.

Thus it appears reasonable to assert that social media and its tools must present themselves as an absolutely essential way for public institutions to communicate their scientific results to citizens (Moreno, 2013). Doing so could also lead to overcoming one of the chief handicaps various writers point out when discussing the possibility of using the Web to publicly communicating scientific information: namely, the lack of expert vetting that determines the veracity of opinions and assessments about the research being presented (Moreno, 2013; Vázquez, 2013).

Materials and Methods

The larger part of Spanish scientific production is carried out in public research centers integrated into the public universities and the *Consejo Superior de Investigaciones Científicas* [CSIC]. To extract results from the state sector grouping, we selected the 132 research centers, institutes, and units that make up the CSIC and

the 50 public universities that provide education in the different regions of Spain (Ministerio de Educación, Cultura y Deporte, 2012).

The choice of public universities meets our interest in homogenizing the study subject and avoiding any biases that might be brought about by the manifest differences between public and private universities. At the same time, we consider it is public universities that, by their very name, should uphold the greater social responsibility in everything referring to publicly communication scientific knowledge. The selection of public universities corresponds to the selection established by the Ministry of Education, Culture, and Sport (2012).

The analysis was carried out over three periods: from 1 to 31 December 2012, 2013, and 2014. The same month in three different years was chosen to determine the development undergone by the centers in the preceding 12 months as well as to use in analyzing any future trends that might be deduced.

Methodology

The analysis was performed with regard to the prior design of an ad hoc checklist and was structured around three areas of analysis: tool use, connectivity, and intensity (see Table 1).

Table 1: Ad Hoc Checklist to Analyze CSIC Research Centers and Public Universities.

General information		
Name		
Scientific subject		
Date of analysis		
URL of site		

Web 2.0 tools		
Content		
Blogs	Yes	No
	Nº	
Monthly posts	Nº	
Dissemination channel	Yes	No
News channel		
Monthly news items	Nº	

Social networks		
Use		
Facebook	Yes	No
Twitter	Yes	No
Youtube	Yes	No
Connectivity		
Number of followers		
Facebook		
Twitter		
Intensity		
Number of followers		
Facebook		
Youtube		
Twitter		
Research areas		
News channels		
Dissemination of research		
Facebook	Yes	No
	Nº	
Twitter	Yes	No
	Nº	
Youtube	Yes	No
	Nº	
	Nº	

Intelligent organisation of information		
RSS channel	Yes	No
Applications or services	Yes	No

The tools studied were blogs and news channels; the social media sites Facebook, Twitter, and YouTube; and content syndication channels and other applications (apps) that include video and audio players, among others types. In this regard, it is important to note that profiles dedicated exclusively to scientific dissemination were those chosen for our analysis.

Connectivity has been evaluated by quantifying the number of followers of the two social media sites Facebook and Twitter, which takes into account an indicator of communication effectiveness. In other words: a bigger audience leads to greater effectiveness.

Regarding intensity, this refers to the number of publications available on the social media sites Twitter, Facebook, and YouTube. This area includes quantifying the number of publications destined specifically to disseminate research accomplished by the center. As with connectivity, this value also allows us to infer effectiveness: the greater the number of publications that communicate the research undertaken by the centers, the more effective is the channel and the greater the impact it can have on society.

Results

Public Universities

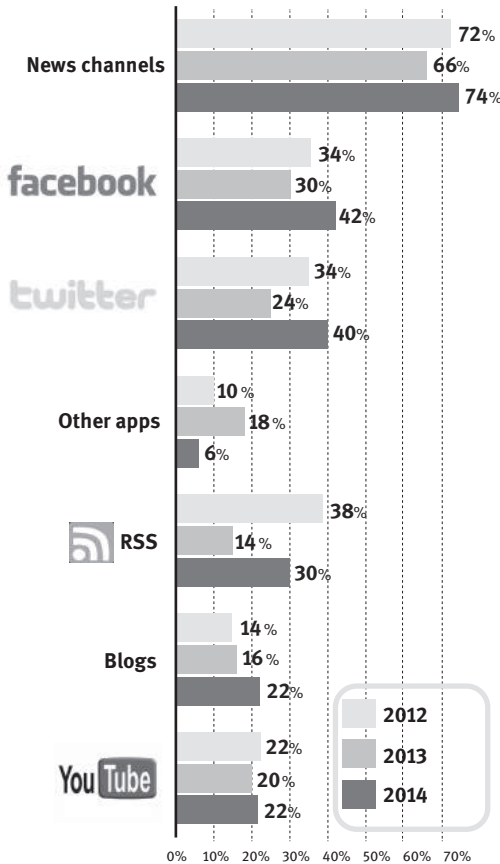
Use of tools. Spanish public universities are aware of the Internet's importance as a means of disseminating science: 70 % of them have a channel specifically for disseminating scientific knowledge, a value that was consistent across the three periods we analyzed.

News channels are the tool most widely used by universities, and the least used are other apps and blogs. Although the percentage of centers using the latter – which is considered one of the main channels of dissemination – is low for the three periods analyzed, it is interesting to highlight the progressive trend in its use since 2012, when only 14 % used it, and observing its rise to 22 % in 2014.

This increase is significant because it shows the tendency of universities to consider this tool as an effective means of making their research work publicly available. This general trend is upward in terms of social media tool use if we examine data from 2012 and 2014. On the other hand, 2013 was a bad year for universities, as they made less use of all of the channels studied with respect to the previous year. This trend changes significantly in 2014, particularly on networks such as Twitter, which went from being used by 34 % of universities in 2013, to 40 % in

2014. It is difficult to explain why it happened but we can speculate that this situation it should be a result of the economical crisis that Spain is suffering currently.

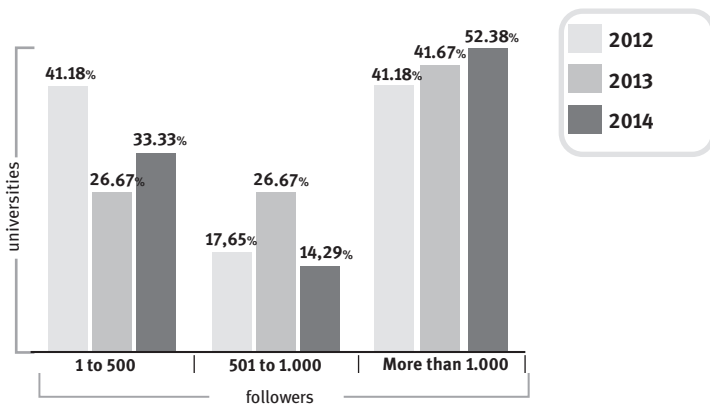
Of participants, 42% also use Facebook, and YouTube remained at around 20% over those three years. This shows that, despite the economic crisis affecting the Research, Deployment and Innovation system, universities are starting to realize these channels' importance in bringing the universities' work closer to the general public and, above all, to young people in particular. The latter are, after all, a university's target audience (see Graph 1).



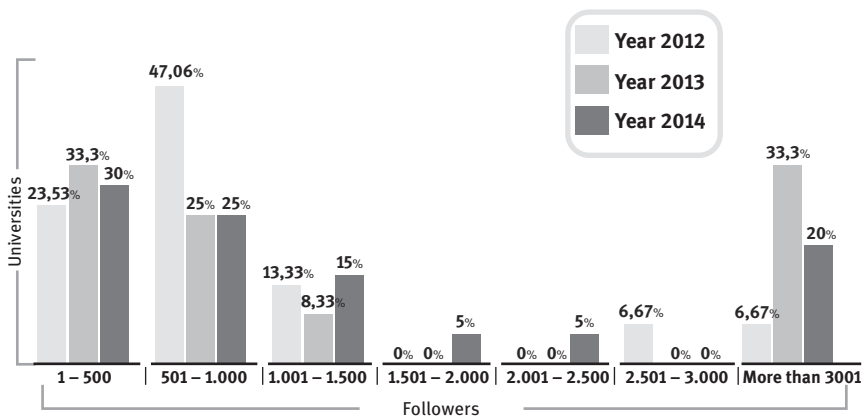
Graph 1: Use of Social Media Tools in Spanish Public Universities.

Connectivity and intensity. Although it is true the majority have a greater presence on Web 2.0, this presence is not effective if we take into account data on connectivity and intensity. More than a third of universities have fewer than 500 followers each Facebook and Twitter. Although the remainder, approximately 70%,

exceed this number, none has more than 10,000 followers on both Facebook and Twitter in the three years analyzed. This could indicate that, although university faculty and staff may avail themselves of these tools, they are not creating effective outreach strategies that attract the public. In this regard, it is important to point out the difficulty of finding social profiles dedicated to popularizing science on the universities' websites. They were not provided on the homepage in any of the cases, and many of them could not be located, even on pages devoted to university research. We were compelled to look in other subsections, such as the Office for the Publication of Research Results or the Scientific Culture department to find them.



Graph 2: Evolution of the Number of Spanish Public Universities According to Facebook Connectivity.



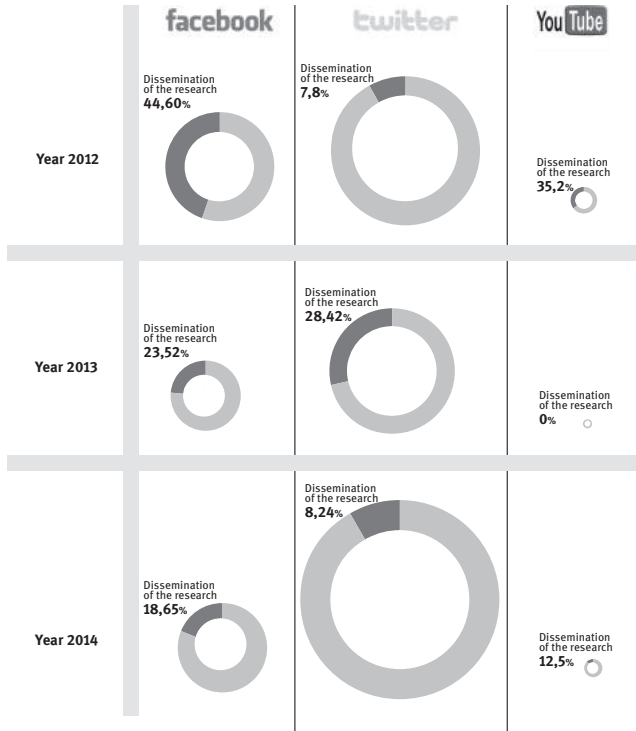
Graph 3: Evolution of the Number of Spanish Public Universities According to Twitter Connectivity.

Such a *lack of visibility undoubtedly makes increasing the number of followers a challenge, as most of the time, users must execute a selective search to locate these profiles*. Making the effort to maintain a Web 2.0 presence and to feed the various channels is of little use if nothing is then done to ensure people know they exist. One of the main advantages of social media is their ability to reach a large section of a heterogeneous audience simply and directly. If this cannot be achieved, it makes little sense to expend resources to create channels at all.

Furthermore, it should also be noted that, although these channels are specifically for scientific outreach, the percentage of research results being published is very low across all available tools (López-Pérez & Olvera-Lobo, 2015; Olvera-Lobo & López-Pérez, 2013a, 2013b, 2014). News channels barely exceed 30 %: on Facebook, the share is around 20 %, and on Twitter, it varies between 10 % and 30 % (see Graph 4). In the case of YouTube, the result is the same, both in terms of content publishing in general, and of specific information on the research carried out in particular. This may be due to the complexity and quantity of resources necessary to create audiovisual content.

We found that public universities are not harnessing the communication potential of social media tools to make their research work public. Rather, they use them to highlight outreach activities, such as congresses and conferences. Finally, while they work on outreach, they do not explain what scientific results are being obtained via the expenditure of public funds. This is a critical process not only for gaining public support but also because doing so might encourage the development of R&D&I, and, as public institutions, they are obligated to keep society informed.

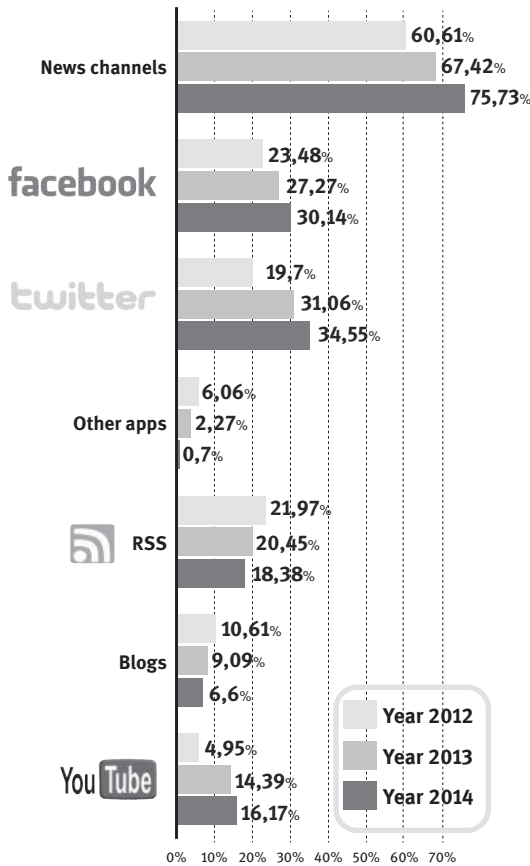
Biology and biomedicine are the subjects most often featured. Universities pay attention to topics of the greatest interest to society – in this case, health. In other words, we could state that in some way, the universities themselves are contributing to this “medicalization” of scientific information by giving more prominence to this area over others. Finally, we want to note universities in Andalusia and Madrid are those most often using Web 2.0 tools to broadcast scientific content to society at large, and to the younger generations in particular.



Graph 4: Dissemination Intensity of Spanish Public Universities' Research on the SNSs Facebook, Twitter, and YouTube.

CSIC Research Centers

Use of tools. The general trend in the case of Consejo Superior de Investigaciones Científicas centers is positive in terms of the use of Web 2.0 tools (López-Pérez & Olvera-Lobo, 2015; Olvera-Lobo & López-Pérez, 2013a, 2013b, 2014). This points to a promising future and is indicative of the growing interest that CSIC centers are showing in publicly communicating scientific discoveries. In fact, in 2014, more than one-third of centers had both Facebook and Twitter profiles, and 78.7% had news channels. However, the use of blogs is still very uncommon (see Graph 5). The constant updates this resource requires, along with the effort to make content more complete and complex, may be slowing this tool's growth.



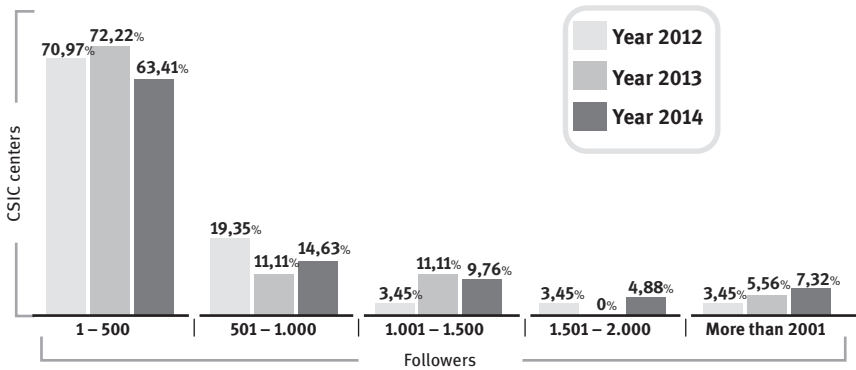
Graph 5: Use of Social Media Tools by CSIC Centers in Spain.

It should be noted that CSIC has had an institutional blog since 2014, which it publishes in the digital edition of the *20 Minutos* newspaper. In addition, it has listed the personal blogs of Council researchers – a total of 25 – on its website (www.csic.es) since the end of 2013. This demonstrates the Council’s interest in this tool.

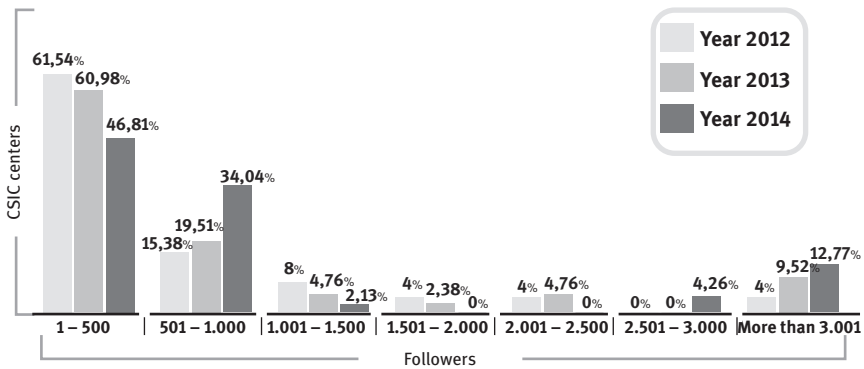
Moreover, we should also add the institutional profiles of the Consejo Superior de Investigaciones Científicas as an organization. It has two Facebook profiles, one general and another specifically for outreach, along with two Twitter profiles. It also has both a YouTube and a news channel. The profiles of the CSIC Delegation in Andalusia and the Casa de las Ciencias [House of Science] museum in Seville on both networks are noteworthy as well.

Connectivity and intensity. Although the trend in tool use is an upward one, connectivity continues to be very low. Many of the CSIC Centers have less than

500 followers on both Twitter and Facebook 500 followers in Facebook and Twitter (see Graphs 6 and 7). These values remained constant over the three years analyzed despite the passing of time, which undoubtedly helps to increase the number of users. This may suggest, as in the case of the universities, a lack of an outreach strategy for these profiles. In many cases, their lack of visibility on the centers' homepages and websites may also be having an effect. They are often placed in subsections or spaces users may find tedious to locate, such as at the bottom of a web page.



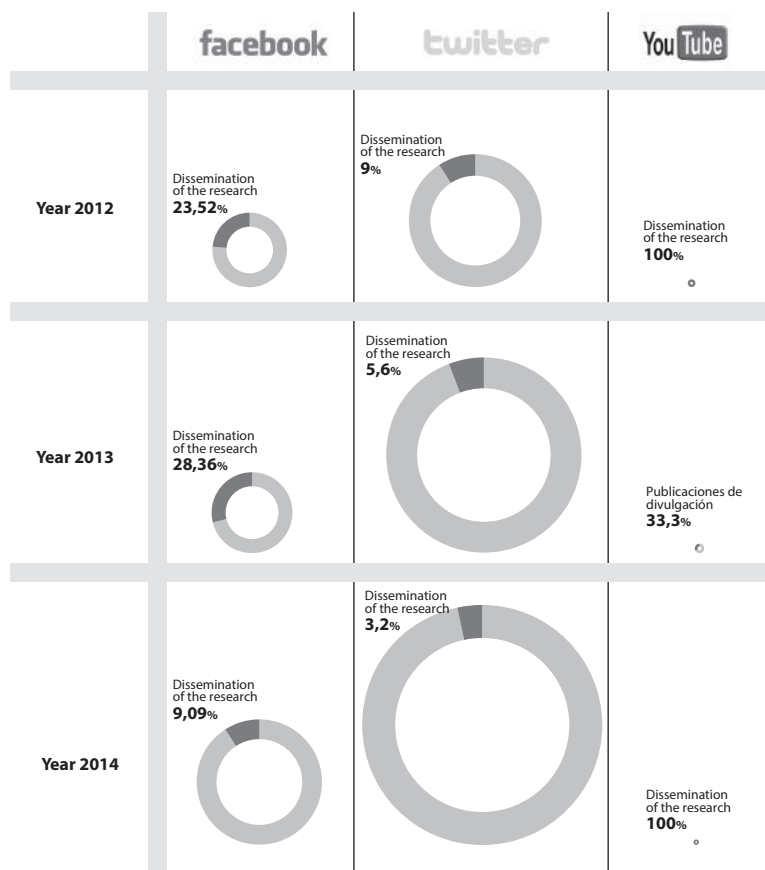
Graph 6: Evolution of the Number of CSIC Centers According to Facebook Connectivity.



Graph 7: Evolution of the Number of CSIC Centers According to Twitter Connectivity.

Furthermore, the lack of followers may also suggest that, although the centers are increasing their presence on Web 2.0, doing so may be aimed more at attracting experts in the same field than the wider public. In any case, having a presence is of little use if it has no effect. In this regard, the Senior Scientific Research Council

is already helping to publicize these profiles by including on its website a section entitled “Social Networks,” which publishes links to the centers’ social profiles.



Graph 8: Dissemination Intensity of CSIC Centers’ Research.

This strategy will undoubtedly help attract followers, but the centers themselves must consolidate their presence on Web 2.0 with more effective communication strategies. In many cases, this lack of interest is due to resource shortages and even a lack of responsibility in disseminating scientific results. Although the number of followers is increasing, the centers’ social network profiles face another handicap: their scant use of these tools to publish scientific results. As explained in our results, over the three-year period of our analysis, comments aimed at disseminating research barely account for 10 % of the total (see Graph 8). Therefore, the initial objective of these new channels, which may be to allow

centers to fulfill their social responsibility of informing the public where public funding is being invested, is not being met. Rather, the sites are being used to advertise congresses, conferences, outreach activities, and the like, as we have observed occurring with the universities.

In sum, it appears universities have not yet moved away from the concept of public communication of science as a one-way dialog. It continues to be treated in the traditional manner: experts teaching a lay audience about science, instead of using their discipline to create a dialog in which they relate what they are doing, so their public can participate in the process and assess progress. Regarding those sub-disciplines exhibiting the highest level of Web 2.0 presence, centers whose work belongs to the areas of the physical sciences and technologies show the most interest in using these tools, followed by those in environmental and natural resources, and biology and biomedicine. This accords with what we learned about universities. In any event, future trends must aim at increasing not only the use of the tools, but also the connectivity and intensity of comments aimed at disseminating research results.

Discussion and Conclusions

The results we obtained regarding social media tool use unfortunately paint a somewhat colorless picture for the public communication of science in Spain. Although public universities and research centers are starting to positively exploit the Web's potential to establish a "dialog" with the public, this process has not been as productive as it could be – either in terms of interactivity (due to the low connectivity shown by social network profiles), or in disseminating scientific results, which account for a small fraction of published content.

While a tendency toward using these tools is on the rise, the effectiveness of the communication they enable has remained low despite the number of years that have passed. This calls into question specifically how centers and universities are exploiting this important channel's potential. It thus leads to recommendations and strategies for public universities to focus their efforts more intently on achieving one of the objectives for which they were originally conceived and designed: none other than ensuring the importance of scientific culture and awakening society's interest in general, and young people's in particular, in science.

Although it is not our study's purpose to make recommendations, we would like to suggest some strategies that can be implemented immediately and easily. The main one is to make specialist profiles for scientific outreach visible on the

homepages of centers and universities. This simple action certainly would help increase connectivity.

As the Consejo Superior de Investigaciones Científicas has done, Spanish public universities should gather and register the science blogs created by their researchers on their websites. To give these blogs credibility, both CSIC centers and universities could create universal designs identifying the institution supporting the published content. This would not only help manage the information that reaches the public, but also create reliable information sources for scientific journalists to use and to which they could cite and track back on their own websites.

Concerning those disciplines figuring most prominently in Web 2.0 communication channels, centers in the areas of physical sciences and technologies exhibit the greatest interest in using these tools, followed by centers in the areas of environmental and natural resources, and biology and biomedicine. These are, in short, disciplinary areas repeated at the universities and research centers. One wonders whether society is more interested in these subject areas than in others and whether universities thus make greater efforts in communicating their research in science because they know a willing audience awaits; or is it the opposite effect at work: Has the effort to communicate caused society to be more interested in these subjects?

In any event, following our analysis, we believe it is clear that aiming not only to increase tool usage, but also to raise connectivity and intensity of the comments – both of which work in tandem to disseminate research results – ought to be a primary goal for any future such efforts, for both universities and research centers.

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Chapter 10. “Blind as a Bat”: Users of Social Networking Services and Their Biased Quality Estimations in TAM-like Surveys

Abstract: Studies concerning the quality and the acceptance of services on the Internet often make use of the technology acceptance model (TAM) or related models (e.g., TAM 2, TAM 3, UTAUT, MATH, and ISE), which in turn bank on the results of user surveys. TAM-like approaches try to measure information systems’ quality on dimensions, such as perceived ease of use, perceived utility, trustworthiness, and fun. Yet all of those dimensions are constructs. Are the constructs valid? Empirical studies based on the TAM model family always work with quantitative user surveys. Are the surveys valid and reliable? We reviewed the validity and reliability of surveys using the example of social networking services (SNSs). Each user will be “socialized” through her or his standard quasimonopolistic SNS (e.g., Facebook in Germany and VKontakte in Russia). The evaluation of both the standard and a nonstandard SNS ultimately results in a discovery called *standard-dependent user blindness* (SDUB). SDUB is a newly discovered method bias in quantitative TAM-like surveys that pertain to using Internet services. It thus appears impossible to gather unbiased user perceptions on the network markets of the Internet. If this discovery were indeed generalizable, it would have strong consequences for empirical research on the Internet insofar as it relies on quantitative user surveys.

Keywords: Social Networking Services, Quality, User, Technology Acceptance Model, Standard-dependent User Blindness, Method Bias, Status Quo Bias, Survey, Facebook, VKontakte.

Introduction

Are users of the Internet able to present objective, unbiased descriptions and evaluations of “their” primarily used Internet services and of other competitive

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services? Are user surveys that pertain to Internet information systems valid and reliable? In this chapter, we will discuss the appropriateness of quantitative surveys in the service of Internet research using the example of the social networking services (SNSs) market.

On national SNS markets, we find precisely one dominant SNS. In terms of network economics, such a dominant service is known as a “standard.” Are users, in effect, captured by their standard SNS? Does it make them “blind” to perceiving the quality of their own SNS compared with other, possibly even better service providers? If such blindness is indeed a given, its discovery would have consequences for all empirical Internet research on social media insofar as the studies rely on user surveys. Under the proposition of such a *standard-dependent user blindness* (SDUB) (Baran & Stock, 2015c; Baran & Stock, 2015e), all user surveys on network markets are principally at risk of bias.

Boyd and Ellison (2007, p. 211) define SNSs as web-based services that allow individuals to 1) construct a public or semipublic profile within a bounded system, 2) articulate a list of other users with whom they share a connection, and 3) view and traverse their list of connections and those made by others within the system. The nature and nomenclature of these connections may vary from site to site.

To capture user experience with information systems and to perform quantitative measurement and evaluation tasks, the social sciences as well as computer science often make use of surveys (Stern, Bilgen, & Dillman, 2014). All known common models of technology acceptance and information system evaluation rely on quantitative user statements. The technology acceptance model (TAM) (Davis, 1989) and its successors, for example, TAM2 (Venkatesh & Davis, 2000), the Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh, Morris, Davis, & Davis, 2003), the model of adoption of technology in households (MATH) (Brown & Venkatesh, 2005; Venkatesh & Brown, 2001), TAM3 (Venkatesh & Bala, 2008), the DeLone/McLean models (DeLone & McLean, 1992; DeLone & McLean, 2003), the Jennex/Olfman model (Jennex & Olfman, 2006), and the information service evaluation model (ISE) (Schumann & Stock, 2014) try to measure information systems’ quality on dimensions, such as perceived ease of use, usefulness, trust, and fun.

Some of these models have also been applied to describe the success of SNSs. Most authors use modified (i.e., enriched) versions of TAM or (to a lesser extent) UTAUT (Baran & Stock, 2015d; Rauniar, Rawski, & Johnson, 2014). All dimensions of either TAM or UTAUT are constructs. Are these constructs valid? Studies based on the TAM model family always work with quantitative user surveys. Are the surveys valid and reliable? This chapter examines two surveys on SNSs (Face-

book¹ and VKontakte²) in two countries (Russia and Germany), covering them as case studies.

Davis and Venkatesh (Davis & Venkatesh, 1996), the originators of TAM and many subsequent TAM-like methods, were well aware of potential biases in TAM. “A major potential concern is that the high reliability and validity of the TAM scales and the large proportion of variance in intention explained by perceived usefulness and ease of use could simply be an artifact of the measurement approach” (Davis & Venkatesh, 1996, p. 21). Some authors are even more skeptical about the validity and reliability of TAM, calling the method a “black box” (Benbassat & Barki, 2007; Wu, 2009).

Quality Dimensions in TAM-Like Surveys

We will empirically evaluate the information systems quality (perceived ease of use, usefulness, trust, fun) of both Facebook and VKontakte. Why do we measure those four dimensions? A historical point of origin for evaluating the quality of information systems in the business area is the registration of technology acceptance in the workplace. TAM (Davis, 1989) uses dimensions (initially: perceived ease of use and perceived usefulness) in order to measure the quality of an information service’s technical composition. In TAM2, Venkatesh and Davis (2000) demonstrated that perceived usefulness is dependent on other factors including the user’s experience, voluntariness, social influences (called “subjective norm”), image, output quality in relation to the job, and result demonstrability. Perceived ease of use correlates with control (computer self-efficacy and facilitating conditions), with the intrinsic motivation of the user and with his/her emotions (Venkatesh, 2000). The construction of TAMs climaxed with UTAUT (Venkatesh et al., 2003). In this vehicle, four user-specific criteria (gender, age, experience, and voluntariness of use) meet four aspects of the user-system relationship (performance expectancy, effort expectancy, social influence, and facilitating conditions). Performance expectancy includes the well-known perceived usefulness, and effort expectancy, the perceived ease of use. The other two aspects are known from TAM2.

TAM, TAM2, and UTAUT find their applications in business contexts. For the example of adopting of personal computers in homes (Venkatesh & Brown, 2001),

1 <https://www.facebook.com/>

2 <https://vk.com/>

Brown and Venkatesh (2005) constructed their MATH. MATH works with a set of users' beliefs and includes attitudinal beliefs (e.g., application for personal use, utility for children, or status gains), normative beliefs (among others, friends' and family influences as well as those from television, newspaper, etc.), and control beliefs (costs, ease of use, requisite knowledge).

Venkatesh (2000) conceptualized intrinsic motivation as computer playfulness. With the development of the Web (Moon & Kim, 2001), of digital games – or “pleasure-oriented (or hedonic) information systems” (van der Heijden, 2004, p. 695), and of social media services (Knautz, Soubusta, & Stock, 2010), the dimension of perceived fun as a result of perceived playfulness (Lieberman, 1977; Barnett, 1990) became an important building block of the perceived information system quality. Especially with the successful implementations of e-commerce systems and electronic banking, a further dimension emerged: perceived trust (Gefen, Karahanna, & Straub, 2003).

Meta-analyses of TAM (King & He, 2006; Legris, Ingham, & Collette, 2003; Yousafzai, Foxall, & Pallister, 2007) demonstrate this model's utility in organizational settings as well as in household, residential, and consumer contexts.

The ISE model (Schumann & Stock, 2014) applies – apart from an unspecific “other factors” category – the four important dimensions of perceived ease of use, perceived usefulness, perceived trust, and perceived fun as indicators of the information systems' quality estimation. In line with ISE and most of the other TAM-like methods, we will adopt those four dimensions for our surveys.

For Russian users, VKontakte is the standard SNS, but many Russian students are also familiar with Facebook (as a nonstandard SNS in Russia). For German users, Facebook is the standard SNS; VKontakte is only rarely used. We instructed students to use VKontakte for a while. For our study, VKontakte was the nonstandard SNS in Germany. Thus, we insured that all test participants were familiar with both services.

Under such conditions, we can initially assume that all survey respondents will have (more or less) similar estimations of the quality of Facebook (case study 1) and of VKontakte (case study 2). Our participants all were given identical questions, their familiarity with both SNSs was comparable, and they evaluated the same systems. There is one difference between our groups of participants: Though one group (the Russians) is familiar with Facebook, Russians mainly use VKontakte. In Germany, our participants use Facebook on an everyday basis, and they learned to handle VKontakte only for a brief period. In a second view, we can hypothesize that the experiences with the standard (VKontakte in Russia and Facebook in Germany) lead to different quality estimations of both the standard and the nonstandard SNS.

What is a “Standard” on Network Markets?

What is a “Standard” SNS?

Why do people use SNSs (Lin & Lu, 2011)? Key characteristics of SNS suppliers are that “any pair of participants may interact with one another” (Aggarwal & Yu, 2012, p. 147), and that “the presence of a larger number of users increases the value of the site for all other users” (Aggarwal & Yu, 2012, p. 142). An SNS is not very useful if it only has a small number of users in relation to the amount of the SNS’s target group. Based on a literature study, Nadkarni and Hofmann (2012) found that the use of Facebook is primarily motivated by two basic social needs: “1) the *need to belong*, and 2) the *need for self-presentation*. The *need to belong* refers to the intrinsic drive to affiliate with others and gain social acceptance, and the *need for self-presentation* to the continuous process of impression management” (p. 245). The benefits of Facebook “friends” can be seen as the “social capital” of its users (Ellison, Steinfield, & Lampe, 2007; Valenzuela, Park, & Kee, 2009). In an empirical investigation, PwC (2012, p. 37) observed that 75 % of all (German) SNS users access his or her SNS to keep in touch with friends. Around 67 % used the SNS to search for old acquaintances and to restore contact with them. The more direct network effects an SNS offers, the more it will serve those main motivations to use SNSs.

In the theoretical framework of network economics (Linde & Stock, 2011; Shapiro & Varian, 1998), direct and indirect network effects play important roles (see Figure 1). After one or more players enter a market and a combat zone emerges, one service trespasses on the critical mass of users. Then, network effects start (Katz & Shapiro, 1994; Rohn, 2013). Direct network effects (Linde & Stock, 2011, pp. 53–57) are given by the number of users: the more users, the more valuable the network is. The more valuable the network is, the more it will attract new users. This feedback loop leads to the successful networking service taking off and to the losing network sputtering out. Indirect network effects (Linde & Stock, 2011, pp. 57–60) are user-independent effects, for example, the number of complementary products (e.g., social games on an SNS), or the amount of advertising. Direct as well as indirect network effects conduce the winning network toward a “standard” (Fjell, Foros, & Steen, 2010) and thus to a quasimonopoly (a winner-take-all scenario) and the losing rivals toward niche markets or even toward a market exit (“the loser standing small”) – an idea perfectly captured in song by the Swedish pop group ABBA (Anderson & Ulvaeus, 1980).

So much for theory. Are there really standards on the Internet? On specific Internet markets, we are unfailingly able to locate precisely *one* information service that dominates a single submarket as a standard, in most cases on a global

level, in a few cases only on country level. There is only one sharing service on the Web for images with a broad market share, namely, Flickr³; the same holds true for video sharing services (YouTube⁴). Delicious⁵ dominates the social bookmarking service market, as Wikipedia⁶ does in that for knowledge bases. Twitter⁷ is dominant on the market of microblogging-oriented SNSs. Similar monopolies on information markets can be found for search engines (Google⁸), auctioning platforms (eBay⁹), and online bookselling (Amazon¹⁰) in many regions of the world. Does the Web indeed drive market monopolization (Haucap & Heimeshoff, 2014)?

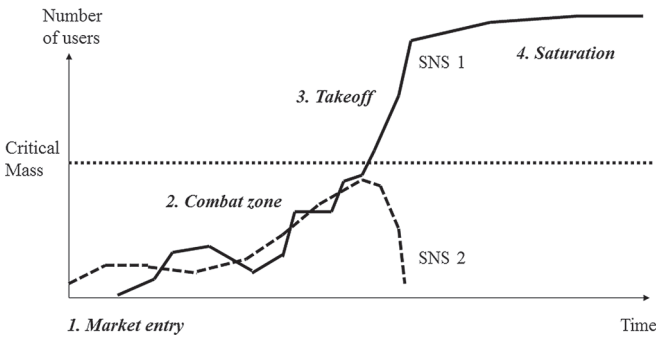


Figure 1: Typical Development on SNS Markets. Source: Following Dietl & Royer (2000).

How is the situation in the SNS Internet market? The research firm eMarketer¹¹ (Winkels, 2013) found that for the United States (2012), 89 % of all SNS users are on Facebook (next is Google Plus with 1 %).

In Germany, there are 38.6m unique visitors on Facebook, followed by Xing¹² with 4.2 million visitors. Regarding all social media platforms, PwC calculates Facebook's visitors' share in Germany at about 88 % (2012, p. 11).

3 <https://www.flickr.com/>

4 <http://www.youtube.com/>

5 <https://delicious.com/>

6 <https://www.wikipedia.org/>

7 <https://twitter.com/>

8 <https://www.google.com/>

9 <http://www.ebay.com/>

10 <http://www.amazon.com/>

11 <http://www.emarketer.com/>

12 <https://www.xing.com/>

In Russia (Winkels, 2013, p. 13), VKontakte has 38.5 million unique visitors, with about 13.5 billion page views; second is Odnoklassniki¹³ with 33.5 million unique visitors, but with only 3.7 billion page views. There are only around 19 million Facebook users in Russia, with 0.6 billion page views (all data for September 2012).

In both the United States and Germany, Facebook clearly dominates the SNS market as the standard SNS; in Russia, VKontakte does, but to a lesser extent. Indeed, ABBA (and the theory on network markets) appears to be correct: On SNS markets, the winner apparently takes all.

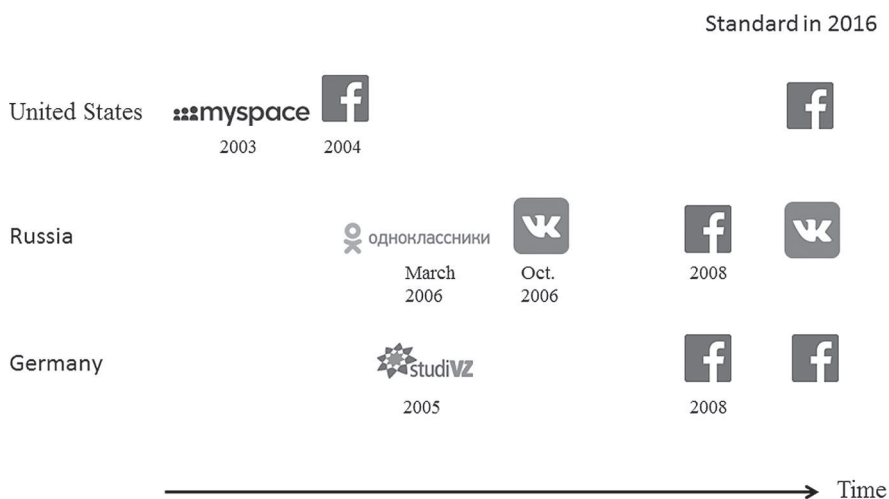


Figure 2: Market Entries of SNS Players in the United States, Russia, and Germany. Source: Baran, Fietkiewicz, & Stock (2015).

Innovators and Imitators on Network Markets

After a prehistory with some SNS-like information services (e.g., in 1995, Classmates,¹⁴ or, in 1996, Bolt¹⁵), the history of broadly successful SNSs started in

¹³ <http://www.odnoklassniki.ru/>

¹⁴ <http://www.classmates.com/>

¹⁵ [http://bolt.com/\(1996-2007\)](http://bolt.com/(1996-2007))

2003 with the market entry of MySpace.¹⁶ A few years later, national SNSs such as Odnoklassniki in Russia or studiVZ¹⁷ in Germany entered their markets. From the global perspective, MySpace was the innovator on the SNS market, and all other companies were imitators. For the national markets of Russia and Germany, however, Odnoklassniki and studiVZ were innovators. In the United States, Facebook superseded MySpace; in Germany, Facebook superseded studiVZ as well; and in Russia, VKontakte prevailed over Odnoklassniki. In Russia, Facebook never had a chance to become the standard (Baran & Stock, 2015a; Malahov, 2011). In no case has the (international or national) innovator become the standard; it has always been an imitator (see Figure 2).

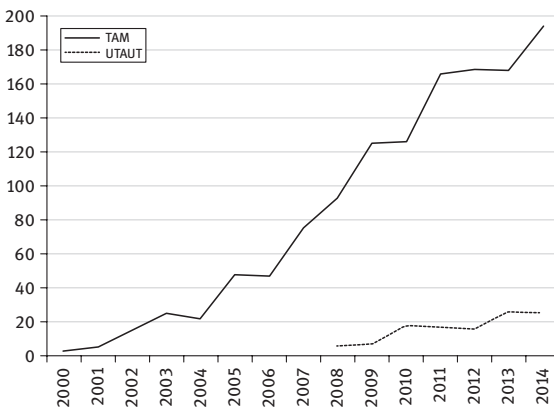


Figure 3: TAM and UTAUT Studies on Internet Information Systems, 2000–2014. Data source: Web of Science.

TAM-Like Studies on Internet Information Systems

In the literature of information systems research, one finds thousands of articles that address TAM and TAM-like models. Yousafzai, Foxall, and Pallister (Yousafzai, Foxall, & Pallister, 2007, p. 264) found in a meta-analysis of TAM that it “has emerged as a preeminent model of user’s acceptance of technology.” In this chapter, our focus is narrower: We only analyze the employment of TAM-like models on the Internet. Are such models also used in Internet research?

¹⁶ <https://myspace.com/>

¹⁷ <http://www.studivz.net/>

To answer this question, we conducted a small bibliometric study. We considered the article’s title terms, and words in both the abstract and in the keywords. Our search arguments on “Web of Science” (SCI, SSCI, A&HCI)¹⁸ were

a) “technology acceptance model” and (Internet* or online or WWW or mobile or digital or web or wireless or “e-commerce” or ecommerce or “e-government” or egovernment or “e-governance” or eovernance or website* or “e-learning” or elearning);

and

b) (UTAUT or “Unified theory of acceptance and use of technology”) and (Internet* or online or WWW or mobile or digital or web or wireless or “e-commerce” or ecommerce or “e-government” or egovernment or “e-governance” or eovernance or website* or “e-learning” or elearning).

The results of our bibliometric study (see Figure 3) are indisputable: There is a sharp increase of the number of articles on TAM in Internet systems studies between 2000 and 2014. In 2014, nearly 200 journal articles on this topic were covered by Web of Science. UTAUT saw less attention devoted to the topic, but here as well, one can identify about 20 publications per year in Web of Science. If a systematic bias were found in TAM-like surveys on the Internet, this result would have massive consequences for appraising both the validity and the reliability of survey-based Internet studies.

Case Studies: Facebook and VKontakte

Our exemplary SNSs are Facebook and VKontakte. Facebook (see Figure 4), one of the most popular SNSs at present, has a “mission:” “to give people the power to share and make the world more open and connected. People use Facebook to stay connected with friends and family, to discover what’s going on in the world, and to share and express what matters to them” (Facebook, 2016a). Facebook was founded by Mark Zuckerberg in 2004. Its headquarters is in Menlo Park, California, and it has 12,691 employees (December 31, 2015) and more than 1.04 billion daily active users all over the world (on average for December 2015). More than 1 million advertisers work with Facebook, leading to revenues of about \$17.928 billion (in 2015) (Facebook, 2016b).

18 <http://webofknowledge.com/>

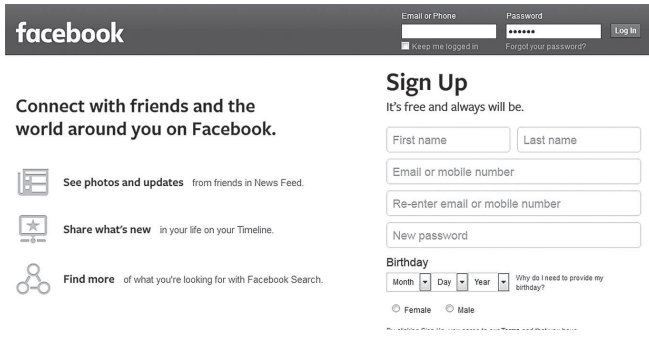


Figure 4: Case Study 1: Facebook. Source: Facebook.com.

VKontakte (“in touch”) (see Figure 5) was founded by Pavel Durov in 2006. It is owned by Mail.ru, has about 200 employees, and it is located in St. Petersburg, Russia. VKontakte reports an average of 65 million daily users (November 2014). In 2013, VKontakte generated revenues of \$85 million, leading to a profit of \$1.2 million. VKontakte’s functionalities are similar to Facebook’s, but in contrast to Facebook, it additionally offers a platform to share audio and video files (Baran & Stock, 2015a; Baran & Stock, 2015b; Khveshchanka & Suter, 2010).

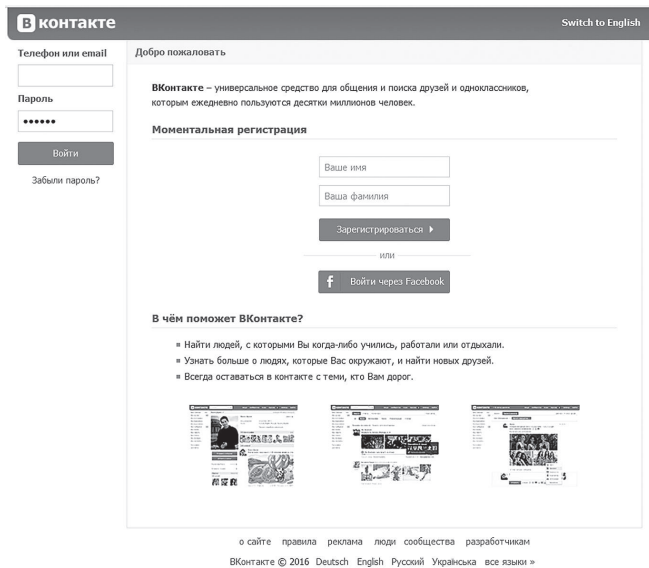


Figure 5: Case Study 2: VKontakte. Source: VK.com.

Research Model

Facebook achieved a critical mass of German users, retaining its dominant position as the country’s standard SNS; VKontakte has achieved the same level of success in Russia. Additionally, Facebook is a nonstandard SNS in Russia, as is VKontakte in Germany.

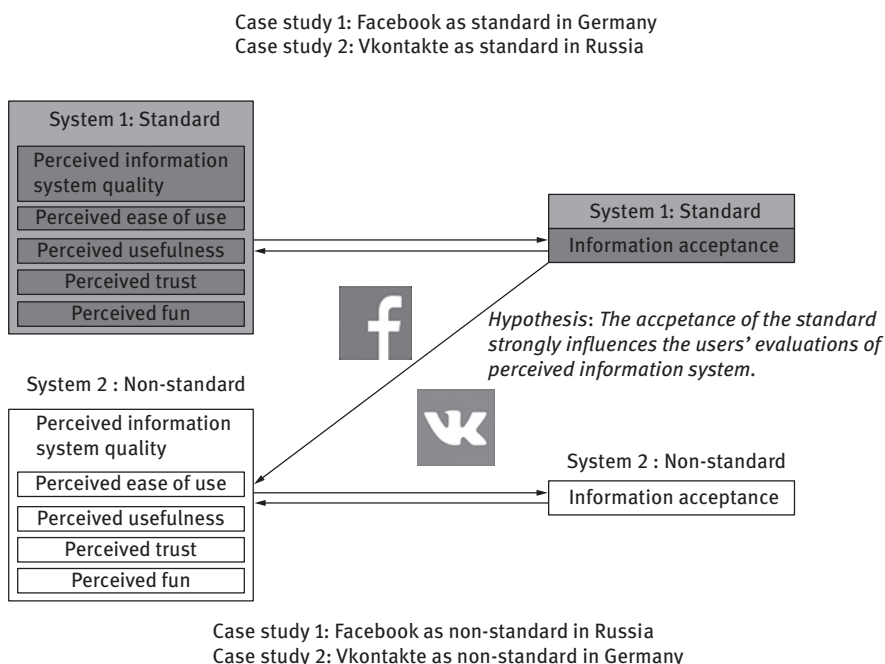


Figure 6: Our Research Model. Source: Following Baran & Stock (2015c).

Here, our research question arises: Under such conditions, are users able to give an unbiased view on the information quality dimensions of “their” standard SNS and (perhaps even better) other SNSs, which is needed for studies based on TAM and related models? The “classic” view of TAM-like studies focuses on analyzing the influences of indicators of perceived information system quality (e.g., ease of use, usefulness, trust, and fun) on the acceptance of the information systems. In Figure 6, this is the direction from the left-hand side of the model to the right-hand side. In our research, we also change the direction and ask for the influences of the acceptance indicators (in our further studies, we work with the four dimensions of adoption, use, impact, and diffusion) (Baran & Stock, 2015b, 2015d) on the perceived quality indicators. Our research problem lies in the direction from

right to left in Figure 6. How does the user's acceptance of one single information system influence her or his perception concerning its ease of use, usefulness, trust, and fun? Under the conditions of a standard (as in SNS markets), how does the user's acceptance of the standard influence the quality perceptions of the standard system and of further nonstandard information systems? Hence, in this work we propose the following hypothesis:

User perceptions of the quality of an SNS are strongly influenced by the standard SNS. This “winner-takes-all” situation makes its users “blind” to offer an unbiased quality perception of “their” (standard) SNS and of other (perhaps even better) SNSs.

Research Methods

We tested our research model employing two case studies. The target respondents of these studies were current SNS users in Moscow, Russia, and Düsseldorf, Germany. Our TAM-like questionnaire included 50 items. On a scale between 1 (“not at all”) and 10 (“highly applicable”), every participant was asked to estimate the importance of an indicator for his or her SNS behavior for both services – VKontakte and Facebook – in a quantitative way. Typical questions for the dimension of perceived SNS quality were “Is the design of SNS clear and easy to use?”; “Could you quickly orient yourself on the website?”; “Do you find that VKontakte / Facebook enriches your life”; and so forth. Some questions are adopted from the TAM (Davis, 1989) and others from the ISE model (Schumann & Stock, 2014). We validated our questionnaire by applying a pretest with four people, three of whom were native Russian speakers. All questions were formulated in the Russian language for the Moscow respondents and in German for the Düsseldorf group. The examiner was present at the time of filling out the questionnaires. If there were any problems (e.g., what does “enriches your life?” mean), the examiner could answer those questions.

The questionnaire method and additionally the in-depth interviews in an offline context were chosen to collect empirical data because we want to study Russian and German users as well; therefore, we had the chance for a live investigation of our participants.

Our test group in Moscow was composed of Russian students from Lomonosov Moscow State University. To identify our sample, we contacted 12 deans of Lomonosov University. Two of them (philosophy and economics faculty) answered in the affirmative and allowed us to distribute the questionnaires and

to conduct interviews in their classes. The surveys took place at Lomonosov University in February 2014. A total of 54 participants completed the questionnaire and the interview. The interviews lasted from 10 to 30 minutes. The examiner (KSB) recorded all answers on her interview guideline form. Our participants declined to approve the use of video- or audiotaping. Among these SNS users, 61.1 % were women and 38.9 % were men. Most were between 18 and 25 years old. All 54 participants are active VKontakte users. Of users, 52 to 54 answered they are registered on Facebook, but they do not use it, being thus passive users; only 2 participants are active Facebook users. At the time of the survey, everyone had experience using VKontakte and Facebook for more than 6 months and had more than 100 friends on VKontakte and about 10 friends on Facebook. Of participants, 79.6 % spent more than 2 hours a day on VKontakte and 61.1 % spent fewer than 15 minutes a day on Facebook.

We replicated the survey with students of Heinrich-Heine-University Düsseldorf, Germany ($N = 27$). German students had a Facebook account and used it very actively, but they did not have a VKontakte account, so our participants were instructed to create one for this study, and they used it actively for about one month. All our participants were thus familiar with both SNSs.

Other than the language (Russian vs. German), all questions were identical. The standard/nonstandard distinction is oppositional. What in Germany is the standard (namely, Facebook), is a nonstandard in Russia. Whereas, what in Russia is the standard (namely, VKontakte) is a nonstandard in Germany.

We calculated the mean values of the user values for all questions on the two analyzed SNSs. Additionally, we calculated for the four “classic” TAM dimensions (ease of use, utility, trustworthiness, and fun) the difference values between the user estimations of the service as a standard and the user estimations of the same service as a nonstandard.

Results

We present the results of our two case studies in two strands: for Facebook as standard (Germany) and nonstandard (Russia) (see Figure 7), and for VKontakte as standard (Russia) and nonstandard (Germany) (see Figure 8). For all indicators of information systems’ quality, our Russian and German participants chose their favorite SNS – Russian users favor VKontakte over Facebook, and German users favor Facebook over VKontakte. Almost all values are twice as high for the standard. Keep in mind users answered identical questions and evaluated identical systems! The only difference is a user group whose members are familiar with a

specific standard. Additionally, the differences between the standard SNS and the nonstandard SNS are statistically very significant for nearly all indicators, apart from the utility of the Russian standard (VKontakte).

For perceived ease of use, the difference between the evaluation of the standard and the nonstandard users is 1.31 points (**) for the case study of VKontakte and even 2.96 points (***) for the other case study of Facebook. The standard is easier to use for those individuals most familiar with the site.

The case study of VKontakte does not lead to statistically significant differences for the TAM dimension of utility. But the Facebook case study shows a great difference of 3.18 points (***). For Facebook standard users, this SNS is more than twice as useful as for nonstandard users (5.67 points in contrast to 2.49 points).

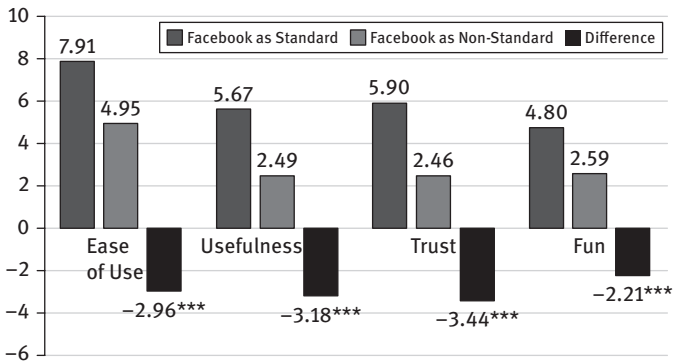


Figure 7: Quality Perceptions for Standard and Nonstandard SNSs. Case Study 1: Facebook. ***: $p < 0.001$. Facebook is the standard SNS in Germany (dark gray) and a nonstandard in Russia (light gray).

Perceived trust shows extreme differences for both case studies. The difference for case study 2 (VKontakte) is 2.55 points (***), while the difference for the Facebook case study is 3.44 points (***). We learned that a particular standard's users do trust "their" SNS and trust, to a much lesser extent, other SNSs.

For perceived fun, both case studies exhibit great differences between the standard and nonstandard users. The VKontakte study amounts to a difference of 2.04 points (**) and the Facebook case to a difference of 2.21 points (***). All users have much more fun with "their" standard than they do with a nonstandard SNS.

It is obvious that identical questions on the same SNSs lead to completely different answers, independent of any affinity for the users' standard SNS. Our research hypothesis could be clearly confirmed. The users were not able to give an unbiased quality perception on SNSs. We refer to this bias on SNS markets as

the “Standard-dependent User Blindness” (SDUB) (Baran & Stock, 2015c; Baran & Stock, 2015e).

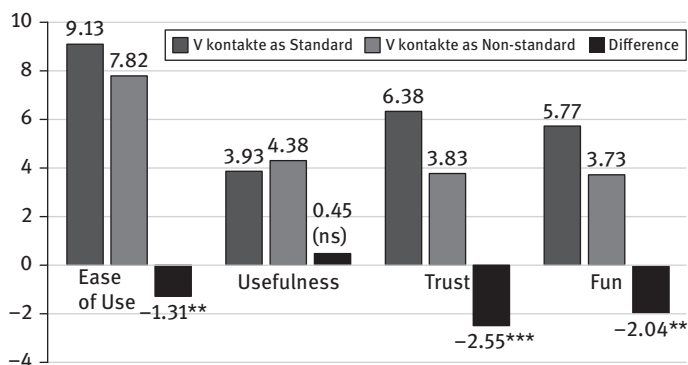


Figure 8: Quality Perceptions for Standard and Nonstandard SNSs. Case Study 2: VKontakte. *ns*: not significant; **: $p < 0.01$; ***: $p < 0.001$. VKontakte is the standard SNS in Russia (dark gray) and a nonstandard in Germany (light gray).

SDUB as a New Method and Status Quo Bias

What kind of bias is SDUB? Is it a new bias or is it a new manifestation of a known bias? There are some “methodological problems with subjective self-reported measures” (Straub, Limayem, & Karahanna-Evaristo, 1995, p. 1329) in TAM-like quantitative surveys. A first bias to discuss is the existence of faked answers. But SDUB is clearly no fake bias. Our participants did not consciously falsify their value estimations. Nor does it seem to be a bias of social desirability (Furnham, 1986), which is a kind of a fake bias, as test takers falsify their estimations in the direction of what they believe other people favor.

SDUB is a method bias (Podsakoff, MacKenzie, & Podsakoff, 2012), because the reasons for the biased results lie in the method (i.e., in quantitative TAM-like surveys on the Internet). In such a method bias, different constructs are measured with the same method. Normally, similar values for different constructs result from the fact “that they share the same method of measurement” (Podsakoff, MacKenzie, & Podsakoff, 2012, p. 540). This kind of method bias is called “common method bias” or “common method variance” (Straub, 2007). “With this utilization of the same method (i.e., the same common rater), the risk of common method variance (CMV) is extremely high” (Straub, 2007, p. 225). Such a bias could be confirmed with regard to TAM (Baek, 2012; Gerpott, 2011; Sharma, Yetton, &

Crawford, 2009). In the case of SDUB, we indeed apply the same method of measurement (i.e., TAM or TAM-like methods), but we do not observe such similar results – contrariwise, there are differences in the results of the same constructs. Therefore, SDUB is not a bias of CMV.

Kim and Kankanhalli (2009) discuss a so-called “status quo bias.” This bias results from user resistance to change to a new information system and to a preference for the status quo (i.e., the system actually used). “Status quo bias theory aims to explain people’s preferences for maintaining their current status or situation” (Kim & Kankanhalli, 2009, p. 569). Possible triggers of status quo are switching costs (which refer to “the perceived disutility a user would incur in switching from the status quo to the new IS” (Kim & Kankanhalli, 2009, p. 572) and the switching benefits (changing the system would result in beneficial effects for the user). There is a clear positive relation between switching benefits and the perceived value of the information system, but a negative one between switching costs and the perceived value of the new system. “Switching costs increase user resistance” (Kim & Kankanhalli, 2009, p. 578). SDUB is near to the status quo bias. But there is a difference: here, the status quo is the standard and the other service is not new for the user, but is known (albeit only as a nonstandard).

Considering the reviewed literature and the current state of survey methodology (Stern, Bilgen, & Dillman, 2014), SDUB seems to be a new Internet-specific bias. SDUB is a special case of method bias and has a clear relation to the status quo bias. It is a bias of surveys on network markets (where a standard exists, which in turn is one of the triggers of SDUB). The “black box” of TAM (Benbassat & Barki, 2007; Wu, 2009) thus incorporates with the discovery of SDUB another – and unpleasant – facet.

Discussion

Considering the wide distribution of TAM-like studies throughout the social sciences, computer science, and information systems research as well as the high level of importance SNSs occupy in present-day society, the results of our study concerning the conditions of system quality perceptions are extremely interesting and also new. This study discovered that users perceive the quality of an SNS to be dependent on their standard SNS in favor of their standard system and in opposition to the nonstandard information systems. This winner-take-all scenario blinds its users to offer an unbiased quality perception of “their” (standard) SNS and, accordingly, of other SNSs. SNS quality estimations by users are obviously highly vulnerable areas of surveys.

If such an effect is determined to apply to other markets of the network economy, then we must expect to always find biased user perceptions and SDUB in all social and computer science studies concerning social media insofar as the situation relies on TAM-like user surveys. In network markets, describing information systems quality by user statements is highly biased, because users are so familiar with their standard system. To open the “black boxes” of TAM-like surveys (Wu, 2009), it could be helpful to combine more independent measurement methods with TAM (Straub, 2007), for example, mixing quantitative and qualitative methods in Internet research.

Have we any advice to estimate the impact of the SDUB bias on survey results or even to avoid SDUB bias completely? For now, the simple answer is, “no.” What is needed is further research on SDUB as a method bias of TAM-like quantitative surveys on the Internet.

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Chapter 11. New Media and New Territories for European Law: Competition in the Market for Social Networking Services

Abstract: Competition (or antitrust) law regulations around the world are supposed to maintain open competition on the economic markets through a series of national or international regulations and their enforcement by authorities. In the digital age, new (online) markets emerge and some stakeholders may be concerned whether present regulations and practices of national cartel offices, i.e. the national competition regulators, are still suitable. The focus of this chapter is on social networking services (SNSs), as an example of a new medium, and the question whether the current European competition law is sufficient to control these new and rapid developments. The market for consumer communication services (CCS) as well as aspects of data privacy are also addressed. The legal perspective on this matter will be complemented with an analysis in view of information science and economic theories. Here, such aspects as direct and indirect network effects, or standards established on the relevant markets are significant. It is possible these network effects will have a noticeable influence on the development of monopolies or oligopolies in the SNSs market. Furthermore, SNSs that in recent years became more or less standards appear to have strengthened their position by broadening their offerings spectrum through internal enhancements and acquisitions of other companies.

These practices may be also relevant in the legal debate. In terms of the competition law, the first step is determining if there are potential monopolies or oligopolies within the SNSs market, how they emerge, and how persistent they are. For this purpose, the relevant market must be defined. Should one company have a monopoly position and abuse this power in any way, consequences under the cartel law, particularly under Article 102 from the Treaty on the Functioning of the European Union (TFEU) will follow. The second step is investigating if another aspect of the competition law – merger control – should become more relevant (and more rigid) for the SNSs market now and in the future. For this purpose, the recent agreement between Facebook and WhatsApp will be discussed and the

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(approving) decision of the European Commission (EC) analyzed. Moreover, the most important aspects of the European merger regulation and its lack of compatibility with data privacy protection will be addressed. Finally, a conclusion regarding the compatibility of (European and German) cartel offices' current practices with the new market for SNSs will be offered.

Keywords: Competition Law; Antitrust Law; Social Network Services; Facebook; WhatsApp.

Introduction to Social Media Markets

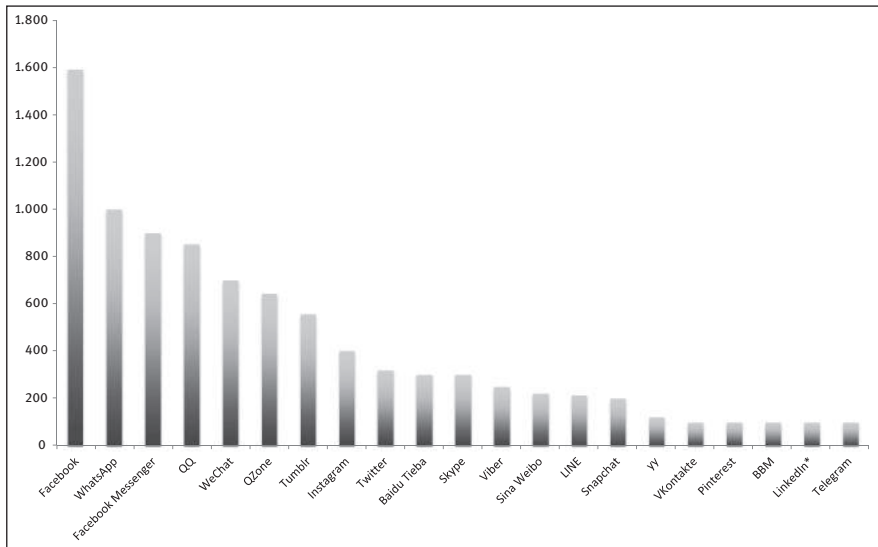
In the last decade, social media rapidly became an inevitable part of the Internet and, hence, of everyday life. Their variety and capabilities continue increase at an incredible pace. Following Linde and Stock (2011, p. 261), we observe four submarkets of social media: 1) sharing services allowing for the depositing of certain types of resources to share with other users; 2) social bookmarking services for managing resources; 3) knowledge bases for collecting documents and making them available to others; and 4) social networking services (SNSs) for communicating with other members of the community. It also appears in each social media (product and geographic) submarket, for the most part, one service dominates in either a European economic area (EEA) or at the global level. Some examples are YouTube as a video sharing service, Delicious as a social bookmarking service, Wikipedia as a collaborative online encyclopedia (knowledge-based submarket), or Twitter as a microblogging-oriented SNS.

Facebook is the leader for SNSs at almost a global level (some national SNSs are similar to Facebook, e.g., Renren in China or VKontakte in Russia and several other East European countries) (Baran, Fietkiewicz, & Stock, 2015). Other important players on the (global) digital market are Google for search engines (or Yahoo, e.g., in Japan), eBay for auctioning platforms, and Amazon for online bookselling. Considering the above, a question suggests itself: Does the Internet drive market monopolization and, respectively, is the digital economy characterized by high market concentration (Baran, Fietkiewicz, & Stock, 2015; Haucap & Heimshoff, 2014)? How do monopolies emerge on an information market, and can current competition law keep up with the new challenges (Baran, Fietkiewicz, & Stock, 2015; Graef, 2013; Waller, 2012)? This chapter will focus on the SNSs market, in particular, on Facebook. It will also address the customer communication services (CCS) market, in particular, WhatsApp, as part of the Facebook/WhatsApp transaction analysis.

Table 1: Facebook Ad Revenues (in Billions USD). Source: Statista, 2015.

Year	Revenue
2012	4.3
2013	6.99
2014	11.35
2015*	14.93
2016*	18.18

With reference to Boyd and Ellison (2007), we define SNSs as “web-based services that allow individuals to 1) construct a public or semipublic profile within a bounded system, 2) articulate a list of other users with whom they share a connection, and 3) view and traverse their list of connections and those made by others within the system” (p. 211). Facebook was founded by Mark Zuckerberg in 2004. It employs about 9,200 people and has around 890 million daily active users all over the world (average for December 2014) (Facebook, 2015). Facebook is also an online advertisement provider, realizing high revenues that continue to increase (see Table 1).

**Figure 1:** SNSs Ranked by Number of Users (in Millions) as of April 2016. Source: Statista, 2016.

Since its launch, Facebook has gained a powerful, if not monopolistic, position in the social media market. The range of Facebook users is far broader than observed on other online services, including SNSs and communication applications (e.g., WhatsApp, Skype, or Line) (see Figure 1). The distribution of power, or rather its concentration in one market player, may be explained with network effects applicable to this kind of online service, explained in the following section. A high concentration of market power can lead to its abuse as well as to a distortion of competition in individual cases. Due to so-called multihoming effects (i.e., use of numerous online services simultaneously) also characteristic in this sector, however, such monopolistic tendencies are not perceived to be as detrimental as they would be in other industries. In addition, we will examine economic rules applicable to the digital economy in the following section. Afterward, we will turn to the European competition law and its compatibility with the social media industry, especially SNSs such as Facebook.

Economic Perspective on Competition for SNSs

Schumpeterian Economics of Innovation

In each social media submarket, we generally can identify one service occupying a nearly monopolistic market position, leaving only limited space for competitors to grow. A crucial twofold question arises from the competition policy perspective: Why, in particular, do these Internet-based companies have such a huge market share, and is this phenomenon temporary? In the following, we will highlight the theoretical background of the emergence of monopolies from the Schumpeterian perspective in the context of SNSs to better distinguish between the economic life cycle of innovative firms and anticompetitive behavior.

Schumpeter regarded technological innovations as the most recognizable appearance of innovation that is not continuously distributed in time, defining it as “the setting up of a new production function” (Schumpeter, 1939, p. 84). Yet in contrast, innovations occur by leaps that disturb and upend the existing equilibrium and generate erratic growth (Kuznets, 1940). Schumpeter’s theory of economic business cycles is based on a waveform process of economic developments under capitalism. Furthermore, he does not consider technological uncertainty as a necessary factor for the evolutionary process of economic business life cycles, but instead theorizes those waveform developments are caused by supply changes based on irregular technological changes. Such life cycles are the major catalysts of economic growth, but they vary in terms of industry, content, and

time span, such as the short Kitchin inventory cycle (3–4 years), the Juglar fixed investment cycle (6–8 years), and the Kondratieff long wave cycle (45–60 years) (Korotayev & Tsirel, 2010; Kuznets, 1940).

Early in the life cycle of an industry – when technology is changing rapidly, uncertainty is high, and entry barriers are low – new, young firms are the major drivers of innovation and a key element of industrial dynamics (Wiklund et al., 2010). They create economic discontinuities and an entrepreneurial environment conducive to introducing innovation and monopoly developments (Kuznets, 1940). If an entrepreneur or a small company aims to innovate to earn monopoly profits, it must identify unexplored markets in which low entry barriers are prevalent, so it can constantly drive the process of internal and external innovations. The growth of internal resources and knowledge stock enables firms to operate globally, to use economies of scale and a monopoly position to create high entry barriers (Scherer & Ross, 1990), as well as to further influence industry life cycles (Klepper, 1996; Schumpeter, [1954] 1994, p. 897 f.) and market structure (Agarwal, Sarkar, & Echambadi, 2002).

Firm development differs with respect to sector and industry specifics, which are particularly obvious when comparing the manufacturing sector with that of the service. Firms operating in manufacturing industries usually rely more on tangible assets, such as raw materials, machines, automobiles, and production plants. Economies of scale are limited for manufacturing firms, meaning the average total costs rise at relatively modest output levels (Posner, 2001). Further, those industries can be characterized by a modest rate of innovative activities due to the necessity of heavy capital investments, and slow and infrequent entry barriers (Posner, 2001). In comparison, service industries and particularly online services lack these characteristics to a considerable extent. Instead, they can be characterized by falling average costs at the product level, modest capital requirements to develop business operations, high innovative activities with a faster market entry, and economies of scale in consumption, which are so-called *network effects* (Posner, 2001).

In economics, the process known as “creative destruction” was defined by Schumpeter as the transformations of firms and industries through a destruction of the old, which allows for a creation of the new (Schumpeter, 1942, ch. 7). The development of Internet technology, which became publicly and commercially available in the 1990s, can be seen as an example of such a dramatic shift. Soon after the economic potential of the Internet was revealed, a large number of Internet companies, the so-called *dotcoms*, emerged and begin to conduct business via the new electronic medium (Wang, 2007). When considering the development of information technology and, in particular, the online market in the late 1990s, we can observe rapid changes that reached their first peak at the end of the 1990s;

these also were characterized by enormous stock price increases, followed by a turning point in spring 2000. An abrupt decline occurred, which was marked by the bursting of what was termed the *dotcom bubble*. Stocks in the dotcom sector began to fall, bottoming out in mid-2001, when 384 dotcom companies closed their doors or declared bankruptcy (Florian et al., 2001). One reason for the crash was the immaturity of technology, in terms of slow Internet connections and restricted Internet access. However, only a few years later, both the number of Internet users and Internet speed had increased significantly, which is one potential reason Internet companies, such as Google, could see their stock double in price within a few short months. Amid this period, Facebook emerged in 2004 and soon achieved its dominant position in the SNSs market.

Such dominance is typically observed in *winner-take-all* markets, whereby a company can achieve a quasi-monopolistic position (Fjell, Foros, & Steen, 2010). Besides gaining a monopoly by implementing radical improvements in performance dimensions, if a company introduces innovative products or services, this entails even greater disruption. Such a change can occur, for example, when a company offers consumers more than they actually need or thought themselves willing to pay for (Dietl & Royer, 2000). As a result, for example, consumers who once might have bought laptops based solely on the machines' processing power, become moved to consider entirely different functional capabilities, such as battery life, design, or weight (Galvan et al., 2008, p. 59). Entire product categories can thus be shaped, developed, launched, and established when companies can change consumer perceptions of value and price for the product offered.

Changing the basis of competition is not the only factor necessary to create a winner-take-all situation. Other factors, such as the presence of a consumer *lock-in*, are necessary to establish a profitable winner-take-all situation (Dietl & Royer, 2000; Liebowitz & Margolis, 1995). A lock-in can be described as a situation in which a consumer is not willing to change to another product due to high switching costs (Shy, 2000). Switching costs occur when many complementary parts of a network must be substituted. In the case of network specific and limited complementary parts, switching costs are relatively high, as the user perceives a high value loss when turning to another network. Besides this economic explanation, a behavioral-scientific explanation also serves to interpret the lock-in effect. From this cognitive theory perspective, consumer learning costs increase switching costs and thus, exit barriers. As a result, the consumer is bound in a position of dependence and limited freedom of decision. Therefore, the lock-in effect serves as a consumer loyalty instrument (Zauberman, 2003).

Not only can the adaptation of products or services lead to a lock-in and thus, to a strategic advantage, but also the timing of a product or service launch plays a role. This aspect is particularly relevant when considering innovations. A market

pioneer's position, clearly observed when launching an innovative product or service, offers both advantages and disadvantages (Lieberman & Montgomery, 1998). When examining so-called first-mover advantages, benefits derived from being the first to *enter* the market exceed the costs of being the first to *explore* new market areas. A first-mover must deal with significant uncertainty regarding consumer response and technological developments. Second-movers or early followers can learn from the market pioneer and avoid mistakes by entering the market with improved products or services. However, early followers must offer improved products or services to lure away the first-mover's consumers. Additionally, a first-mover usually enjoys consumer loyalty, a distribution network, and an established product line (Robinson & Min, 2002). Therefore, the period between the entries of a first- and a second-mover are particularly important from a Schumpeterian perspective, because the longer a market pioneer can dominate a relevant market in a monopoly position before the entry of followers, the greater its advantage.

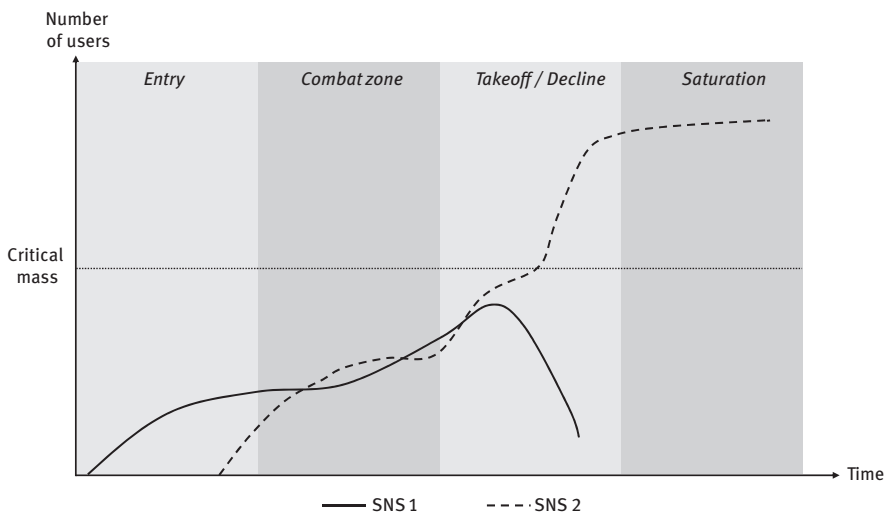


Figure 2: Typical Development on SNS Markets. Source: Following Dietl and Royer, 2000.

MySpace.com, the pioneer in SNS platforms, was able to reach a temporarily dominant position in SNSs market with more than 50 million unique U.S. visitors in May 2006 (comScore, 2006). With regard to Schumpeter, the online environment in the 2000s was characterized by rapid changes, and the raw concept of an SNS did not fit neatly into this development of online social networking and users expectations. However, Facebook – an early follower – was able to adapt quickly

to rapid changes, when expanding from its inception at Harvard University to colleges around the world and ultimately to open its services to everyone. Facebook's site design was clear, uniform, and standardized across all users, which provided a satisfying user experience (Safar & Mahdi, 2011, p. 112). By 2008, Facebook had overtaken MySpace, and as the dominant SNS, has grown increasingly relevant to become one of the largest SNS platforms worldwide (comScore, 2008).

Considering several SNSs after their market entry, we observe a successful network trespass the critical mass of users within a winner-take-all market after some point (see Figure 2). At this position, network effects are particularly relevant. Direct network effects (Linde & Stock, 2011, pp. 53–57) can be derived from the number of consumers, or users for an SNS, respectively, since an increase in the number of users is associated with an increase in the network's value. Indirect network effects (Linde & Stock, 2011, pp. 57–60) occur as consumer- or user-independent effects, such as the number of complementary products. Both direct and indirect network effects support the development of a quasi-monopoly and the establishment of the superior network as an industry standard.

Importance of Network Effects for SNS

In the context of SNSs, indirect network effects occur when product or services with more complementary products or services create higher benefits and greater demand (Lin & Bhattacharjee, 2008). Hence, the more complementary products an SNS offers, such as supporting tools, the more and better are users able to express themselves and maintain interactions with others, thereby giving users greater benefits (Lin & Lu, 2011). For instance, users of SNSs profit from the service functions of photos, videos, and message sharing to present and express themselves, share information, and interact with other users of the network in various ways. While it can be difficult to determine the impact of indirect network effects on certain SNS, we believe indirect network effects are particularly strong for Facebook due to the large number of user applications, such as games developed by Zynga, a provider of social games for social networking platforms (Schiesel, 2011). Complementary social gaming providers have become increasingly important for Facebook as they generate a large share of the company's revenue (Raice, 2012). For instance, 66 million Facebook users played Zynga's game *Sims Social* in September 2011 and shared gaming results with their friends (Schiesel, 2011).

Previous studies have analyzed network effects for SNSs to examine and explain information technology users' behavior as consumers (Gupta & Mela, 2008; Kim & Lee, 2007). Direct network effects originally were observed in a physical communications network (e.g., telecommunication networks between

two parties) (Rohlf, 1974). Users of the network receive increasing returns in consumption, which expands with the number of consumers who can communicate over a certain two-way communication network. Thereof, network providers might receive increasing returns to scale in their production. The extension of network size appears to attract additional new consumers due to an increase of perceived value: The larger the expected network size, the more valuable the network (David, 1985), which is in line with Metcalfe's law suggesting that a network's overall value can be increased with the square of the number of users (Shapiro & Varian, 1998). However, positive network effects are only prevalent as long as network overcrowding is avoided.

Direct network effects derive from the perception that an increasing number of people are using a particular product or service. Thus, a user's benefit increases due to market size effects, which, for SNSs, are directly applicable to network size. If the network size increases, more elaborate conditions need to be provided to make the product or service more convenient to use (Katz & Shapiro, 1994). Such upgrades might involve additional resources, content, or functions to enhance the user experience. In addition, users can also benefit from the increasing knowledge or social support a large network offers, as well as that a large number of users can be interpreted as a signal a certain service is easy to use (Katz & Shapiro, 1994).

When arguing in favor of Facebook monopolizing social networking, we observe this SNS reached a critical user mass circa 2008 and thus was poised for immense growth potential afterward (*Takeoff*, see Figure 2) (comScore, 2011). On the one hand, in 2008, Facebook surpassed its main competitor, MySpace.com, in terms of user numbers, as well as being able to *generate a lock-in* effect that increased the perceived switching costs. MySpace, on the other hand, lost a large share of its users as a result (*Decline*, see Figure 2) (comScore, 2011). From that point, Facebook could constantly enforce its dominant position within the market for SNSs by generating direct network effects.

Previous studies have also identified indirect network effects. These generally occur when people use complementary devices of a certain network system, even if the devices are not physically connected. Such systems can be any combination of a durable product or service offering some desired functions. This type of system can be illustrated with the hardware/software paradigm, which includes not only computer products, but also camera and film devices, as well as television sets and other offerings (Katz & Shapiro, 1994). Consumers/users of compatible hardware and software systems form a so-called *virtual network* (Katz & Shapiro, 1985, 1994). Theoretically, any combination of complementary products or services can be seen as a system, constituted by the people who purchase a certain group of products. Herein, indirect effects are obtainable when these

system components are purchased at different times. Haucap and Wenzel (2009) describe in detail the characteristics of two-sided markets and the indirect effects on other platforms, such as eBay.

Nonetheless, network effects and Facebook's adaptability will not necessarily protect it – even as the present dominant SNS – from competitors. Arguing against the perception of Facebook monopolizing social networking, Facebook was able to overtake MySpace. The former, a start-up founded by students, ultimately came to dominate the latter, which up to that moment, had been the world's most popular SNS with a large number of users in 2008–2011, along with a contract to provide \$900 million of advertising space to Google (Potter, 2013, p. 111). In addition, MySpace had dominated the market for SNSs between 2005 and 2007, at an even greater rate than Facebook does today (comScore, 2006). Breaking through the barrier of network effects, as Facebook did with MySpace, is a difficult task but – with regard to Schumpeter – apparently only a matter of time.

Economics of Information

Particular online platforms tend to dominate their relevant market and leave only limited space for competitors to operate and grow. Such platforms are able to gather large numbers of users on their websites and retain their personal information. If an SNS has a dominant or even quasi-monopolistic position, it can monetize user data, thereby increasing its revenues and enforcing entry barriers against competitors. The monopolist might have too little incentive to concern itself with users' privacy demands, and it could further erode privacy practices in exchange for greater income by directly reselling user's personal information and contact data (Levmore et al., 2010, p. 247). As a result, users might choose to switch to an alternative SNS, but would do so only once the costs/value of their privacy outweigh the perceived benefits offered by the original SNS.

In addition, it is interesting to consider to whom information might be made available. Information a user shares is obviously available within an SNS itself. The user may not fully know or comprehend the extension time of data or their durability, as well as their membership extension (Gross & Acquisti, 2005). Furthermore, ease of joining and extending a user's network and the lack of adequate security policies make it easy to access users' information with the collaboration of the SNS (Gross & Acquisti, 2005). In the case of Facebook, the company has already used its market dominance to impair user privacy. In December 2009, Facebook deprived user control over pictures, contact information, and friend lists, and made these data publicly available (Levmore et al., 2010, p. 255).

However, the numbers of users continued to climb to new heights, reflecting the general trend for SNS users to cede control over their private information (comScore, 2011; Levmore et al., 2010, p. 255).

Even if privacy concerns may constitute a risk in an SNS, users provide the information willingly. Different aspects affect users' willingness to reveal their data in SNS. The most important ones include signaling, which reflects the perceived benefit of selectively revealing personal information to strangers may outweigh any perceived costs of possible privacy invasions (Gross & Acquisti, 2005). Other reasons might be peer pressure or herding behavior, a lack of interest in SNS privacy issues, incomplete information about the usage of the revealed data, or even trust in the SNS and its users to use the information appropriately (Gross & Acquisti, 2005).

When considering the possibility of a regulatory regime applying specific privacy protections for SNS users, government-mandated protection might be either too great or too little. It might be difficult for a regulatory regime to assess which information to protect and how much data users are willing to reveal, and which parts they want to retain control over (Levmore et al. 2010, p. 247). A regulator cannot accurately predict user demands, and must weigh the costs and benefits of various privacy policies and seek to develop an efficient economic approach to maximize the welfare gain. Another problem for a regulator might be the opportunity for a dominating SNS with a quasi-monopoly position to charge monopoly "fees" in a number of areas in addition to privacy issues, for instance, providing suboptimal SNS features or prices above competitive levels when selling user information, which would require additional regulatory solutions (Levmore et al. 2010, p. 247). Furthermore, government-mandated protection for SNSs faces the problem of rapid changes in this particular sector. New technologies or adaptations of business models are implemented both to and for SNSs on a frequent basis, which is why such a regime would need to constantly scrutinize its protection schemes in terms of effectiveness and usefulness, adjust its policies accordingly.

Social Media and Competition Law

Introduction to European Competition Law

The tendency for monopolies to dominate on information markets is very provocative, particularly as it concerns the European Union's (EU) competition law (Fatur, 2012). Reference is made to Article 102 of the TFEU, which states: "Any

abuse by one or more undertakings of a dominant position within the internal market or in a substantial part of it shall be prohibited as incompatible with the internal market in so far as it may affect trade between Member States” (EC, 2008a, Article 102). Another central rule the European antitrust policy is based on is Article 101 of the TFEU prohibiting “agreements between companies which prevent, restrict, or distort competition in the EU and which may affect trade between Member States” (EC, 2008a, Article 101). The language encompasses two kinds of agreements – horizontal (between actual or potential competitors) and vertical (between firms operating at different levels) (EU, 2013a). For the present, anticompetitive agreements do not appear to be urgent issues in information market areas. The abuse of dominance by monopolistic online service providers may be a more relevant problem. Regarding our study, we mainly focus on merger control as it relates to the agreement between Facebook and WhatsApp reached in February 2014.

Moreover, Article 102 of the TFEU states the law “prohibits abusive conduct by companies that have a dominant position on a particular market” (EU, 2013b). Hence, to fall within the scope of this article, the concerned company must hold a dominant position in a specific market. The European Commission (EC) must first assess whether this prevails and define the relevant product market (“made of all products/services which the consumer considers to be a substitute for each other due to their characteristics, prices, and their intended use”) as well as the relevant geographic market (as an “area in which the conditions of competition for a given product are homogenous”) (EU, 2013b). A critical indicator for a company’s dominant position is its share of the predefined market. If the share is less than 40 %, then dominance is rather unlikely (EU, 2013b). In addition to market share, other factors are considered, such as market entry barriers (for new companies), the existence of countervailing buyer power, or the company’s overall size and strength (EU, 2013b).

A dominant position per se is not illegal, and a company must “abuse” its power by, for example, forcing buyers into exclusive purchasing agreements, setting prices at a loss-making level (to eliminate competition), or, in contrast, charging excessive prices (EU, 2013b). Recent cases concerning the digital market/web portals in general handled by the EC regarding the abuse of dominant position, for example, have been proceedings taken against Google. The investigation followed complaints about unfavorable treatment of search service providers in Google’s unpaid and sponsored search results as well as preferential placement of Google’s own services (EC press release IP/10/1624).

In this chapter, we examine the acquisition of WhatsApp by Facebook, which is a case for EU merger control with its legal basis in Council Regulation (EC) No. 139/2004 (EC, 2010). Uncontrolled mergers and acquisitions of companies can

change a distinct market into a monopoly (or oligopoly) and limit competition. However, not all mergers are controlled by the EC, since they have to be characterized by the *EU dimension*; namely, a planned merger must reach a certain turnover threshold in at least three member states. Involved companies must notify the EC about any pending merger with an EU dimension before the process can be finalized. In the first phase, the EC has 25 working days to analyze the agreement and can either clear the merger (unconditionally or subject to accepted remedies) or, when the proposed merger raises competition concerns, open the second phase of the investigation (EU, 2013c). The second phase requires more time to process as it involves more extensive information gathering, more detailed questionnaires to market participants, and so forth. The EC has 90 working days to make a final decision about the merger, a period that may be extended by an additional 15 working days, and subsequently, by up to 20 working days (on request or approval by the notifying parties). Finally, the EC may either unconditionally clear the merger (or approve it as subject to remedies) or prohibit it (EU, 2013c).

The Internet Economy's Challenges for the Current Legal System

In the Internet economy, many business models are based on the use of personal data, with the most popular being Google and Facebook (Monopolkommission, 2014, p. 52). It is characteristic for the digital economy that "(...) for many online offerings which are presented or perceived as being 'free,' personal information operates as a sort of indispensable currency used to pay for those services. As well as benefits, therefore, these growing markets pose specific risks to consumer welfare and to rights to privacy and data protection" (European Data Protection Supervisor, 2014, p. 6). From the information economy's inception, "personal data has been its most valuable asset" and, therefore, "an open conflict [has arisen] between [the] business demand for data and [the personal] desire for privacy" (Spiekermann & Novotny, 2015, p. 181). The relationship between SNS providers and platform users can be seen as a civil contract, based on the providers supplying information technology performance (the social network) and consumers agreeing to the use of their private data for commercial purposes (advertising) (Bräutigam, 2012, p. 635). Bräutigam (2012, p. 640) compares this "licensing"-like granting of the use of private information to the type of licensing known from copyright law. Bräutigam (2012) thus views recent developments as a commercialization of the right to informational self-determination (in the German legal system, a fundamental right to the free disposition of one's private data). He even anticipates the idea of collective societies managing compensation interests (for

use of private information), as is commonly done for managing copyright and related rights (Bräutigam, 2012, p. 641).

Data Privacy and Competition Law

Many legal concerns exist concerning the issue of data privacy on the digital market. One is the extent of the Internet's impact and its illimitability; hence, the need has arisen for a global uniform regulation of privacy issues in order to ensure its effectiveness. The German Monopolies Commission¹ defined three main problematic issues in terms of (Internet) companies' excessive personal data access: 1) data security (i.e., unlawful elicitation, storage, and use of personal data); 2) competition (i.e., the abusive exploitation of a databased economic position of power), and 3) consumer protection (i.e., the exploitation of a corporate entity's powerful position vis-à-vis consumers) (Monopolkommission, 2014, p. 60).

One of the most important competitive factors in the Internet-based industry is information about consumers. With the help of collected and analyzed data, such companies may provide better and more suitable services. Big market players, such as Google or Facebook, extend their range of activity and strengthen their market position by acquiring further online services (not necessarily directly related to their original field of activity). This increasing diversification of important service providers and takeovers of adjacent (online) services may lead to portfolio or conglomerate effects and, hence, to increasing market power of the discussed market players (Monopolkommission, 2014, p. 63). Portfolio effects are typically meant as synergies on the demand side, when diverse products are being purchased from only one provider (Monopolkommission, 2014, p. 63). Such integration of diverse products and services may offer positive as well as negative effects (negative, mostly, regarding market entry barriers). Additionally, existent network effects and economies of scale may hinder competition and market development (Monopolkommission, 2014, p. 63).

It is difficult to identify *ex ante* all possible competition problems in the Internet-based industry, since this is a relatively new field. Facing dynamic technology development, it is unclear what size a provider must be to develop a new (and competitive) product, and also, it remains uncertain what consequences network effects will have (Monopolkommission, 2014, p. 69). Despite this uncertainty,

¹ The (German) Monopolies Commission is “an independent expert committee, which advises the German government and legislature in the areas of competition policy-making, competition law, and regulation”; retrieved from: <http://monopolkommission.de> on 22-03-2015.

the practice of the competition authorities deserves a critical review. It appears the administrative bodies only focus on competition problems to the detriment of other online service providers (i.e., the primary market level), and do not at all address problems of data access or data security of consumers (i.e., the secondary market level) (Monopolkommission, 2014, p. 69). The German Monopolies Commission sees this selective regulation of competition as insufficient to solve current problems or resolve customer concerns. Even though the competition law primarily focuses on market structure and actions against competitors, consumer welfare is an important component as well. Consumer welfare encompasses the protection of personal data – “the ultimate purpose of competition law is to ensure that the internal market will satisfy all reasonable wishes of consumers for competition, including not only the wish for competitive prices but also the wish for variety, innovation, quality, and other nonprice benefits, including privacy protection” (European Data Protection Supervisor, 2014, p. 17).

Concerning the problem of extensive access to user data, the German Monopolies Commission analyzed the existing competition regulations regarding their suitability for preventing these security issues (Monopolkommission, 2014, p. 69). As for merger control, it regulates market structure by supervising transactions between companies (i.e., mergers or acquisitions), which may have a significant impact on it. In recent years, several transactions between online service providers involving extensive data and user portfolios have been subject to merger control. One of them is the agreement between Facebook and WhatsApp discussed in the following section. Due to turnover thresholds that must be reached in individual countries, German authorities did not have the opportunity to assess the announced transaction. During the determination of the merger control jurisdiction, the data-related turnovers were not taken into consideration by the European competition authorities. The German Monopolies Commission views this matter as problematic and considers transaction volume or market shares as better jurisdiction criteria for German authorities (Monopolkommission, 2014, p. 70). However, it is already questionable if merger control is appropriate to use in regulating data security matters, and if there is a need to extend its application domain. The German Monopolies Commission explains that data security instead is a question of abusive exploitation of market power rather than the subject of merger control. The main focus of merger control lies in market structure and thus is only partially suitable to secure the competition against dynamically changing markets, such as the Internet (Monopolkommission, 2014, p. 70).

The German Monopolies Commission recognizes the current handling of personal data as a serious challenge for government and society, and the current competition law enables only limited interference against abusive personal data

exploitation. One solution would be extensive data security regulation; however, it is uncertain if such would be compatible with competition law (Monopolkommission, 2014, p. 72). There are already several regulations addressing data protection and respect for privacy existing side by side with the competition law. Regarding regulations beyond the competition law, we find Article 7 of the Charter of Fundamental Rights (the Charter), which governs the right to respect for private and family life, home, and communications against the state (EU, 2012, Article 7), and in Article 8 of the Charter, the protection of personal data (EU, 2012, Article 8). According to the Charter, personal data can only be processed when several essential requirements are fulfilled, namely, when the processing is fair and lawful, when it occurs for specified purposes, when it is transparent to the individual, and when this individual can access the collected data (European Data Protection Supervisor, 2014, p. 12). Another relevant regulation is the Data Protection Directive 95/46/EC (EC, 1995), in which, according to Article 12, individuals have the right to access data relating to them as well as to rectify, erase, or block data that is incomplete or inaccurate (European Data Protection Supervisor, 2014, p. 15).

In 2012, the EC proposed a comprehensive reform of data protection rules including, for example, the “right to be forgotten” (EC Press Release IP/12/46). The aim of the planned General Data Protection Regulation is to harmonize the current data protection laws across the EU. In contrast to the (Data Protection) Directive, this regulation will be directly applicable in all EU member states without the need for nationally implementing legislation (Computer Weekly, 2015). Consumer welfare in general is not defined in the EU competition law, and its relationship with market efficiency (as the main issue of the competition law) is not commonly understood (European Data Protection Supervisor, 2014, p. 19). In the holdings concerning competition cases by the European Court of Justice (ECJ), we rarely find references to consumer welfare. However, even if not explicitly referenced (and then only at a conceptual level), consumer interests are taken into account in each major branch of the competition law – prohibition of anti-competitive behavior, abuse of dominant market position through exclusionary conduct or exploitation, control of mergers, and control of state aid (European Data Protection Supervisor, 2014, p. 19).

In the digital economy, personal data is a significant intangible asset in the value creation of online services, and it may have further implications for defining key concepts in competition law, such as transparency, market dominance, or consumer welfare and harm (European Data Protection Supervisor, 2014, p. 37). Even though there is heightened risk for personal data, “the market for privacy-enhancing services (...) remains weak. While many consumers may be becoming more and more ‘tech savvy,’ most appear unaware of or unconcerned

by the degree of intrusiveness into their searches and emails as information on their online activities is logged, analyzed, and converted into revenue by services providers” (European Data Protection Supervisor, 2014, p. 11). A new concept of consumer welfare protection for competition enforcement could be based on the abuse of market dominance and consumer harm through a refusal of access to personal information and misleading privacy policies, which could further lead to the promotion of privacy-enhancing services and better control over one’s own personal data (European Data Protection Supervisor, 2014, p. 26).

A greater need exists for rigid merger control when considering the amount of data accumulated by companies to be one of the most important indications for (online) market dominance, as well as the need to assess a given transaction’s impact not only on competitors but also on users. The lack of effective policymaking interaction among competition, consumer protection, and data protection efforts “may have reduced both the effectiveness of competition rules’ enforcement and the incentive for developing services which enhance privacy and minimize potential for harm to the consumer” (European Data Protection Supervisor, 2014, p. 37). To better understand the current praxis of the EC during a merger control, in this chapter, we examine the transaction between Facebook and WhatsApp conducted in 2014.

Newest Trends

The digital market is developing rapidly. Again and again, new and alarming trends concerning data privacy emerge, for example, big data analyses, which are useful for optimizing products, processes, or business decisions, and involve analytic association of vast amounts of data (retrieved from different sources) in order to attain economic, social, or scientific insights (Ohrtmann & Schwering, 2014, p. 2984). However, the concept of big data entirely contradicts the basic principles of data protection – data minimization (only to utilize as much information as necessary) and appropriation (only to collect or analyze data for specific and explicit purpose) (Ohrtmann & Schwering, 2014, p. 2984 ff.). The increasing use of personal information for marketing aims may be explained by economic efficiency, which arises when complete information and transparency are provided (see Posner’s neoclassical economic theory, Posner, 1978; Spiekermann & Novotny, 2015, p. 181).

It appears the basic principles of data minimization and appropriation are not fully compatible with the requirements of the *digital information society* (Hackenberg, 2014, recital 17). As for Germany, the basic decision of the Federal Constitutional Court from 1984 (the so-called “census verdict”) led to the estab-

lishment of these two principles as grounds for the informational self-determination fundamental law. This law was based on the idea that each person has the right to know who owns what information about her/him, and for what purpose. However, it is questionable if today, a frequent Internet-user, even after proper clarification by providers, can still maintain an accurate overview of all the information he/she once disclosed (Hackenberg, 2014, recital 17).

Another current privacy issue comes from the *social media login*, which allows users to create new accounts with further service providers by using already existing social media profile (i.e., Facebook, Google Plus, or Twitter). The (personal) information on the former social media profile is usually shared with the new service provider upon registration (Weber, 2015, p. 236). Besides the exchange of data and linking profiles or services originally meant to remain separate (such as a professional account on LinkedIn, meant to establish an individual's credibility and professionalism in the labor force, now linked to a Facebook-account, designed to showcase one's leisure activities and personal life beyond the workplace), a serious threat is posed by the possibility of criminal activities. Once login-data for one service is obtained, several other services can be easily accessed as well (Weber, 2015, p. 236).

Therefore, when it comes to the information market, huge amounts of personal data, and along with them, an uneasy feeling about their attendant data security, travel in tandem. We have observed the challenges that come from new developing sectors and the (un)suitability of current legislation to meet or if need be overcome them. In the following section, we will examine the current EC practice in a case concerning all the problems we have noted above – the agreement between Facebook and WhatsApp.

Agreement Between Facebook and WhatsApp

During the last decade, Facebook has acquired over 50 companies. The most “controversial” transaction discussed by the media and feared by users was the 2014 acquisition of WhatsApp. In this section, we examine this agreement and the EC proceedings pertaining to it. The commentary is based upon the EC's decision *Case No. COMP/M.7217 – FACEBOOK/WHATSAPP*. On 29 August 2014, Facebook notified the EC about its planned acquisition of WhatsApp by means of a share deal (i.e., purchase of shares). Keep in mind the broad spectrum of services the *company* Facebook, Inc. currently offers and that the *Facebook* social networking platform is only one component in its product range. The EC described the notifying party (Facebook) as a provider of websites and applications for mobile devices offering SNSs (e.g., the platform *Facebook*), consumer communications

(*Facebook Messenger*), and photo/video sharing functionalities (*Instagram*), as well as a provider of online advertising space. The other party, WhatsApp, has a much narrower field of activity. It only provides consumer communication services (CCS) via the mobile application WhatsApp and does not sell any advertisement space. The purchase price amounted to 19 billion USD, and the transaction resulted in Facebook gaining sole control over the entity into which WhatsApp was merged.

The transactions did not have a strict EU dimension, because given WhatsApp's limited revenue, it did not meet the required turnover threshold (EC, 2015, p. 2). However, the notifying party requested that the EC examine the case, and the transaction was deemed to have a EU dimension pursuant to Article 4 (5) of the Merger Regulation (EC, 2004b, Article 4). Again, the question arises: Is a current regulation of the EC's jurisdiction appropriate for new sectors, in this case, digital ones? As in the investigated transaction between Facebook and WhatsApp, other cases may eventually arise offering free (or nearly so) products to consumers, and therefore fall outside the EC's jurisdiction (EC, 2015, p. 2). The merger control process can be pursued only when the required thresholds are reached, and in cases such as this, only when one or both parties operate in two-sided markets "where their free services are monetized through advertising, as in the case of online search or social networking services" (EC, 2015, p. 2). It could be beneficial to take an example from the United States and base identifying the EU dimension on the transactions' value, especially for the digital market, since "turnover-based thresholds do not properly reflect the future market potential of an IT company" (EC, 2015, p. 2). Furthermore, it should be considered that on the online market, personal data customers provide could be viewed as the "currency" they use to pay for the "free" service (EC, 2015, p. 2).

During its investigation, the EC worked to define the relevant product and geographic markets for both parties and conduct a competitive assessment for them all. With due regard to the assessment's outcome, the EC decided not to oppose the transaction and cleared the acquisition as being compatible with both the internal market and the EEA agreement. After a short summarization of the EC's conclusions regarding the relevant markets and competitive assessment, we offer a discussion/critical review of the decision, especially as it concerns data privacy and security.

Relevant Markets

In the course of the investigation, the EC considered the three markets Facebook is active on to be relevant: 1) CCSs, 2) SNSs, and 3) online advertising services.

Consumer communication services. CCSs are “multimedia communications solutions that allow people to reach out to their friends, family members, and other contacts in real time” (EC, 2014, recital 13). These services can be further differentiated into stand-alone applications (e.g., WhatsApp, Viber, Threema, and Facebook Messenger) or functionality being part of a broader offering (e.g., Facebook, Xing, or LinkedIn). Despite the single functionalities of text, photo, video, or group chat, the distinction can be made regarding the operating system for which the applications are available. Here, the differentiation among applications (apps) is mostly made among “proprietary apps” available for only one operating system (e.g., FaceTime or iMessage) and “cross-platform apps” available for multiple operating systems (e.g., WhatsApp and Facebook Messenger) (EC, 2014, recital 17). The most important question is whether this differentiation between CCSs indicates the presence of separate product markets. The concrete definition of the relevant market is important, since a narrow market definition may lead to a certain company becoming dominant, whereas a broad definition would rank the same company as only one among many market players.

In the present case, the EC decided the relevant product market should encompass consumer communication apps for all operating systems and include all communication functionalities, since an investigation indicated that communication apps available for different operating systems are normally regarded as a single product (EC, 2014, recitals 23, 27). The EC assessed the effects of the transaction between Facebook and WhatsApp in the product market of consumer communication apps for smartphones. Regarding the geographic market, the EC decided it is at least EEA-wide, if not worldwide.

Social networking services. The social networking platform is Facebook’s core offering. The essential functionalities of such SNSs are to create public or semi-public profiles and lists of friends or contacts, followed by exchanging messages, sharing information (through posts, links, or videos), and commenting on other users’ posts (EC, 2014, recital 51). Even though there are some overlaps between SNS and CCS (e.g., content-exchange), the differences between them remain crucial. As for SNSs, they “tend to offer [a] richer social experience,” whereas “the functionalities of consumer communication apps (...) are more limited and focus on enabling basic communication between users rather than creating a richer experience around their digital identity” (EC, 2014, recital 54). The assessed differentiation by the EC can be further inferred from Table 2.

Table 2: Differences Between SNS and CCS (EC, 2014, Recitals 51–56).

Social Network Services	Consumer Communication Services
Rich social experience through disclosure of personal interests, activities or life events etc.	Focus on basic communication between users instead of creating a richer experience around one's digital identity
Messages (posts, comments) are normally not expected to be answered in real time	Instant, real-time communication, responses are normally sent promptly
Communication and information-sharing with broad audience (or even strangers)	Targeted and personal communication (mostly only on one-to-one basis)

The EC left open whether CCSs should fall within the scope of the SNS market since the transaction would not raise any concerns under any alternative market definition. As for the geographic market assessment, the scope for the relevant SNS market is, again, at least EEA-wide, if not worldwide.

Online advertising services. The last product market to define was the advertising sector. As for Facebook, it provides online (non-search) advertising on its SNS platform. However, there is no advertising on Facebook Messenger. As for WhatsApp, it “does not currently sell any form of advertising and does not store or collect data about its users that would be valuable for advertising purposes,” nor are messages sent by users stored on WhatsApp’s servers (EC, 2014, recital 71). Here, the question concerns whether the transaction may somehow change Facebook’s position in the advertising market.

The EC distinguished between providing offline versus online advertising space. Further sub-segmentation may be offered for search and non-search advertising, as well as mobile and static online advertising. For the investigated case, the EC stood by its distinction between online and offline advertisement without further sub-segmentation, hence, a rather broad market definition. Regarding geographic reach, the “advertisers typically purchase online advertising space and conduct advertising campaigns on a national (or linguistic) basis” (EC, 2014, recital 82). Therefore, the EC concluded, “that the online advertising market (...) should be defined as national in scope or alongside linguistic borders within the EEA” (EC, 2014, recital 83).

Competitive Assessment

After defining relevant product and geographic markets, the EC next pursued a competitive assessment, investigating whether the transaction would have an impact on predefined markets and would raise concerns in terms of the competition law. The most important aspects the EC focused on were market shares, closeness of competition, consumers' ability to switch providers, and possible barriers to entry and expansion (for competitors).

Consumer Communication Services

Regarding the CCS industry, the transaction involved Facebook Messenger with approximately 250–350 million users worldwide and 100–200 million users in the EEA, and WhatsApp with approximately 600 million users worldwide and 50–150 million users in the EEA (EC, 2014, recital 84). Despite these two large players, there are other providers present in the EEA and worldwide markets. According to the EC's market investigation, the main drivers for competitive interaction between the different CCS providers are the functionalities offered and the underlying network (EC, 2014, recital 86). In addition, many customers use several CCS apps simultaneously, the so-called “multihoming” (EC, 2015, p. 5). Such apps are only useful when the people with whom the users want to communicate also employ that same concrete CCS, and a larger network makes this more likely to occur. Due to network effects, the value of a product or service increases with the number of users and, as for the Facebook/WhatsApp transaction, mainly, the primary direct network effects are affected (an increase of users directly benefits those same users) (EC, 2015, p. 5). The final two important aspects appear to be the “perceived trendiness and coolness amongst groups of users” and the price of the app (CCS consumers appear to be very price-sensitive) (EC, 2014, recitals 89–90).

First, the EC targeted the market shares and concentration level of both parties. The estimated market shares (in the EEA) for the period between November 2013 and May 2014 are listed in Table 3. Even though the EC assessed that the data on market shares (provided by the parties) are probably underestimated, it concluded that in the present case, the market shares are not necessarily indicative of market power, and hence, are not a threat to competition. The EC based this reasoning on the concept that the CCS is “a recent and fast-growing sector ... characterized by frequent market entry and short innovation cycles in which large market shares may turn out to be ephemeral” (EC, 2014, recital 99). This

view has reference to Schumpeter's innovation cycles discussed in section above, this chapter.

Table 3: Market Shares, EC (2014).

Provider	Shares
Facebook Messenger	20–30 %
WhatsApp	10–20 %
Android's messaging platform	5–10 %
Skype	5–10 %
Twitter	5–10 %
Google Hangouts	5–10 %
iMessage	5–10 %
Viber	5–10 %
Snapchat	0–5 %
Other market players	0–5 %

Second, the EC examined whether both parties are close competitors on the CCS market. There are several important differences between Facebook Messenger and WhatsApp. One of them is the identification system used to gain access to the service, with the contact lists also coming from different sources. The user experience in Facebook Messenger is richer (given the integration with the SNS platform Facebook), but its privacy policy is less favorable (data collection about users for advertising activities) (EC, 2014, recital 102). Given a significant overlap between these two networks as well as the consumer tendency for multihoming, the EC concluded the two offerings complement rather than closely compete with each other.

Third, the EC investigated whether consumers can still take into account alternative services. Switching costs among different providers are relevant, and according to the EC, to date, are not significant. All CCS apps are either available free of charge or at a very low price, all are easily downloadable and can coexist on the same handset, switching time between different apps installed on one device is nearly nonexistent, learning costs are minimal due to similar and simple user interfaces, and information about new apps is easily accessible (EC, 2014, recital 109). Also, due to “push” notifications, users are not required to actively launch each app (EC, 2015, p. 5) Another important aspect is the missing “*status*

quo bias,” since the considered apps are preinstalled on only a very small amount of handsets, whereas a software pre-installation can apparently make switching more difficult (EC, 2014, recital 111). The only issue of concern may be network effects that could lead to an increase of switching costs (EC, 2014, recitals 112–115), as they create value for the users and can make competition more difficult. When the number of users grows, more users are attracted to the service, which in turn leads to a positive feedback loop (which is why most online services are free of charge in order to generate a critical mass of users) (EC, 2015, p. 4).

Fourth, the EC checked the market entry and expansion barriers for (potential) competitors. Here, the CCS market “has been characterized by disruptive innovation” (EC, 2014, recital 116), which may be explained with Schumpeter’s theory on innovation cycles. Hence, there are no particular “traditional barriers for new providers entering the market” of concern (EC, 2014, recital 117). This (new) market is dynamic and fast growing; in addition, there are no patents or other intellectual property rights hindering the entry of new competitors. The transaction itself would not increase the entry barriers since neither of the parties disposes of any control elements (EC, 2014, recitals 118–121). Finally, the only concerning aspects are again network effects. Many competitors see “the presence of established players with a large user base and network effects in consumer communication apps” as a significant entry or expansion barrier (EC, 2014, recital 126).

The mechanics of network effects were explained in section above, this chapter. Facebook Messenger and WhatsApp have a large user network. According to the EC, while network effects as such do not “a priori indicate a competition problem in the market affected by a merger,” they may, however, in some cases allow involved parties to foreclose on competitors (EC, 2014, recital 130). The EC examined whether an acquisition may strengthen network effects, which would be possible only if the transaction somehow led to uniting the two networks into a single, larger one (EC, 2014, recital 136). According to Facebook, such an integration would cause significant technological difficulties and is not intended. Even if it were to take place, there is already a significant overlap between the user bases, so no significant strengthening of network effects would occur. In due consideration of the above-outlined aspects, the EC expressed no serious doubts regarding the compatibility of the transaction with the internal market (with respect to the CCS).

Social Networking Services

Facebook operates one of the largest SNS platforms worldwide. The important question here is whether WhatsApp is Facebook's (close) competitor in this sector (i.e., also perceived as an SNS). Taking into account the differentiation presented in Table 2, SNSs provide far richer social experiences. Therefore, providers such as Facebook, Google Plus, LinkedIn, Twitter, and MySpace ought to be qualified as SNSs (EC, 2014, recital 148). Should we enclose the consumer apps into the SNS market, the competition would be even greater and would include such services as WhatsApp, LINE, WeChat, iMessage, Skype, Snapchat, Viber, and Hangouts (EC, 2014, recital 150). This broad view on the SNS market would lessen the market shares of Facebook and make the agreement even less of a concern in terms of competition law. However, the differences among these groups of services are quite significant. The EC concluded that the diverse functionalities and focuses of Facebook and WhatsApp prevent these two providers from being seen as close competitors on the SNS market. Should a post-transactional integration of WhatsApp into Facebook occur, its impact would be mitigated by the fact that a large share of WhatsApp users already utilize Facebook (approximately 70%–90%) (EC, 2014, recital 162). Considering all the above, the EC did not see any concerns regarding the transaction's compatibility with the competition law in terms of the SNSs market.

Online Advertising Services

The final assessed market was that of online advertising. Its importance should not be underestimated. Even though for users, the core service of Facebook appears to be a social network, the company's money flowing in on the other side, thanks to its advertising service. For SNS users, the service appears to be free of charge, however, users pay with the currency of their time, attention, and personal data. How much Facebook actually collects with its online advertising program can be concluded from the information presented in Table 1. The EC has analyzed the potential data concentration to investigate whether the transaction is likely to strengthen Facebook's position in the online advertising market. Apparently, the consumer protection and privacy-related concerns emanating from this transaction do not fall within the scope of EU competition law, but instead within the scope of EU data protection rules (EC, 2014, recital 164). In general, there are two cases in which data may be relevant in the competition law assessment of mergers in the digital sector – “either as a competitive advantage

of the merged entity, or, on the context of privacy, as a non-price parameter of competition in the market” (EC, 2015, p. 5).

There are no horizontal overlaps in the market for online advertising, since WhatsApp is not active in this area. Moreover, WhatsApp does not collect data about its users concerning age, verified name, gender, social groups, and so forth, nor does it store the messages (once they are delivered). Therefore, there is no user data beneficial for online advertising that Facebook could use (EC, 2014, recital 166). Facebook could only strengthen its position if (post-merger) advertising were introduced on WhatsApp or its user data were used for something other than their original purpose (EC, 2014, recital 167). It is important to keep in mind that in the digital economy, data can be construed as “assets” or offering a “competitive advantage.” Large datasets thus are increasingly valuable and form a competitive advantage for companies active in targeted online advertising, online search, or SNSs (EC, 2015, p. 6).

Regarding the first possibility (introducing advertising on WhatsApp), Facebook’s market shares in the sector of targeted advertising are around 20 %–30 % (EC, 2014, recital 171). Introducing advertisements on WhatsApp would renege on that firm’s earlier “no ads” policy. Furthermore, there would be a need to abandon end-to-end message encryption, which would lead to broad discontent of users who value data privacy and security. Indeed, “privacy concerns also seem to have prompted a high number of German users to switch from WhatsApp to Threema in the 24 hours following the announcement of Facebook’s acquisition of WhatsApp” (EC, 2014, recital 174). Given the circumstances, introducing ads on WhatsApp is very unlikely. Nevertheless, should such a change be implemented, there remain enough actual and potential competitors as strong as Facebook in the targeted ads sector (EC, 2014, recital 179).

Regarding the second possible scenario in which WhatsApp is used as a potential source of user data, the EC expressed no concerns. First, the collection and integration (or matching) of data from Facebook and WhatsApp would require complex technological changes and regulatory adjustments that are apparently not wanted by either party. Second, such changes would motivate many users to switch providers. Furthermore, even if these changes were pursued, a significant number of alternative providers of online advertising would remain. The EC decided that “there will continue to be a large amount of Internet user data that are valuable for advertising purposes and that are not within Facebook’s exclusive control” (EC, 2014, recital 189).

While taking into account all addressed matters, the EC cleared the transaction as being compatible with the internal market and with the EEA Agreement. The aspect of privacy, however, was left open.

Critical Review and Data Privacy Concerns

In the end, the EC expressed no concerns concerning the agreement between Facebook and WhatsApp. Again, however, we witness the emergence of a lack of compatibility between competition law/merger control and consumer protection/data security. In two-sided markets, products are offered at no charge to users, but monetized through targeted advertising; hence, private data comprise the “currency” with which the users pay (EC, 2015, p. 6). Accordingly, post-merger, if a provider starts to require “more personal data from users (...) as a condition for delivering its ‘free’ product [this change] could be seen as either increasing its price or as degrading the quality of its product” (EC, 2015, p. 6). Consequently, such behavior could lead to competition or infringements of data protection law. Still, this “theory of harm” is only relevant in cases “where privacy is an important factor in the decision to purchase a product or services, that is, a key parameter of competition” (EC, 2015, p. 6), and was not applied to the Facebook/WhatsApp transaction. Even though consumer protection is indirectly included in the aims of the competition law, it does not really surface when it comes to data privacy issues, as apparently this is already a separate jurisdictional concern controlled by the data privacy regulations. Nonetheless, there are serious data privacy issues regarding such occurrences on the online market – concerning WhatsApp and Facebook separately, and especially after the acquisition process is complete.

Market Entry Barriers

Regarding market entry barriers, the EC presumed that even such a strong or dominant market position as Facebook enjoys would not raise any serious competition concerns. This presumption was based on the digital market being characterized by Schumpeter’s innovation cycles, which posit dominant market players being quickly replaced by new ones. As explained in section above, this chapter, however, the quasi-monopolistic position of Facebook may persist far longer than that of its predecessors, namely, due to its “immunization strategy,” network effects, and, following Waller (2010), its *stickiness*. The term *stickiness* means that in some way, Facebook has become “mandatory” for millions of users to join for social reasons. A temporary account deactivation (or even worse, a permanent one) can be psychologically and socially difficult and damaging, because one is not reachable online anymore – to family members, friends, or colleagues. Facebook’s stickiness also derives from the fact that the information gathered on Facebook cannot be easily exported to another SNS profile (Waller, 2010, p. 1789). Considering the strong network effects and stickiness (and possibly such aspects

as brand loyalty, information gaps, and some switching costs), it is possible that current users of Facebook are (or feel) locked-in to the system, giving Facebook dominant market power (at least over current users) (Waller, 2010, p. 1791).

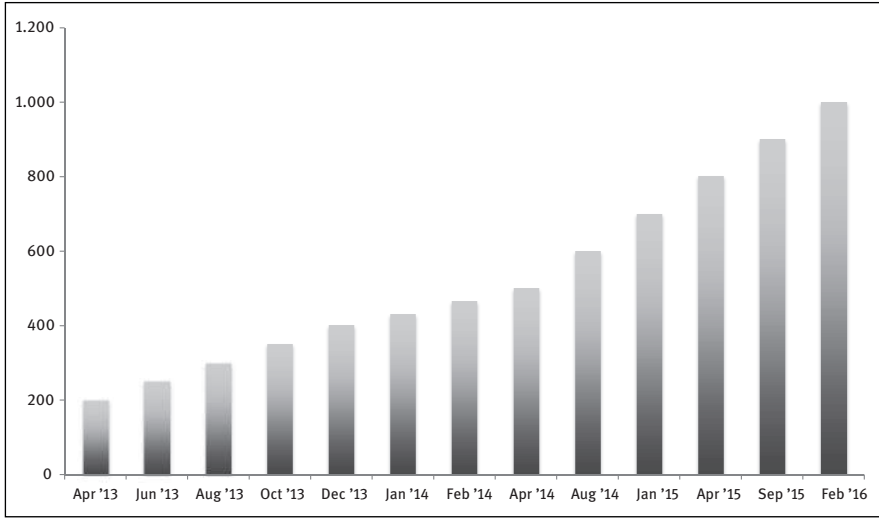


Figure 3: Monthly Active WhatsApp Users, April 2013-February 2016 (in Millions).
Source: Statista, 2016.

WhatsApp and Privacy Concerns

According to “Datenschutzbeauftragter” (2015), message content sent with WhatsApp is stored on its servers until the messages are delivered, but not longer than 30 days. Moreover, WhatsApp gains access to the user’s address book and uses only the telephone numbers saved there. After an account is deactivated/deleted, all user data, except for payment information, is also erased (the deletion of the payment information occurs after 30 days) (Datenschutzbeauftragter, 2015). At first, this seems to be relatively good news for users concerned with privacy. However, during WhatsApp’s growth period, every once in a while, serious data privacy objections arose. In 2012, it was learned that messages sent via WhatsApp were not encrypted (which in turn leads to a high risk of interference by unauthorized third parties), because even though the company had implemented encryption in its new version of the app, it was very simple and therefore easy to hack (Datenschutzbeauftragter, 2015). Notwithstanding the issue of poor encryption, the amount of information users must allow WhatsApp

to access upon its installation (microphone, pictures, location data, etc.), and that afterward, are allegedly stored on servers located in the United States, was also criticized (Datenschutzbeauftragter, 2015, with further references). With the start of 2015, WhatsApp adopted end-to-end encryption (following the lead of other messenger apps more concerned with privacy, e.g., Threema), however, initially only for Android devices and excluding group-chats and media. Moreover, it became known that users' privacy settings can be easily circumvented (see Datenschutzbeauftragter, 2015, for further references). Finally, the straightforward functionality of direct association of a phone number with a user's identity is more problematic than it first appears. It is enough to save a phone number in an address book in order to access considerable information about the number's carrier. When this phone number is associated with a registered WhatsApp user, it automatically appears in the WhatsApp favorites' list (without any *contact confirmation* or related information). Next, we can easily observe the profile picture or status changes as well as the usage habits (by monitoring when and for how long the user is online) (see King (2014) with further references). Yet, apparently, all of these shortcomings failed to discourage millions of people from using WhatsApp (see Figure 3).

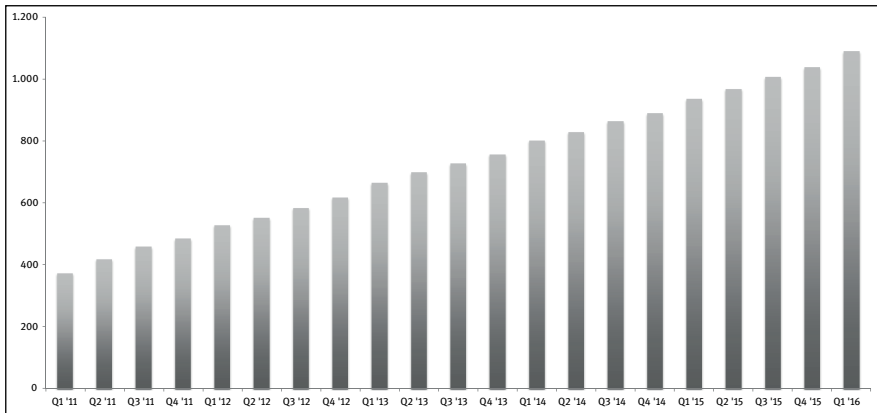


Figure 4: Daily Active Facebook Users (in Millions, Worldwide), 2011-2016.

Source: Statista, 2016.

Facebook and Privacy Concerns

It appears that Facebook causes even more privacy concerns than WhatsApp. Facebook has access to huge amounts of data, which is further analyzed and used

for online advertisement. Nonetheless, the count of Facebook users continues to increase (see Figure 4). Many users who broadly disclose aspects of their private life on Facebook (or other SNSs) either do not realize to what extent their personal data are being used or simply do not care. It is not a vague notion to state that Facebook and other SNSs compete on the data markets, that is, the market for information about users. It would be a significant advantage for an SNS to be able to define privacy as an aspect of non-price competition, leading to SNS providers competing to offer the best form of privacy to users (Harbour & Koslov, 2010; Waller, 2012). Today, instead we recognize the opposite tendency, namely, “most social networking [web]sites compete in the opposite direction as to the acquisition, compilation, manipulation, exposure, and monetization (rather than protection) of personal information” (Waller, 2012, p. 1784). However, some users have acknowledged the potential endangerment of personal information and fight against excessive personal data (mis)use by the big online market players. In this regard, the safe harbor decision by the European Commission is emphasized as it enables U.S. companies to gain, relatively easily, access to European users’ data.

Data Transfer Outside the EU

Data transfer outside the EU on principle is only legal when the non-European country assures an adequate level of data security (see Article 25 of the Data Protection Directive 95/46/EC, EC, 1995; Jensen, 2014). The aim of this regulation is to ensure that the rights and interests of the person concerned are not endangered due to data export (Deutlmoser, 2014, recital 41). The agreement made between the EC and the U.S. Department of Commerce thus comprises the safe harbor principles (EC, 2000), enabling easier data transfer between the two regions. According to the agreement, the required privacy standard is maintained when data are transmitted to a U.S.-based company that complies with the safe harbor principles (Deutlmoser, 2014, recital 43; Spies, 2013, p. 535). However, the validity of this agreement was questioned after a lawsuit (in the form of a class-action) against Facebook was filed by an Austrian privacy activist, Max Schrems (Privacy Association, 2015; SC Magazine, 2015). This case has already been in motion for a few years. Schrems started a citizens’ initiative against Facebook (and indirectly other similar U.S. Internet giants that control enormous amount of private information), called *Europe versus Facebook*². The heavy critique about Facebook and

² <http://www.europe-v-facebook.org/>

the safe harbor decision started after Edward Snowden's affair exposing the practice of NSA and its program PRISM (Bräutigam, 2015).

Edward J. Snowden is a former U.S. Central Intelligence Agency (CIA) employee and former National Security Agency contractor, who in 2013, publicly revealed intelligence information concerning Internet surveillance programs, such as PRISM, Xkeystone, and Tempora (Zhang & Schmidt, 2015, p. 201). After this disclosure, data privacy authorities started questioning the current regulations that pertain to data transmission to nonmember countries. Foreign intelligence services were alleged to be accumulating vast amounts of private data, violating European data-privacy standards (Voigt, 2014). After Max Schrems filed his complaint against Facebook regarding Facebook's cooperation with NSA, the Irish High Court submitted questions to the ECJ concerning the continuity of the safe harbor agreement with the United States after this disclosure by the whistleblower, that is, the compatibility of the agreement with the Charter (ZD-Aktuell, 2014). The Irish High Court wished to "ascertain whether that Commission decision [from 26 July 2000, the safe harbor scheme] has the effect of preventing a national supervisory authority from investigating a complaint alleging that the third country does not ensure an adequate level of protection and, where appropriate, from suspending the contested transfer of data" (ECJ, 2015). First, the Court of Justice held that the existence of a Commission decision "cannot eliminate or even reduce the powers available to the national supervisory authorities" and "the supervisory authorities (...) must be able to examine, with complete independence, whether the transfers of person's data to a third country complies with the requirements laid down by the directive" (ECJ, 2015). Second, the Court investigated whether the safe harbor decision itself is invalid. Here, the Court observed that "the scheme is applicable solely to the United States undertakings which adhere to it, and United States public authorities are not themselves subject to it," and furthermore, "national security, public interest and law enforcement requirements of the United States prevail over the safe harbor scheme, so that United States undertakings are bound to disregard, without limitation, the protective rules laid down by that scheme where they conflict with such requirements" (ECJ, 2015). All in all, the Court of Justice found that the Commission "did not have the competence to restrict the national supervisory authorities' powers" with the safe harbor scheme, and declared the safe harbor decision invalid (ECJ, 2015).

The Europe-versus-Facebook initiative offered a number of relevant objections about Facebook's monopolistic position and power, as well as several interesting proposals to resolve the situation. One of the proposed solutions, next to data minimization and more transparency, is an open social network: "Like with your email, you should be able to choose your provider and still be able to communicate with your friends [who] made another choice. This would mean that the

market for social networks would be open to new business models or even non-profit concepts that would bring us innovation and choice.”³ It is not necessary to determine whether the idea of an open social network would indeed solve current data privacy-related problems. There are other legal steps with much higher priority. Data privacy regulations and competition law both need to be more compatible, especially regarding merger control in order to prevent uncontrolled data concentration. In the age of the Internet, people are overwhelmed with the flow of information, and it can be difficult to keep track of all the changes in agreements, general terms, and conditions imposed by the rising number of online service providers (this is also because due to possible “multihoming,” we are accessing an increased number of online offers simultaneously). Furthermore, consumers might not realize how many services may be housed under one single corporate rooftop. Multicorporate enterprises are getting bigger by acquiring smaller, yet still powerful, popular companies. As a result, numerous personal data sources are becoming concentrated in the hands of very few entities. The leniency toward reckless and frivolous handling of personal data by U.S. companies can be addressed only by more rigid regulations. The nullification of the safe harbor decision is surely a good first step towards better data protection, however, we are in need for new agreement. The annulment of the decision does not mean that since that day, there is no data transfer in the US. The transfer is conducted based on other regulations. Finally, consumers do not have enough power to autonomously resist data abuse. A total “opting-out” from the Internet and its services is of course possible, but nowadays rather difficult and unattractive to pursue.

Do We Need Privacy?

We ought to keep in mind the speed of technological changes as well as the presence of significant intergenerational differences between digital natives (or the millennial generation) who have been born into an already digitalized world, and digital immigrants (or preceding generations) who still can remember life without Facebook and other social media (Bennett, Maton, & Kervin, 2008; Margaryan, Littlejohn, & Vojt, 2011; Kilian, Hennings, & Langner, 2012; Fietkiewicz, Lins, Baran, & Stock, 2016). The digital market is rapidly evolving, and it is more and more complicated to comprehend all the changes and technological trends that may prove available. On the one hand, it is not necessarily true that actions we take at this moment in time toward more rigid data privacy regulations and

3 <http://www.europe-v-facebook.org/EN/Objectives/objectives.html>

protections will indeed favor future generations. Times change. In a few short decades, we may no longer be concerned with data privacy. Instead we might appreciate targeted advertisements showing us which products to buy before we even realize we actually want or need them. We can already recognize tendencies of the youngest generations toward exposing much of their private lives to the world with the help of new media, for example, the live-streaming platform YouNow⁴ (Honka, Frommelius, Mehlem, Tolles, & Fietkiewicz, 2015). On the other hand, many may expect different (and negative) outcomes to occur from such courses of action, similar to George Orwell's version of the future, where people are controlled and watched by "Big Brother" (Orwell, 1949). We cannot precisely estimate the impact of current developments, and it is too early to definitively resolve all competition issues related to this industry (see also Waller, 2012, p. 1772).

Still, society is recognizing that privacy is an "increasingly important dimension of competition" and, therefore, "modern antitrust analysis must take privacy into account. It makes no sense to maintain an artificial dichotomy between competition and consumer protection law, especially when their goals are complementary" (Harbour & Koslov, 2010, p. 773). Furthermore, even though the judicial system, to a certain extent, can sanction the harmful or negative consequences of companies' actions toward consumers and other stakeholders, it is better to prevent these negative effects from happening in the first place since some of them cannot be readily undone. Even if we are challenged to maintain a golden mean among consumer protection, a free market economy, and a developing digital information society, it seems more prudent to prevent troublesome outcomes, rather than try to recover from the damage they may perpetrate on society. One must continuously work to find a balance and support the digitalization and development of technology and the information society, and refrain from entirely blocking out its progress by the aide of traditional legal means. Following Haucap (2015), instead of asking how to constrain new technologies and markets under old regulations, we should focus on new legal frameworks, enabling us to prevent undesirable developments or side effects of the digitalization process. At the same time, these regulations should not limit the development or suppress positive outcomes (Haucap, 2015, p. 1). It remains open whether an amendment of merger regulations would significantly enhance data protection. Still, progress would be easier if such aspects as consumer protection and data security were already included in premerger investigations by the EC, rather than later attempts to obtain demergers and decentralization, anonymization, or deletion of personal

4 <http://www.younow.com>

data. Also, requirements for the EC's jurisdiction (despite the turnover thresholds) for the digital sector should be expanded, so mergers and acquisitions conducted in this market setting (including services that often are free of charge) will not fall outside the scope of merger control.

Conclusion

A high concentration of market power can lead to its abuse and to distortion of competition. Especially in Internet submarkets, we can observe a tendency of such concentration, for example, Facebook among the SNSs. Here, the concentration of market shares in one dominant company may be explained by the presence of strong network effects and the creation of entry barriers. Hence, the question arises whether a dominant position in online markets is temporary or not. In line with this, we wanted to study whether the current European competition law is sufficient to adequately control dominating companies. For this purpose, we examined the acquisition of WhatsApp by Facebook and the assessment of it by the EC.

We found that Facebook uses its financial resources, acquired due to its dominant position on the SNS market, to take over innovative companies. In doing so, the company tries to spur the development of complementary products and services for the SNS, as well as to enter other emerging markets. With the acquisition of WhatsApp, one of the most popular messaging apps in the EEA, Facebook is able to enforce its attempt to gain a foothold in the growth market for mobile Internet communication. Further, it potentially marks the next innovative, developmental stage in Internet usage, with regard to the Schumpeterian view of economic business cycles and the inception of mobile Internet use. Facebook has grasped the potential of the mobile Internet market, and it has not been ruled out that the company will try to integrate WhatsApp into its Facebook app to strengthen network effects (see recent news about implementing the “WhatsApp button” into the Facebook app; Spiegel, 2015). In view of the above, and considering the additional revenues the company prospectively can generate by embedding personalized advertisements on its pages, or collecting and redistributing consumer data, Facebook can move to enforce entry barriers in both SNS and CCS markets. In this way, it can accumulate significant knowledge stock to face down and even foreclose on emerging competitors. Thus, Facebook's acquisition of WhatsApp prospectively serves to bolster its dominant position, stickiness, and economic success.

When considering the Facebook/WhatsApp agreement solely from a merger control perspective, we are in agreement with the EC's assessment of the situation. Facebook and WhatsApp were active on different markets. Although WhatsApp takes a strong, leading role in the market of CCS (especially in the EEA), the application is far from being a monopoly. The CCS market is characterized by short innovation cycles and frequent market entry, both of which spur disruptive changes in competition. This is in line with Schumpeter's theory of innovative leaps followed by sweeping technological change. Another critical point is the user's opportunity for multihoming and perception of low switching costs, which could erode WhatsApp's market share in a short period. Consequently, the acquisition neither induced nor enforced a monopoly in the market for CCS, which is why no severe concerns about this agreement regarding competition law could be offered.

However, in contrast to stance taken by the EC, which expressed no concerns about the acquisition of WhatsApp by Facebook, we pointed out the problem of a lack of compatibility between competition law/merger control and consumer protection/data security. Even if competition law partially comprises consumer protection, this was not considered in the WhatsApp acquisition due to a separate jurisdiction of data privacy issues. Indeed, WhatsApp and Facebook both have recently been associated with privacy issues and, particularly, users' restricted control of personal information. The latest dispute around this matter is a case currently under consideration by the ECJ, which may regulate the handling of personal data with more attention to privacy. Meanwhile, in those markets concerned with communication, such information is a most valuable asset and should not be underestimated. Moreover, when considering the rapid changes and developments in the recent past as well as their outcomes in these innovative sectors, an immediate and definitive settlement of problematic issues appears to be long overdue.

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