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Older and Wiser? Facebook Use, Privacy Concern, and Privacy Protection in the Life Stages of Emerging, Young, and Middle Adulthood

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Abstract

A large part of research conducted on privacy concern and protection on social networking sites (SNSs) concentrates on children and adolescents. Individuals in these developmental stages are often described as vulnerable Internet users. But how vulnerable are adults in terms of online informational privacy? This study applied a privacy boundary management approach and investigated Facebook use, privacy concern, and the application of privacy settings on Facebook by linking the results to Erikson's three stages of adulthood: emerging, young, and middle adulthood. An online survey was distributed among 18- to 65-year-old Dutch-speaking adults ($N = 508$, 51.8% females). Analyses revealed clear differences between the three adult age groups in terms of privacy concern, Facebook use, and privacy protection. Results indicated that respondents in young adulthood and middle adulthood were more vulnerable in terms of privacy protection than emerging adults. Clear discrepancies were found between privacy concern and protection for these age groups. More particularly, the middle adulthood group was more concerned about their privacy in comparison to the emerging adulthood and young adulthood group. Yet, they reported to use privacy settings less frequently than the younger age groups. Emerging adults were found to be pragmatic and privacy conscious SNS users. Young adults occupied the intermediate position, suggesting a developmental shift. The impact of generational differences is discussed, as well as implications for education and governmental action.

Keywords

social networking site, privacy protection, privacy concern, life stage theory, adulthood, SNS

The rapid and high uptake of social networking sites (SNSs) has greatly influenced the public debate on online informational privacy (Madden, 2012). The notion of informational privacy comprises the control of each individual or group to decide on the dissemination of personal information (Altman, 1976; Petronio, 2012). The balance between privacy and self-disclosure is the core of social behavior and defines interpersonal relationships (Petronio, 2012). Moreover, the choice for more or less privacy can change according to situational desires and social goals (Altman, 1976; Petronio, 2012). Therefore, desired privacy may differ according to specific contexts and will influence how interpersonal boundaries are negotiated (Petronio, 2012). More particularly, on SNSs, the outcome of this negotiation takes the form of two strategies: privacy settings control and self-disclosure (Liu, Yang, Yao, & Tu, 2014).

Individuals in different age groups vary in their conceptions of informational privacy and how it is managed on SNSs (Steijn, 2014). Youth are reported to experiment eagerly with online social platforms (boyd, 2014). This need for experimentation, which is inherent to adolescents' development, is one of the reasons why youth are often described in media reports to behave "young and reckless" and take things too far with regard to the dissemination of personal stories and information on SNS (Hoofnagle, King, Li, & Turow, 2010). The perceived vulnerability of children and adolescents and how they deal with online privacy is increasingly discussed in education, media, and policy circles. Young people are clearly viewed as a vulnerable age group in controlling their self-disclosure and managing privacy, but what about older age groups?

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After adolescence, adults continue to develop themselves in terms of social skills (Erikson, 1968). Since SNSs can serve as a means of communication, they can play a significant role in social interactions and regulation of privacy boundaries (Subrahmanyam et al., 2008). The use of SNSs by individuals of older age groups is consistently increasing (Duggan & Smith, 2013). Moreover, research shows that users in older age groups are possibly high-risk users of SNSs, as they have more difficulties in understanding and applying SNS privacy settings (Brandtzæg, Lüders, & Skjetne, 2010). These privacy settings are important tools for controlling self-disclosure, regulating privacy boundaries, and thus managing privacy, in the SNS environment (Litt, 2013; Liu et al., 2014). The inclusion of adult age groups in the comparative analysis of privacy concern and privacy protection is a necessary step in order to obtain a general view on a crucial matter as privacy (Raynes-Goldie, 2012; Steijn, 2014).

It is important, that "adults" are not approached as one uniform group. Individuals' needs and wants in terms of communication and social activity are related to their life stage (Erikson, 1968). It can be assumed that students have different social needs than the working population, therefore have differing ideas on privacy and self-disclosure and subsequently use SNSs in different ways. Therefore, this study investigates Facebook use, privacy concern, and privacy protection on Facebook within different age groups of the adult population. The life cycle theory of Erikson (1968, 1980) and the additional stage of "emerging adulthood" (Arnett, 2000) are used as theoretical framework.

Life Stages of Adulthood

According to the life cycle theory (Erikson, 1968, 1980), eight stages in life can be discerned: infancy (0–1.5 years old), early childhood (1.5–3 years old), play age (3–6 years old), school age (6–12 years old), adolescence (12–18 years old), young adulthood (18–40 years old), middle adulthood (40–65 years old), and maturity (65+ years old) (Kail & Cavanaugh, 2012). In addition to these life stages, Arnett (2000) has formulated a ninth stage: emerging adulthood (18–25 years old). Each life stage is linked to specific needs and wants in terms of identity management and interpersonal relationships (Steijn, 2014). Therefore, the changing social priorities in life may have implications on the use of SNSs and on how privacy is dealt with. Although the life cycle theory is first described in the 1960s, recent studies successfully applied the framework for assessing social development in the digital media era (i.a. Salimkhan, Manago, & Greenfield, 2010; Steijn, 2014; Subrahmanyam, Reich, Waechter, & Espinoza, 2008). The following paragraphs will summarize the body of literature that exists on SNS use, privacy concern, and privacy protection, presented according to the three age groups in this study.

Emerging Adulthood (18–25 Years Old)

Jeffrey Arnett (2000) stated that for developed countries the eight life stages of Erikson did not grasp the most recent societal changes (Bynner, 2005). Due to demographic shifts in terms of age of marriage and age of first childbirth and driven by evolutions in education and welfare, emerging adults nowadays have increased possibilities to develop themselves (Arnett, 2000). This results in the ability for emerging adults to extend the period of experimentation inherent to adolescence (Arnett, 2000; Salimkhan et al., 2010). In terms of social developmental goals, this life stage is characterized by a renegotiation of boundaries through the emergence of intimacy in friendships and romance (Arnett, 2000). Self-disclosure plays a major role in achieving these goals (Christofides, Muise, & Desmarais, 2009; Liu et al., 2014). It is therefore not surprising that emerging adults' SNS use is often characterized by its urge to self-disclose personal information and experiences (i.a. Steijn & Schouten, 2013; Urista, Dong, & Day, 2009). In terms of Facebook use, it is common to use Facebook for public electronic communication (boyd & Hargittai, 2010; Steijn, 2014; Subrahmanyam et al., 2008). In relationships with Facebook-friends, emerging adults seek to share experiences, emotional support, trust, and loyalty (Pempek, Yermolayeva, & Calvert, 2009; Subrahmanyam et al., 2008). In terms of communication with friends, members in this age range are the most active group on Facebook (Bolton et al., 2013; Brandtzæg, Heim, & Kaare, 2010). Moreover, emerging adults seem eager to self-disclose a larger amount and more diverse personal details on SNSs than older adults (Debatin, Lovejoy, Horn, & Hughes, 2009; Steijn, 2014; Subrahmanyam et al., 2008). Yet, users can experience a lack of control over the recipients of their messages since the audiences on SNSs often are broad categories like "friends" or "friends of friends" (boyd & Ellison, 2007; Debatin et al., 2009). The choice between these categories can prove to be a too vague boundary management system, not providing sufficient control (Liu et al., 2014). The eagerness to engage in self-disclosure could raise the impression that emerging adults are less privacy aware. However, research showed that emerging adults are in fact more likely to adjust their privacy settings than users in young and middle adulthood (Dey, Jelveh, & Ross, 2012; Madden & Smith, 2010; Steijn, 2014). According to a recent study carried out by Young and Quan-Haase (2013), only 14% of 17- to 25-year-old adults left their privacy settings untouched. Also earlier studies report high percentages of users in the age range of emerging adulthood to apply stricter privacy settings on SNS (Christofides et al., 2009; Debatin et al., 2009; Madden & Smith, 2010). Authors point to the higher frequency of SNS use and higher Internet knowledge of the younger users as possible explaining factors for these findings (boyd & Hargittai, 2010; Litt, 2013).

Young Adulthood (25–40 Years Old)

The social process of commitment in friendship and romance is typical of this life stage (Erikson, 1968). Experimentation is declining and important boundary choices in terms of intimacy and isolation are made. Moreover, due to the emergence of possible new family situations, loving relationships, and a new work–life balance, the time that young adults spend with friends declines (Crocetti & Meeus, 2014; Steijn, 2014). Consequently, it could be expected that the social function of SNSs for young adults changes from meeting new friends or maintaining (rather superficial) relationships to replacing face-to-face meetings and keeping in contact with different groups in one's social circle (Steijn & Schouten, 2013). Putnam (2001) states in this regard that there are two types of "social capital": bonding social capital (characterized by relationships that offer emotional support) and bridging social capital (characterized by relationships that are maintained because they provide useful information). It can be assumed that Facebook is increasingly used during young adulthood to establish "bonding social capital," by facilitating the maintenance of (offline) "strong tie" relationships. This contrasts with emerging adults' use of Facebook for establishing "bridging social capital"; having many "weak tie" Facebook relationships (Ellison, Steinfield, & Lampe, 2007). Young adults seek to establish social boundaries by attempting to find a balance in the amount of information they disclose to each separate social group (e.g. friends, family, acquaintances, colleagues). Extensive options on Facebook exist to granularly decide what content can be viewed by which user or group. It can therefore be assumed that young adult Facebook users actively control privacy settings on SNSs (Christofides et al., 2009).

During the developmental process, emerging adults become more independent and self-sufficient compared to adolescents. The search for employment and a suitable life partner is typical for emerging adulthood (Arnett, 2000). Therefore, identity experimentation declines and self-presentation become more serious and focused, this has an impact on how (online) privacy is perceived and managed (Arnett, 2000; Bolton et al., 2013; Steijn, 2014). Self-presentation is behavior that seeks to communicate a certain image of oneself toward others. SNS is an important platform for this since it is characterized by a high amount of control (Urista et al., 2009). Self-disclosure and sharing of experiences on SNSs are less unintentional than offline (boyd, 2014; Tufekci, 2007). The developmental change people go through, is reflected in their online behavior (Salimkhan et al., 2010; Subrahmanyam et al., 2008). It can therefore be assumed that a shift takes place during emerging adulthood and results in lower levels of disclosure and higher privacy concern for individuals when they reach the young adulthood life stage.

Middle Adulthood (40–65 Years Old)

Individuals in middle adulthood generally have a busy lifestyle, dividing the majority of their time between family life and career management. SNS users in this age range were found to log on to the network less frequently, but for longer sessions than younger users (Brandtzæg, Lüders, & Skjetne, 2010). They use Facebook for establishing bonding social capital by maintaining contact with old friends and family (Brandtzæg, Lüders, & Skjetne, 2010; Ellison et al., 2007). The use of Facebook as a means for communicating with family members has been found to be the highest in middle adulthood (Brandtzæg, Heim, & Kaare, 2010). Moreover, middle adults publish more status updates or wall posts than younger age groups (Brandtzæg, Lüders, & Skjetne, 2010). Sheehan (2002) found that adults over the age of 45 years could be divided into two categories according to their privacy concern: either not at all concerned or highly concerned about their privacy. Furthermore, SNS members over the age of 40 years are found to have more difficulties in understanding SNS navigation logic and privacy settings, both important technical boundary management tools (Brandtzæg, Lüders, & Skjetne, 2010; Liu et al., 2014). This leads to less privacy control and makes them vulnerable for privacy intrusions (Park, 2013).

Hypotheses and Research Questions

This study investigated Facebook use, privacy concern, and privacy protection on Facebook by linking the results to emerging, young, and middle adulthood. Facebook was used in this study since this is the largest and most popular SNS in the world and has a demographically diverse user base (Duggan, Ellison, Lampe, Lenhart, & Madden, 2015).

Facebook use will be approached in terms of activities that adults performed on the SNS and self-disclosure of personal information on the SNS. Literature suggests that emerging and middle adults engage frequently in publishing wall posts and status updates (boyd & Hargittai, 2010; Brandtzæg, Lüders, & Skjetne, 2010; Steijn, 2014). These types of activities, whereby SNS users share information on the SNS, for multiple people to see, are categorized in this study under "public electronic communication." Based on literature describing the need for self-presentation and public communication during emerging adulthood (i.a. Steijn, 2014), the following hypothesis is formulated:

> *H1*. Emerging adults engage most frequently in public electronic communication on Facebook, followed by the young adults and middle adults group.

Moreover, Facebook can also be used for interpersonal communication, categorized as "private electronic communication."

In this case, the sender of the message chose the receiver, and it is clear which individual(s) will receive and read the

message. Bolton et al. (2013) found that SNS users aged 18–34 years old are more likely than older age groups to use social media for interpersonal communication; therefore, the following hypothesis is formulated:

H2. Emerging adults engage most frequently in private electronic communication on Facebook, followed by young adults. Middle adults use Facebook relatively least for private electronic communication.

In terms of *self-disclosure*, this study will focus on how privacy boundaries are managed by examining the audience with whom the SNS users share their personal information. If more openness is desired, boundaries will be looser and one can assume that a SNS user will share personal information with a larger audience. Literature indicates that emerging adults disclose more, and more diverse personal information in comparison to older age groups (Steijn, 2014). This inspired the formulation of the following hypothesis:

H3. Emerging adults disclose personal information to a larger audience than older age groups.

Personal information will be divided into three groups in terms of "sensitivity": low, medium, and high sensitive data (Brandimarte, Acquisti, & Loewenstein, 2013). For example, respondents could make their information regarding their gender available to everyone, yet make their phone number only visible to their friends. "Mobile phone number" would then be perceived as a more sensitive type of data than "gender." Using this approach, age group differences and similarities in sharing personal information can be defined more precisely. The following research question is formulated:

RQ1. Are there significant age group differences among adults in terms of disclosure of low, medium, and high sensitive personal information on Facebook profiles?

An individual's privacy concern is, among others, dependent on current culture and past experiences (Malhotra, Kim, & Agarwal, 2004). Therefore, people in different age groups are likely to vary on dispositional privacy concern. Yet, authors found evidence of both higher and lower degrees of privacy concern among older age groups (Sheehan, 2002). In order to contribute to the discussion, a second research question is formulated:

RQ2. Do the age groups of emerging, young, and middle adulthood differ in terms of dispositional online privacy concern?

Last, in terms of privacy protection, one of the most important technical boundary management strategies was assessed: the use of privacy settings (Liu et al., 2014). Literature suggests that middle adulthood SNS users have less control over their online privacy due to a lack of understanding of the privacy settings (Brandtzæg, Lüders, & Skjetne, 2010). The emerging adults are more intensive users of SNSs and have a broader knowledge of these platforms; this could possibly explain their frequent use of privacy settings (Litt, 2013). Therefore, the following hypotheses were formulated:

H4a. Facebook users in emerging adulthood update Facebook privacy settings more often than older age groups.
H4b. Facebook users in middle adulthood update Facebook privacy settings less often than younger age groups.

Method

Procedures

The survey was distributed among 579 respondents and had a dropout rate of 12%, resulting in a sample of 508 Dutch-speaking adults aged 18–65 years ($M = 35$, $SD = 12.96$) of whom 51.8% were females. The survey took approximately 15 min to complete. Respondents could access the online survey on *Qualtrics.com*. First, demographic information was gathered. Second, measures for assessing Facebook use were implemented. Third, respondents were presented questions related to their use and knowledge of privacy settings on Facebook. The questionnaire concluded with a scale for assessing privacy concern.

Measures

Facebook Use. Activities on SNSs were assessed through respondents' frequency of several activities (e.g. "commenting on others' photos"). Two items from the Facebook activity scale (Yang & Brown, 2013, reported *Cronbach's* $\alpha = .80$) were dropped from analysis since they did not load .4 on any factor. A principal component analysis was conducted on the remaining 11 items with orthogonal rotation. The Kaiser–Meyer–Olkin (KMO = .835) measure verified the sampling adequacy for the analysis. All KMO values for individual items were >.76. Bartlett's test of sphericity, $\chi^2(45) = 1875.54$, $p < .001$, indicated that correlations between items were sufficiently large. Three components were retained and explained 67.52% of the variance. This choice was justified by looking at the scree plot inflexions and eigenvalues. Component 1 represented the activity "public electronic interactions." An example item of this component was "posting a status update." Component 2 indicated "voyeurism" (e.g. "looking at someone's photos without posting a reaction"). Component 3 represented "private electronic communication" (e.g. "sending a private message"). The three factors that were found in our study were different from the factors ("electronic interactions," "voyeurism," and "gaming

& status updates") found by Yang and Brown (2013). This difference can possibly be attributed to the fact that Yang and Brown used a college student sample. For example, the item "playing games on SNS" did not load on any factor and was withheld from further analysis. Another explanation for the different outcome is methodological choices: First, the answers were originally recorded on a 4-point scale (1 = *never*, 4 = *often*), whereas we used a 7-point scale alternative. Second, we rephrased the question in order to cover the time period "last month" instead of "last week" since we assumed that certain activities on Facebook are not undertaken on a weekly basis by our adult sample. Despite the fact that the results indicated three factors different from the factors found in the original article, this scale proved to be valid and interpretable.

Furthermore, two scales assessed respondents' frequency of logging into the SNS (e.g. "monthly"), and the average hours per day spent on Facebook (e.g. "less than an hour a day"). The scales were inspired by the work of Lenhart and Madden (2007). Also a measure for *Facebook experience* was implemented, inquiring on how long the user already had an account on Facebook. Options ranged from 1 = *less than half a year* to 4 = *more than 2 years*. These frequency measures were implemented as control variables in the study.

Self-disclosure for each piece of profile information was assessed through an instrument based on Walrave, Vanwesenbeeck, and Heirman (2012). Respondents had to indicate for each piece of Facebook profile information to which audience this information was disclosed. The seven answering possibilities were equal to the sharing audiences available on Facebook, from "*not disclosed"* to "*publicly disclosed*." An extra "*I don't know"* option was included. The string values were recoded into a numeric scale; the most private sharing option was coded as 1, the most public sharing option as 7. Sorting these average scores in three groups by size gave an indication of the sensitivity (low, middle, and high) of each type of profile information, assuming that the boundaries for more sensitive information are stricter, and thus more sensitive information is better protected. The group of least sensitive profile information (*Cronbach's* α = .835) consisted of first name, last name, year of birth, gender, birthplace, education, and profile photo. The group of medium sensitive personal information (*Cronbach's* α = .825) consisted of employer, hobbies, e-mail address, mobile phone number, religious views, political views, relationship, and sexual preference. Finally, the group of personal information that was considered the most sensitive (*Cronbach's* α = .773) consisted of album photos, favorite pages, membership of groups, and status updates. A *general score of self-disclosure* could be calculated by taking the average of the sensitivity scores on the different profile items (*Cronbach's* α = .883).

Privacy Concern. The respondents filled out the *Internet Users' Information Privacy Concerns* scale (Malhotra et al., 2004). These 21 items, 7-point Likert-scale assessed the dispositional concern about privacy on the Internet. The scale consists of five dimensions of privacy concern, yet is interpreted as one measure on dispositional privacy concern (*Cronbach's* α = .925).

Privacy Protection. Several measures were implemented for assessing different aspects of privacy protection on Facebook; *knowledge of various privacy settings* on Facebook, and the *extent to which respondents used these settings*. First, respondents were asked to indicate *how often they adapted their privacy settings* during the previous year on a scale ranging from "*never*" to "*4 times or more*" (boyd & Hargittai, 2010). This variable was inspired by the work of Liu et al. (2014), who reported that privacy boundaries are maintained through frequent changes of privacy settings. *Knowledge of privacy settings* in general was measured through three self-constructed items measured on a 7-point Likert scale (*Cronbach's* α = .813). One example statement was "I know how I can block certain people from accessing my profile on Facebook." Finally, the *use of technological privacy tools* (*Cronbach's* α = .72) was assessed through an adapted scale of Litt (2013), consisting of six technological privacy tools and answer options "Yes, I use this," "No, I don't need this." This study added an option "No, I don't know how to use this," in order to assess the knowledge of the respondent of the technological tool. Knowledge was coded as "0" when they indicated they did not know how to use the tool and "1" when respondents indicated they either used the tool or not using the tool was their personal choice. The technological tools for protecting privacy on SNS imply more than just the adaptation of settings; for example, deleting friends, untagging photos, or deleting comments. Both use (*Cronbach's* α = .773) and knowledge of technological privacy tools (*Cronbach's* α = .835) reported high reliability.

Results

Age Groups

The purpose of this study was to uncover age group differences in terms of Facebook use, privacy concern, and privacy protection on SNSs. Analysis of variance was used as method for analysis, with the three age groups serving as a categorical independent variable. The emerging adulthood group consisted of 191 respondents (M_{age} = 21.6, SD = 1.7), 130 respondents were categorized as individuals in the young adulthood (M_{age} = 32.9, SD = 3.7), and 186 respondents were part of middle adulthood group (M_{age} = 50.0, SD = 5.2). The three age groups differed in terms of gender composition, $\chi^2(1) = 7.75$, $p = .021$. The emerging adulthood group had slightly more female respondents (58%), whereas the young adulthood group had slightly more male respondents (58%). Also did the three age groups significantly differ in terms of education, $F(2, 504) = 4.44$, $p < .05$. Tukey honest significant

Table 1. Overview F-tests on age group differences.

	Trend line	Emerging adulthood	Young adulthood	Middle adulthood	[Min; Max]
Facebook use					
Voyeurism**		3.33[ab]	3.06[bc]	2.88[ca]	[1; 7]
PrEC**		3.55[ab]	2.88[cb]	2.49[ca]	[1; 7]
PuEC*		2.49[a]	2.67[bc]	2.47[a]	[1; 7]
Self-disclosure*		3.75[b]	3.75[b]	3.48[ac]	[1; 7]
Low[d]*		5.39[b]	5.09[b]	4.88[ac]	[1; 7]
Middle[d]*		4.02[b]	4.04[b]	3.42[ac]	[1; 7]
High[d]*		2.40[a]	2.80[cb]	2.45[a]	[1; 7]
Privacy concern**		5.23[ab]	5.48[cb]	5.80[ac]	[1; 7]
Privacy settings					
Use**		.80[ab]	.69[cb]	.45[ac]	[0; 1]
Knowledge**		5.60[b]	5.35[b]	4.47[ac]	[1; 7]

Mean scores are reported, results are explained in more detail in the article text. PrEC = private electronic communication; PuEC = public electronic communication.
[a]Significant difference from the young adulthood condition.
[b]Significant difference from the middle adulthood condition.
[c]Significant difference from the emerging adulthood condition.
[d]Sharing of personal information with different levels of sensitivity.
F-test significance level: $^{*}p<.05$, $^{**}p<.001$.

difference (HSD) post-hoc comparisons indicated the young adulthood group ($M=5.14$, $SD=1.24$) to be significantly higher educated than the middle adulthood group ($M=4.72$, $SD=1.41$). Value 4 on this scale equaled *higher secondary education*, 5 stood for *professional bachelor education*. The emerging adulthood group ($M=4.83$, $SD=1.11$) did not differ from the other age groups in terms of education. It has to be noted that emerging adulthood group members are often students and thus have not yet ended their education. Results were controlled for these differences. Table 1 depicts the most important results of this study, outlined in the following paragraphs.

Facebook Use

Insights into how the three age groups used Facebook were found through analysis of variance. Significant differences between age groups were observed for the three activities: public electronic communication, $F(2, 504)=3.67$, $p=.026$, voyeurism, $F(2, 504)=26.25$, $p<.001$, and private electronic communication, $F(2, 504)=98.16$, $p<.001$. Tukey HSD post-hoc comparisons indicated that young adults used Facebook for public electronic communication ($M=2.67$, $SD=.72$) significantly more frequently than emerging adults ($M=2.49$, $SD=.60$) and middle adults ($M=2.47$, $SD=.75$). The two latter groups did not differ from each other in public communication use. The first hypothesis (H1) is rejected. In terms of private electronic communication, evidence was found for the acceptance of the second hypothesis (H2). Emerging adults ($M=3.55$, $SD=.59$) engaged the most in private electronic communication activities, followed by young adults ($M=2.88$, $SD=.84$) and middle adults ($M=2.49$, $SD=.81$). A similar result was found for voyeurism. Emerging adults ($M=3.33$, $SD=.56$) indicated using Facebook for voyeurism significantly more than the other two age groups in the study. A significant difference was also found between young adults ($M=3.06$, $SD=.63$) and the middle adults ($M=2.88$, $SD=.66$) for this variable.

Significant differences between age groups on the calculated general self-disclosure score were found, $F(2, 499)=3.73$, $p<.05$. Post-hoc comparisons indicated that emerging adults ($M=3.75$, $SD=.88$) and young adults ($M=3.75$, $SD=1.09$) did not differ in the extent of the audience with whom they shared personal information, yet they both disclosed profile information to a significantly broader audience than middle adults ($M=3.48$, $SD=1.18$). These findings lead to the partial acceptance of the third hypothesis (H3) of this study.

The first research question of this study (RQ1) was addressed by comparing the three computed variables for low, middle, and high sensitive personal information across the three age groups. Age group differences were found for the *least sensitive* personal information, $F(2,475)=7.40$, $p=.001$. Post-hoc comparisons showed that emerging adults ($M=5.39$, $SD=1.14$) shared the least sensitive personal information with a broader audience compared to middle adults ($M=4.88$, $SD=1.47$). The young adulthood group did not differ from the other age groups in terms of the audience with whom they shared the least sensitive personal information ($M=5.09$, $SD=1.18$).

Moreover, significant age group differences were found for the sharing of *middle sensitive* personal information, $F(2, 433)=11.63$, $p<.001$. The emerging ($M=4.02$, $SD=.08$) and young adulthood group ($M=4.04$, $SD=1.13$) did not differ in their sharing audience of middle sensitive profile information, yet they both shared this type of data with a broader

audience in comparison to middle adults ($M=3.42$, $SD=1.55$).

Finally, the audience with whom the *most sensitive* personal information was shared differed significantly between age groups, $F(2, 294)=4.52$, $p=.012$. Young adults shared highly sensitive personal information with a broader audience ($M=2.80$, $SD=1.21$) than emerging adults ($M=2.40$, $SD=1.16$) and middle adults ($M=2.45$, $SD=1.29$).

Privacy Concern

In order to answer the second research question (RQ2), privacy concern was compared between age groups through analysis of variance. Significant age group differences in privacy concern were found, $F(2, 504)=22.22$, $p<.001$. Post-hoc comparisons indicated that all age groups differed significantly from each other. Middle adults expressed the highest privacy concern ($M=5.80$, $SD=.72$), followed by young adults ($M=5.48$, $SD=.83$) and emerging adults ($M=5.26$, $SD=.83$). This result holds after controlling for the amount of public communication, $F(2, 503)=20.31$, $p<.001$.

Privacy Protection

The frequency of privacy setting adaptation, knowledge of privacy settings, and use of technological privacy tools was analyzed. We expected that emerging adults would adapt their privacy settings more frequently than older age groups (H4a), and users of the middle adulthood group would adapt their privacy settings less frequently than younger age groups (H4b). The vast majority (98%) of respondents declared to have changed their privacy settings at least once since the creation of their Facebook account. The answers on the question "How often did you change your privacy settings in the last year" showed age group differences, $\chi^2(6)=52.35$, $p<.001$. The emerging adulthood group consisted of the most frequent privacy settings adapters, only 11% never changed his/her privacy settings during the last year, whereas more than half (51.3%) changed their settings two times or more during this period. In all, 10% of the young adult respondents reported to have never changed their privacy settings the previous year, less than half (40%) changed their settings two times or more. In the middle adulthood group, 32.3% never adapted their privacy settings last year, and even less users (31.8%) changed their settings more than two times.

The use of technological privacy tools differed significantly between age groups, $F(2, 504)=73.58$, $p<.001$. Tukey HSD post-hoc comparisons showed significant differences between all three age groups. Emerging adults ($M=.80$, $SD=.22$) used relatively more technological privacy tools than young and middle adults. In turn, young adults ($M=.69$, $SD=.30$) used more technological privacy tools than middle adults ($M=.45$, $SD=.32$) in the study.

Analysis of variance uncovered significant differences between age groups in terms of the knowledge respondents had of the possibilities for changing privacy settings on Facebook, $F(2, 504)=64.67$, $p<.001$. Tukey HSD post-hoc comparisons showed a significant higher knowledge of the emerging ($M=5.6$, $SD=1.13$) and young adulthood group ($M=5.35$, $SD=.12$), compared to the middle adulthood group ($M=4.47$, $SD=1.61$).

Discussion

This study investigated differences between adult age groups in terms of Facebook use, privacy concern, and privacy protection. Results provided evidence for the acceptance of hypotheses H2, H4a, and H4b, and for the partial acceptance of hypothesis H3.

Age group differences were uncovered in terms of activities on Facebook. For public electronic communication, young adults were found to engage more in this type of activity than the other age groups. This result was rather surprising (cfr. H1) since the need for self-presentation (i.e. behavior that seeks to communicate a certain image of oneself) is seen as a typical characteristic of emerging adulthood (i.a. Arnett, 2000; Bolton et al., 2013) and "public electronic communication" in this case comprised the activities of sharing experiences with the large group of SNS users. Two possible explanations can be offered.

First, since the amount of friends in this age group decreases, it can be assumed that the friends with whom young adults are in contact are chosen carefully (i.e. "strong tie" relationships). The use of Facebook for bridging social capital during emerging adulthood, indicated by acts of self-presentation toward a large group of Facebook-friends, is replaced by the use of Facebook for bonding social capital (Ellison et al., 2007; Steijn & Schouten, 2013). Since the group of Facebook-friends is constructed in a more conscious way, boundaries are stricter and experiences can be shared publicly through the users' News Feed.

Second, the norm for appropriateness of sharing information is proven to differ between age groups (Steijn & Schouten, 2013). It could be that, because emerging adults are more engaged in identity management practices, they do self-disclose personal information, but also put more effort in controlling their boundaries adequately by being more selective in their sharing than young adults (Urista et al., 2009). The young adulthood group is less involved with self-presentation. Therefore, it could be that they more often spontaneously share information publicly online. For the second activity, private electronic communication, emerging adulthood users did engage more often in this type of communication than young adults. This is not surprising, given the need for interpersonal communication, typical for this life stage (Bolton et al., 2013). For example, text messaging is also found to be more popular among emerging adults than older age groups (Smith, 2011). It could be that private

communication through Facebook has partially replaced other channels of private electronic communication like instant messaging (IM) and text messaging (Sale, 2013). The recent launch of Facebook's "Messenger" app, which facilitates Facebook private messaging, strengthens this assumption.

The expected higher disclosure of personal information, as an indicator of looser boundary management, of emerging adults was only partially found. Young adults proved to disclose their personal information to an equally broad audience as emerging adults. Yet, emerging adults and young adults disclose personal information to a broader audience than individuals in their middle adulthood. According to the findings of this study, it could be assumed that the need for self-presentation is still present during young adulthood and decreases toward middle adulthood. In this regard, literature describes a decreasing need for self-presentation and an increasing importance for potential privacy intrusions over time in one's life (Arnett, 2000; Subrahmanyam et al., 2008). Arnett (2000) states that it is possible that the transition of emerging adulthood toward young adulthood can take longer and for some people only is completed by the age of 30 years.

Further evidence of the decreasing need for self-presentation can be found in the sharing behavior of the middle adulthood SNS users. Results indicated that for each level of sensitivity of personal data, the middle adulthood group disclosed consequently the least amount of personal information. The emerging and young adults disclosed significantly more personal information than the middle adults, and are in some aspects (i.e. disclosure of medium sensitive information) similar to each other in their behavior. This could point to the fact that disclosing behavior started to shift during young adulthood.

In terms of privacy concern, results showed that age groups differed significantly from each other, with the users in emerging adulthood experiencing the least concern and the middle adulthood SNS users the most. Tufekci (2012) argues that the lower concern of the younger age group is related to their higher capability for setting their privacy options according to their needs. This helps to explain the findings in terms of privacy protection.

The results indicated that emerging adults adapted their Facebook privacy settings significantly the most often, and middle adults the least. Moreover, the use of technological privacy tools is the highest for the emerging adulthood group and decreases for each age group afterwards. Two possible explanations for this finding were found. First, emerging adults could feel more pressure to use privacy settings because they are in the job-seeking process and they do not want employers to find personal information of them on Facebook (Steijn, 2014). Second, younger users are generally described as tech savvy and therefore possibly often early adopters of new features of SNSs (Bolton et al., 2013; Perry, Simpson, NicDomhnaill, & Siegel, 2003). Because a lot of Facebook privacy features were launched recently (e.g. "privacy checkup"), this could be an explanation for the reported results. The findings are in line with the growing body of literature that claims that young people are privacy aware (Livingstone, 2008; Raynes-Goldie, 2010; Tufekci, 2012).

The described differences and dynamics can be summarized in three distinct age group SNS profiles.

Emerging Adulthood

As opposed to reports in popular media (Christofides et al., 2009; Young & Quan-Haase, 2013), emerging adults seem to use SNSs in a conscious way. On the one hand, this study confirmed that the developmental dynamics that are typical of this life stage (experimentation and identity management) are also found on SNSs. On the other hand, the outcomes that point to a higher disclosure of personal information can be nuanced since findings suggest that emerging adults are highly knowledgeable of privacy settings and use them in a fairly consistent way for managing their interpersonal boundaries. It can be argued that their significant lower use of public electronic communication in SNSs and their higher use of private communication is also a way of preserving their privacy. This conscious approach toward their online privacy is a possible reason for their lower privacy concern (Tufekci, 2012). Distinct privacy perceptions and behaviors of this age group were especially apparent in terms of privacy concern and use of privacy settings.

Young Adulthood

This age group scored higher in terms of privacy concern than the emerging adulthood group. Yet, they engage more in public communication and their use of privacy tools and frequency of adapting privacy settings is lower than emerging adults. This implies the emergence of a discrepancy between concern and behavior in terms of privacy protection around the age of 25 years. No clear differences were found in terms of self-disclosure between emerging and young adulthood. The fact that emerging and young adults behave similar in some regard is not surprising since the distinction between both age groups is not made by all authors (Erikson, 1968). Yet, this study confirms Arnett's (2000) main reason for the addition of the life stage "emerging adulthood": a prolonged period of experimentation, which is indicated in this study by the outcomes on comparisons of Facebook use, privacy concern, and privacy settings.

Middle Adulthood

Also for the oldest age group in this study privacy concern is not reflected in their use of privacy tools and their frequency of adapting settings. Yet, their self-disclosure is significantly lower than younger age groups; they share high, middle, and

low sensitive profile information to a lesser extent. Middle adults were found to have less knowledge of Facebook privacy settings than the younger users. This could possibly be the reason for their lower privacy settings, their higher concern, and their lower frequency of Facebook use.

Limitations

The first limitation that has to be mentioned is the use of self-report scales. It could be that due to memory issues, social desirability, or ignorance respondents reported other behavior than they performed in reality. Second, no follow-up question was implemented for the option "I do not disclose this type of information" in the measure of self-disclosure. This option was viewed as the strictest form of privacy protection. Yet, not disclosing a type of information can have other motives, for example, because users are not aware they were given the option to disclose this type of information. Further are the results in this article dependent on the education and culture of inhabitants of Flanders (Belgium) and the Netherlands. More research is needed in order to assess possible cultural differences. Last, although Facebook was deliberately chosen because of its diverse user base, the choice for the SNS can also be perceived as a limitation. It is possible that the age groups in the study use a combination of different SNSs (e.g. Snapchat, Instagram, LinkedIn) to satisfy their online social needs. This could possibly add to the explanation of the unexpected results in this study. Individuals could use different online channels varying on the goal and public of their self-disclosure. For example, emerging adults could not use Facebook for public communication because their parents are also members of this SNS, therefore using a different online channel instead.

Directions for Future Research

Literature suggests that differences in online behavior are partially due to generational differences (Steijn, 2014). A longitudinal study could be an interesting addition, in order to gain clarity on the developmental and generational differences. Furthermore, the results raise questions on the causal relationships between the variables. For example, it is not clear if privacy concern is an antecedent or a consequence of privacy setting use. This could be addressed in a future research with an experimental approach or through longitudinal designs. A future study should ideally take into account the growing number of Facebook users of the late adulthood (+65) age group (Duggan et al., 2015).

Conclusion

This study shed a new light on privacy concern and protection of different adult age groups on Facebook. New insights were gained regarding the vulnerability of adult SNS users. In sum, we found that the developmental differences in the life stages of Arnett (2000) and Erikson (1968) were also apparent in behavior on SNSs. The results indicated that emerging adults are less concerned about their privacy and have a pragmatic approach to online self-disclosure and how they control their online privacy boundaries. Yet, this study found that older age groups, despite their higher privacy concern, are less knowledgeable of privacy settings on Facebook, and use privacy tools and settings less frequent than emerging adults. Emerging adults have higher knowledge of privacy protection settings and use these settings more frequently compared to older age groups.

A discrepancy between privacy concern and privacy protection can be observed for the young adulthood and middle adulthood group. Because of this discrepancy, these groups are vulnerable in the online environment (Brandtzæg, Lüders, & Skjetne, 2010); their data could be disclosed to audiences that they did not consciously choose. This discrepancy will possibly dissolve in the future. Emerging adults nowadays grew up within a context of digital interactivity and have increasingly been the target of awareness raising campaigns. They are found to have more computer literacy and feel, therefore, safer online than the older generations (Debatin et al., 2009). This dynamic gave rise to a new perspective toward privacy, among others resulting in the recent creation of the highly successful political "Pirate Parties" in several European countries. The higher knowledge of privacy tools will most likely spread throughout the population as the emerging adults grow older. However, it is clear that, at least at this moment in time, a serious lack of knowledge on privacy protection is apparent among members of the middle and young adulthood groups. Therefore, governments and SNS providers are advised to aim their awareness raising efforts to users in the young adulthood and middle adulthood groups. Prevention campaigns could be targeted to SNS users of 25 years and older. These age groups are expected to educate children on how to use the Internet and SNSs safely, yet they may have insufficient knowledge of SNS privacy settings. The three described age group SNS profiles can guide the targeting of privacy awareness campaigns to specific relevant user groups.

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