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Adolescent sexual risk behavior on the internet

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Publication date
2013

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Citation for published version (APA):

Baumgartner, S. E. (2013). *Adolescent sexual risk behavior on the internet*.

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Unwanted Online Sexual Solicitation and Risky Sexual Online Behavior Across the Lifespan

This chapter is published as:

Baumgartner, S. E., Valkenburg, P. M., & Peter, J. (2010). Unwanted online sexual solicitation and risky sexual online behavior across the lifespan. *Journal of Applied Developmental Psychology, 31*, 439-447.

Abstract

There are widespread concerns that on the internet, adolescents are especially vulnerable and take more risks than adults. However, research supporting this concern is still missing. The aim of this study was to explore whether (a) unwanted online sexual solicitation, (b) risky sexual online behavior, and (c) the perception of risks and benefits of risky sexual online behavior vary for males and females in adolescence and adulthood. We conducted an online survey with a representative sample of 1,765 Dutch adolescents (grouped as 12-13-, 14-15-, and 16-17-year-olds) and 1,026 Dutch adults (grouped as 18-29-, 30-50-, and 50-88-year olds). Results indicated that adolescents were more at risk of becoming a victim of unwanted online sexual solicitation than adults. However, they did not engage in more online sexual risks than adults. As expected, females were sexually solicited more often than males but took fewer online sexual risks than males. Across all adolescent and adult age groups, perceived risks of risky sexual online behavior were high while perceived benefits were low. Contrary to earlier theories, adolescents did not perceive fewer risks or more benefits of risky sexual online behavior than adults.

Unwanted Online Sexual Solicitation and Risky Sexual Online Behavior Across the Lifespan

In recent years, there have been growing concerns about the risks that the internet poses to adolescents (Liau, Khoo, & Ang, 2005; Livingstone & Haddon, 2008). Among these risks, sexual risks are considered especially alarming. The concerns about sexual risks on the internet primarily address two different issues: (1) being a victim of unwanted online sexual solicitation and (2) actively engaging in risky sexual online behavior. Unwanted online sexual solicitation can be defined as receiving unwanted requests to talk about sex or to do something sexual (Ybarra, Espelage, & Mitchell, 2007). Risky sexual online behavior can be defined as the active engagement in online sexual activities that may have negative consequences, for example, sexual contact with strangers on the internet or the distribution of sexual information to strangers. Whereas risky sexual online behavior involves the voluntary decision to act sexually online, online sexual solicitation is an unwanted request to do so.

Several studies investigated the prevalence of unwanted online sexual solicitation (Mitchell, Finkelhor, & Wolak, 2001, 2007b; Ybarra, Espelage et al., 2007). Most of these studies have focused on adolescents and report that around 13% to 23% of adolescents have become victims of unwanted online sexual solicitation (Livingstone, 2006; Mitchell et al., 2001, 2007b). Empirical studies on adolescents' risky sexual online behavior are still scarce. Most studies focus either on sexual online activities of adults (Bolding, Davis, Hart, Sherr, & Elford, 2005; Cooper, Mannson, Daneback, Tikkanen, & Ross, 2003; Daneback, Mansson, & Ross, 2007) or on online risk behaviors in general (Liau et al., 2005; Livingstone & Haddon, 2008; Ybarra, Mitchell, Finkelhor, & Wolak, 2007).

Studies on adolescents' unwanted online sexual solicitation and online risk behavior explicitly or implicitly assume that adolescents are especially vulnerable. This assumption is based on several conjectures. First, adolescents are massive users of the internet, and they use the internet for leisure time activities more than adults do (Hasebrink, Livingstone, & Haddon, 2008; Willoughby, 2008). Second, literature on offline solicitation (Raskauskas & Stoltz, 2007) and on offline sexual risk behavior shows that adolescents are involved in those behaviors more often than adults are (Greene, Krcmar, Walters, Rubin, & Hale, 2000; Igra & Irwin, 1996; Steinberg, 2007, 2008). This has been explained by increases in sexual awareness and sensation seeking during that period (Bouchey & Furman, 2003; Breakwell & Millward, 1997; Zuckerman, 1979; Zuckerman, Ball, & Black, 1990). Third, research on offline risks suggests that adolescents and adults differ in the perception of risks and benefits of risk behaviors (Goldberg, Halpern-Felsher, & Millstein, 2002; Halpern-Felsher, Biehl, Kropp, & Rubinstein, 2004).

That is, adolescents may fail to perceive specific risks associated with a risky behavior and, at the same time, overestimate the benefits of such behaviors.

Although all of these conjectures are plausible, empirical evidence showing that adolescents are more vulnerable online than adults is missing. To date, no study has compared unwanted online sexual solicitation and risky sexual online behavior among different adolescent and adult age groups on the basis of representative samples. Therefore, the aim of our study is to fill this research gap by conducting a study on the prevalence of unwanted online sexual solicitation and risky sexual online behavior over the lifespan. We thereby focus on six age groups: early, middle, and late adolescence, and emerging adulthood, middle, and late adulthood. In addition, given the importance of risk perception in theories of offline risk behavior, we compare how these age groups differ in their perceptions of risky sexual online behavior. More specifically, we compare their perceived risks and benefits of risky sexual online behavior. Finally, gender differences are regarded as a key variable both in risk research (Byrnes, Miller, & Schafer, 1999) and in research on unwanted online sexual solicitation (Mitchell, Finkelhor, & Wolak, 2007a; Ybarra, Espelage et al., 2007). Therefore, we also investigate gender differences in unwanted online sexual solicitation, risky sexual online behavior, and risk perceptions during the lifespan.

Age and Gender Differences in Unwanted Online Sexual Solicitation

Incidences of unwanted online sexual solicitation have been frequently reported in the literature (Mitchell et al., 2007a, 2007b; Mitchell, Wolak, & Finkelhor, 2008; Ybarra, Espelage et al., 2007). These unwanted requests may take serious and aggressive forms (Mitchell et al., 2007b), and most victims of unwanted online sexual solicitation reported strong negative feelings as a consequence, such as being upset and afraid (Mitchell et al., 2001). The prevalence of unwanted online sexual solicitation among adolescents has been extensively studied (Mitchell et al., 2001, 2007a; Mitchell et al., 2008; Ybarra, Espelage et al., 2007). For example, Mitchell et al. (2007) have shown that among adolescents aged 10 to 17, the frequency of unwanted online sexual solicitation decreased from 19% to 13% between 2000 and 2005. However, incidences of *aggressive* online sexual solicitation increased during that period. Among British youth, 23% had received unwanted sexual requests online (Livingstone, 2006).

Despite the growing research interest in unwanted online sexual solicitation, no study has compared unwanted online sexual solicitation for different age groups across the lifespan. Evidence for age differences within adolescent samples have been reported by Mitchell et al. (2001) and Mitchell et al. (2008). They have found that older adolescents (14-17) are more at risk for unwanted online sexual solicitation than younger ones (10-13).

However, it is yet unknown whether unwanted online sexual solicitation peaks in late adolescence and declines thereafter, or whether it stays on this level during emerging adulthood or even later.

There are several theoretical reasons to assume that older adolescents and emerging adults are particularly at risk of receiving unwanted online sexual solicitation. First, from a developmental perspective, adolescents may be especially at risk to receive unwanted online sexual solicitation because of the massive changes they undergo during this period. During adolescence, the need to relate to others increases (Sigelman & Rider, 2003). As a result, interacting with unknown people online may be appealing for adolescents in this period. However, interacting with unknown people is a decisive risk factor for unwanted online sexual solicitation (Mitchell et al., 2001). Older adults may be less interested in interacting with unknown people online and may, thus, decrease their risk of receiving unwanted online sexual solicitation. Moreover, receiving unwanted online sexual solicitation also seems to be related to a range of psychosocial problems, such as depression (Mitchell et al., 2001). These psychosocial problems often emerge in the course of adolescence and stay into emerging adulthood (Sigelman & Rider, 2003).

Second, younger people may also be more at risk because the level of internet use peaks in middle to late adolescence and emerging adulthood (Jones & Fox, 2009). Spending more time online may enhance the chance of receiving unwanted online sexual solicitation. Finally, age differences in unwanted online sexual solicitation may be based on the fact that younger people may just be the target group for perpetrators of online sexual solicitation.

Next to age, gender has been identified as an important risk factor of becoming a victim of unwanted online sexual solicitation (Mitchell et al., 2007b). Mitchell et al. (2001), for instance, have shown that 27% of female adolescents have been sexually solicited. In contrast, only 12% of male adolescents reported to have become a victim of unwanted online sexual solicitation. These results are not surprising because males have been identified as the main perpetrators of sexual solicitation (Finkelhor, Mitchell, & Wolak, 2000).

Although no study exists on online sexual solicitation in adults, we may assume that these gender differences exist across all age groups. However, this gender gap may decrease with age. It may be assumed that younger females are the main target group of perpetrators. If the prevalence of unwanted online sexual solicitation decreases for females with age, levels of unwanted sexual solicitation in older females and older males may become more similar. Due to a lack of research on age and gender differences in unwanted online sexual solicitation throughout the lifespan, these assumptions are preliminary. We, therefore, investigate by means of a research question (RQ1) rather than a hypothesis how

incidences of unwanted online sexual solicitation differ for males and females across the lifespan.

Age and Gender Differences in Risky Sexual Online Behavior

Risky sexual online behavior can be defined as the exchange of intimate, implicit or explicit sexual information or material with someone exclusively known online. Behaviors like searching for someone to talk about sex or have sex, and disclosing intimate information such as implicit or explicit sexual pictures or contact details to strangers online may be categorized as risky sexual online behavior. We limit our definition to communication with unknown people because research has shown that communicating with strangers online may lead to negative consequences, such as an increased likelihood of receiving unwanted sexual solicitation (Cooper, Morahan-Martin, Mathy, & Maheu, 2002; Mitchell et al., 2001, 2007b; Wolak, Finkelhor, & Mitchell, 2008). Moreover, previous research has shown that searching for sexual partners online may increase the risk of getting sexually transmitted diseases (McFarlane, Bull, & Rietmeijer, 2002). Other potential negative consequences include the misuse of intimate information by others (Moreno et al., 2009) and feelings of shame, guilt and embarrassment.

Research on risky sexual online behavior is still scarce. However, studies on age and gender differences in offline sexual risk behavior may be informative to make first assumptions about risky sexual online behavior. Engagement in risky sexual offline behavior increases during adolescence (Cubbin, Santelli, Brindis, & Braveman, 2005; Steinberg, 2008), peaks in mid-adolescence and decreases thereafter (Parsons, Siegel, & Cousins, 1997; Shaw, Wagner, Arnett, & Aber, 1992; Steinberg, 2005, 2007, 2008; Steinberg & Morris, 2001). The increase in offline sexual risk behavior during adolescence has been linked to the biological, cognitive, psychological, and social changes that individuals face during this period (Igra & Irwin, 1996; Lerner & Galambos, 1998). These changes also lead to an increase in sexual awareness and interest. For example, the attention for sexually relevant topics increases during adolescence and causes selective information processing (Miltner, Vorwerk, Weichold, & Silbereisen, 2001). The newly developed importance of sexuality also leads to sexual experimentation which may result in sexual risk behavior (Breakwell & Millward, 1997; Buzwell & Rosenthal, 1996).

Although evidence suggests that *offline* sexual risk behavior peaks in adolescence, it is unclear whether this also applies to risky sexual *online* behavior. Despite the lack of empirical studies on risky sexual online behavior, we assume that online risk behavior also peaks in adolescence. Adolescents are the main users of the internet. The internet's specific characteristics may appeal especially to adolescents in their need to satisfy their sexual curiosity. For example, it has been shown that the reduced cues that characterize most

online communication, increase online disinhibition among adolescents (Schouten, Valkenburg, & Peter, 2007). Moreover, young people today grew up with this rather new medium, and may easily integrate the internet into their sexual life (Cooper et al., 2003), whereas adults may have reservations toward this medium. Hence, it may be assumed that the internet offers a new space for sexual experimentation which fits the needs of adolescents more than any other age group.

Being a key variable in offline sexuality and risk behavior, gender differences have been extensively studied (Byrnes et al., 1999). For example, a meta-analysis by Byrnes, Miller and Schafer (1999) showed that males generally take more risks than females. Several theoretical approaches have tried to explain these gender differences. For example, it has been argued that men's higher risk taking is due to higher levels of sensation seeking (Zuckerman, 1979; Zuckerman et al., 1990), lower levels of arousal in response to risk behavior (Byrnes et al., 1999), or higher activity levels (Morrongiello & Rennie, 1998). Another possible explanation may be the different socialization of boys and girls (Block, 1983) and to the greater acceptance of risk behavior for men (Kelling, Zirkes, & Myerowitz, 1976). In sum, Wilson and Daly (Wilson & Daly, 1985) argue that risk behavior is an "attribute of the masculine psychology" (p. 61).

However, gender differences in sexual risk behavior may vary according to age. This may be due to different developmental trajectories of males and females. For example, girls mature faster and exit puberty at younger ages. Thus, girls may stop earlier with risk behaviors. Looking at gender differences in risk behavior across the lifespan, it has been shown that in offline sexual risk behavior, gender differences become smaller with age (Byrnes et al., 1999; Oliver & Hyde, 1993). In contrast, for online sexuality, McFarlane et al. (2002) show that more males than females report having sex with someone first met online and this gender gap even widens with age. However, existing research has only dealt with adults, and the focus lay on online sexuality in general and not specifically on risky sexual online behavior.

In sum, empirical evidence for gender and age differences in risky sexual online behavior is scarce. However, we may expect that males take more sexual risks online than females. We also expect that risky sexual online behavior, like offline sexual risk behavior, peaks in adolescence and declines thereafter. However, because of inconsistent evidence, we do not know if the gender gap grows or narrows across the lifespan. We therefore investigate by means of research question 2 how risky sexual online behavior differs for males and females during the lifespan.

Age and Gender Differences in the Perception of Risks and Benefits of Risky Sexual Online Behavior

Cognitive decision-making theories assume that risk behavior is a result of the weighing of potential costs and benefits (Bechara, 2003; Beyth-Marom, Austin, Fischhoff, Palmgren, & Jacobs-Quadrel, 1993; Furby & Beyth-Marom, 1992; Hooper, Luciana, Conklin, & Yarger, 2004; Mellers, Schwartz, & Cooke, 1998; Steinberg, 2008). Heightened risk behavior during adolescence as compared to adulthood has been attributed to differences in perceived risks and benefits. Generally, it has been assumed that during adolescence, individuals believe in a personal fable, that is the erroneous believe that one is unique and invulnerable (Millstein & Halpern-Felsher, 2002). Due to this personal fable adolescents face difficulties in estimating the potential costs and benefits of a risk behavior (Goldberg et al., 2002; Rolison & Scherman, 2002). More specifically, adolescents may underestimate the risks and overestimate the benefits associated with risk-taking behaviors (Furby & Beyth-Marom, 1992; Goldberg et al., 2002; Halpern-Felsher & Cauffman, 2001). As a consequence of this biased estimation of risks and benefits, adolescents may engage in more risk behaviors than adults, who have a more realistic estimation of risks and benefits. In the transition from adolescence to adulthood, individuals may lose the belief in the personal fable and may become more realistic in their risk estimations.

Empirical evidence for this cognitive decision-making approach has been far from consistent. Most studies failed to find differences between adolescents' and adults' ability to judge costs and benefits of offline risk behaviors (Beyth-Marom et al., 1993). However, in terms of online risk perceptions, studies have consistently shown that adults perceive more online risks than adolescents (Lenhart, 2005; Liau et al., 2005). These differences in risk perceptions may be due to the fact that adolescents today have grown up with the internet and are familiar with this medium. In contrast, adults may not be as familiar with the internet, especially with newer applications such as social network sites, instant messaging, and blogs. Consequently, adults may feel more uncomfortable with the internet.

Gender differences in perceived risks and benefits have also been found. Evidence for gender differences is consistent for both online and offline risk behavior. In general, females tend to evaluate risky behavior as more dangerous and less beneficial than males (Cohn, Macfarlane, Yanez, & Imai, 1995; Hillier & Morrongiello, 1998). Moreover, females tend to estimate their vulnerability as higher than males do (Kontos, 2004; Morrongiello & Rennie, 1998). The same pattern has also been found in studies on risk perceptions of online privacy (Youn, 2005; Youn & Hall, 2008).

Based on this evidence, we expect that females also perceive more risks and fewer benefits of risky sexual online behavior. However, existing evidence does not allow us to

specify whether this gender gap exists for all age groups or whether an interaction between age and gender exists. Moreover, we do not know whether adolescents or adults perceive risky sexual online behavior as riskier. We therefore investigate how perceptions of online sexual risks and benefits differ for males and females across the lifespan (RQ3).

Method

Sample and Procedure

To investigate the three research questions, we conducted an online survey. This survey was done among a representative sample of 1,765 Dutch adolescents and 1,026 Dutch adults. Sampling and fieldwork were done in May and June 2008 by Veldkamp, a Dutch research institute. Respondents were randomly selected from an existing nationally representative online panel administered by Veldkamp, which consists of more than 110,000 participants. In contrast to online convenience samples with their danger of self-selection biases, the pool of potential respondents was originally sampled *randomly* from the Dutch population and is continuously updated. Out of this pool, 2,092 adolescents and 1,267 adults were randomly contacted by email. If participants did not respond they received two reminder emails. A final response rate of 84% for the adolescent and of 81% for the adult sample was yielded. Forty-nine percent of the adolescents and 51% of the adults were female. The age range of the adolescent sample was 12 to 17 years. Of the adult sample, the age range was 18 to 88 years. Most of the adolescents (80.8%) lived with two parents (in line with official Dutch statistics: CBS, 2009). Participants came from urban as well as rural regions all over the Netherlands. Educational levels were equally distributed across the age groups.

Official statistics of the Netherlands reveal that, in 2008, the Netherlands has with 87% the highest percentage of households with home internet connections in the European Union (CBS, 2008). Nearly all Dutch younger than 25 years (98%) have home access to the internet (CBS, 2008). This high percentage of home internet access might prevent typical pitfalls of online surveys like a systematic sampling bias. Previous research has acknowledged that online surveys are especially useful when sensitive issues like sexuality are investigated (Mustanski, 2001; Peter & Valkenburg, 2006, 2009). Parental consent for participation of respondents younger than 18 years was obtained. At the beginning of the questionnaire, both adolescent and adult participants were asked for informed consent. Participants were informed that the survey would be about sexuality and the internet. We asked participants to fill in the questionnaire in privacy and emphasized that the answers would be analyzed only by the principal investigators. Participants were also informed that they could stop at any time if they wished. Completing the questionnaire took about 20

minutes. Participants received a 5 € coupon (approx. 7 USD) for participation. Before the beginning of the study, institutional approval was received.

Measures

Age. Adolescents were divided into three age groups to reflect the developmental stages of early adolescence (12 and 13 year olds: $N = 568$, $M = 12.49$ years, $SD = 0.51$), middle adolescence (14 to 15 years olds: $N = 606$, $M = 14.49$ years, $SD = 0.50$), and late adolescence (aged 16 to 17: $N = 591$, $M = 16.46$ years, $SD = 0.50$) (Van Leijenhorst, Westenberg, & Crone, 2008). Adults were also separated into three groups. The first group included all adults between 18 and 29, and reflected emerging adulthood ($N = 171$, $M = 24.00$ years, $SD = 3.21$) (Arnett, 2007; Arnett & Eisenberg, 2007; Jones & Fox, 2009). The second and third adult group reflected middle (30 to 50 years old: $N = 416$, $M = 40.15$ years, $SD = 6.08$) and late adulthood (older than 50: $N = 439$, $M = 63.99$ years, $SD = 8.85$).

Unwanted online sexual solicitation. Unwanted online sexual solicitation was measured using two items. These items were largely based on items used in prior studies (Mitchell et al., 2001, 2007b; Mitchell et al., 2008). Participants were asked two questions: 1) How often in the past six months, did anyone ask you online to talk about sex when you did not want to? 2) How often in the past six months, did anyone ask you online to do something sexual when you did not want to? Response categories were 0 (*never*), 1 (*once*), 2 (*twice*), 3 (*three to five times*) and 4 (*six times or more*). The two items were strongly correlated, $r = .75$. The resulting online sexual solicitation scale had a mean score of 0.14 ($SD = .53$). All mean scores and standard deviations of this scale for each age group and gender are presented in Table 2.1.

Risky sexual online behavior. Because risky sexual online behavior is a rather new research topic, no validated measures exist. We based our items of risky sexual online behavior on previous research that has shown that engagement in these specific risk behaviors are related to negative experiences, such as unwanted sexual solicitation (Wolak et al., 2008; Ybarra, Mitchell et al., 2007). Moreover, searching for sexual partners online has been shown to be related to an increased risk of sexually transmitted diseases (McFarlane et al., 2002). We used four items. Participants were asked how often, in the last six months, they participated in each of the following activities: 1) Searched for someone on the internet to talk about sex; 2) Searched for someone on the internet to have sex; 3) Sent on the internet a photo or video on which they were partly naked to someone they knew only online, and 4) Sent an address or telephone number online to someone they knew only online. Response categories to all questions were 0 (*never*), 1 (*once*), 2 (*two times*), 3 (*three to five times*) and 4 (*six times or more*). These four items formed a one-

dimensional scale with a Cronbach's alpha of .75. Mean score of this scales was 0.14 ($SD = 0.45$). Mean scores for all age and gender groups are presented in Table 2.1.

Perception of online sexual risks. To assess the perceived risks of risky sexual online behavior, respondents were asked to indicate how dangerous they judged each of the former risk behaviors. This is a typical procedure used in offline risk research to assess perceptions of risks (Parsons et al., 1997; Siegel et al., 1994). Specifically, we asked participants: 1) "How dangerous is it to search on the internet for someone to talk about sex?" 2) "How dangerous is it to search on the internet for someone to have sex?" 3) "How dangerous is it to send on the internet photos or videos on which you are partly naked to someone you know only online?" 4) "How dangerous is it to send your address or telephone number online to someone you know only online?"

Response categories ranged from 0 (*not at all dangerous*) to 4 (*very dangerous*). The emerging four-item online-risk-perception scale resulted in a Cronbach's alpha of .79. The mean score of the risk perception scale was 3.29 ($SD = 0.71$). Mean scores of the specific age and gender groups are presented in Table 2.1.

Perception of online sexual benefits. Analogous to the risk-perception scale, respondents indicated how beneficial they judged each of the four risk behaviors (Parsons et al., 1997; Siegel et al., 1994). For example, participants were asked, "How beneficial is it for you to search on the internet for someone to talk about sex with?" Response categories ranged from 0 (*not at all beneficial*) to 4 (*very beneficial*) and resulted in a one-dimensional four-item scale with a Cronbach's alpha of .83. Mean score of the scale was 0.63 ($SD = 0.82$) (see Table 2.1 for all other means and standard deviations).

Internet communication. The amount of online communication may explain the amount of unwanted online sexual solicitation and risky sexual online behavior. Therefore, we included the frequency of participants' online communication as a control variable. Participants indicated how often they use instant messaging, internet chats, and social networking sites. Response categories ranged from 0 (*never*) to 10 (*every day*). Mean score of the scale was 3.39 ($SD = 2.59$).

Table 2.1. Means (and Standard Deviations) for all Scales by Age and Gender

	Unwanted online sexual solicitation scale <i>M (SD)</i>	Risky sexual online behavior scale <i>M (SD)</i>	Perceived Risks Scale <i>M (SD)</i>	Perceived Benefits Scale <i>M (SD)</i>
Females				
12 - 13	0.12 (0.46) _a	0.09 (0.36) _a	3.56 (0.54) _a	0.53 (0.80) _{a, c}
14 - 15	0.31 (0.79) _b	0.12 (0.37) _a	3.39 (0.69) _{b, c}	0.67 (0.86) _c
16 - 17	0.33 (0.75) _b	0.12 (0.38) _a	3.41 (0.60) _{b, c}	0.70 (0.87) _c
18 - 29	0.21 (0.71) _{a, b, c}	0.08 (0.27) _a	3.27 (0.62) _b	0.68 (0.81) _{a, c}
30 - 50	0.08 (0.41) _{a, c}	0.05 (0.26) _a	3.36 (0.61) _{b, c}	0.46 (0.66) _{a, b}
50+	0.06 (0.34) _{a, c}	0.16 (0.61) _a	3.50 (0.63) _{a, c}	0.32 (0.54) _b
TOTAL	0.20 (0.62)	0.11 (0.40)	3.43 (0.62)	0.57 (0.79)
Males				
12 - 13	0.04 (0.23) _a	0.07 (0.27) _a	3.43 (0.64) _a	0.53 (0.79) _a
14 - 15	0.09 (0.48) _a	0.16 (0.51) _{a, b}	3.11 (0.79) _{b, c}	0.78 (0.76) _b
16 - 17	0.08 (0.38) _a	0.18 (0.48) _b	3.08 (0.73) _{b, c}	0.83 (0.81) _b
18 - 29	0.03 (0.26) _a	0.19 (0.53) _b	3.00 (0.80) _{b, c}	0.73 (0.71) _{a, b}
30 - 50	0.11 (0.53) _a	0.21 (0.58) _{a, b}	2.93 (0.81) _b	0.78 (0.72) _b
50+	0.07 (0.40) _a	0.20 (0.62) _{a, b}	3.24 (0.76) _c	0.47 (0.67) _a
TOTAL	0.08 (0.41)	0.16 (0.50)	3.15 (0.77)	0.69 (0.77)

Note. Means within a column with different subscripts differ significantly from each other (no comparisons between genders displayed).

Results

Data Analytical Approach

First, descriptive statistics of the prevalence of unwanted online sexual solicitation and risky sexual online behavior among the age and gender groups are presented. Second, to investigate age and gender differences for unwanted online sexual solicitation, risky sexual online behavior and perceptions of risks and benefits in risky sexual online behavior, we conducted ANOVAs for each dependent variable. Age (12-13 vs. 14-15 vs. 16-17 vs. 18-29 vs. 33-50 vs. 50+) and gender were included as independent variables in all analyses. The frequency of internet communication was inserted as a control variable in

our analyses because it may present an alternative explanation of these effects. To further disentangle age effects, we conducted Dunnett's T 3 post-hoc tests for males and females separately. This type of post-hoc test was chosen because the assumption of variance homogeneity was not met. In addition, gender differences were further analyzed with additional t-tests.

Descriptives

Of the overall sample, 5.6% of the male adolescents and 19.1% of the female adolescents reported having been unwantedly sexually solicited on the internet at least once in the past six months. Of the adults, 4.6% of the males and 6.7% of the females reported having been sexually solicited online at least once. Table 2.2 depicts the percentages of participants who indicated to have experienced the specific incidences of unwanted online sexual solicitation at least once in the past six months. Percentages are presented according to age and gender. In the case of risky sexual online behavior, 18.2% of the male adolescents and 17.0% of the female adolescents reported having taken at least one of the online sexual risks once in the past six months. Of the adults, 18.7% of the men and 10.9% of the women have taken at least one of the online sexual risks at least once. The prevalence of each specific behavior for males and females in all age groups is depicted in Table 2.2. Among all behaviors, sending intimate pictures or videos to others had the lowest prevalence, whereas disclosing contact information had the highest prevalence.

Age and Gender Differences in Unwanted Online Sexual Solicitation

Research question 1 asked how prevalent incidences of unwanted online sexual solicitation are during adolescence and adulthood and how this differs for males and females. An ANOVA yielded a main effect for age, $F(5, 2791) = 7.61, p < .001, \eta^2 = .01$, a main effect for gender, $F(1, 2791) = 26.73, p < .001, \eta^2 = .01$, and an interaction effect for age and gender, $F(5, 2791) = 6.10, p < .001, \eta^2 = .01$. Controlling for frequency of internet communication yielded an additional main effect for this control variable, $F(1, 2790) = 89.68, p < .001, \eta^2 = .03$. This main effect suggests that participants who used the internet more frequently were also more often sexually solicited online.

Table 2.2. Percentages of Incidences of Unwanted Online Sexual Solicitation and Risky Sexual Online Behavior by Age and Gender

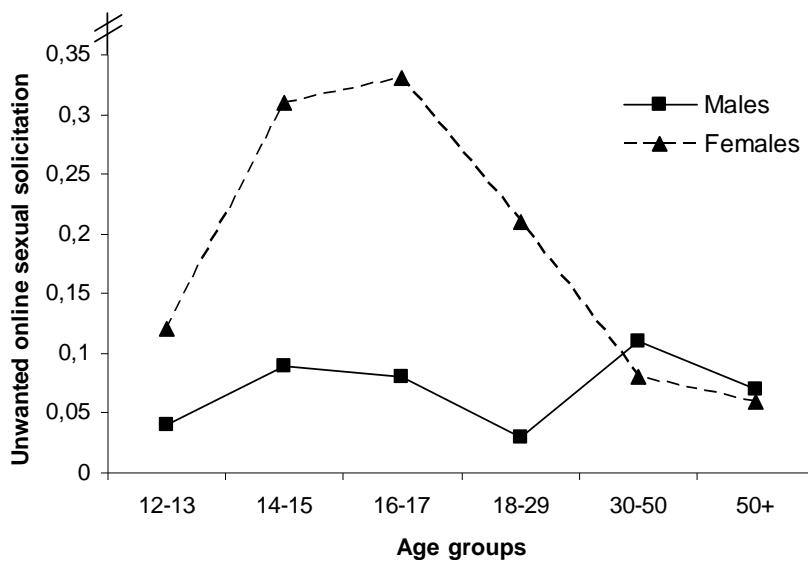
	12-13		14-15		16-17		18-29		30-50		50+	
	Males <i>N</i> = 289 %	Females <i>N</i> = 279 %	Males <i>N</i> = 307 %	Females <i>N</i> = 299 %	Males <i>N</i> = 302 %	Females <i>N</i> = 289 %	Males <i>N</i> = 60 %	Females <i>N</i> = 111 %	Males <i>N</i> = 230 %	Females <i>N</i> = 186 %	Males <i>N</i> = 213 %	Females <i>N</i> = 226 %
Asked to talk about sex	2.8	10.0	6.2	18.1	6.6	23.5	1.7	13.5	4.8	4.8	3.8	4.4
Asked to do sth. sexual	1.7	6.1	2.3	13.7	3.6	13.5	1.7	6.3	3.9	2.7	2.3	2.7
Search to talk about sex	2.8	3.2	10.7	8.0	9.9	7.3	8.3	4.5	9.1	2.2	7.5	6.2
Search to have sex	2.1	1.8	6.2	3.7	5.6	4.8	6.7	1.8	7.8	1.1	7.5	5.3
Send nude photo/video	2.4	1.1	2.3	2.7	3.6	2.8	3.3	0.9	4.8	0.0	4.2	0.9
Disclose information	8.3	10.4	10.4	12.7	16.2	12.8	18.3	10.8	12.6	8.1	12.2	8.8

Note. *N* = 2,765; percentages of the unwanted online sexual solicitation items are based on the number of respondents who had experienced unwanted online sexual solicitation at least once in the past six months. Percentages of the online sexual risk behavior items are based on the number of respondents who had engaged in this behavior at least once in the past six months.

Post-hoc tests revealed no significant age differences for males. Hence, the prevalence of unwanted online sexual solicitation among males was equal across all age groups. For females, however, the youngest age group differed significantly in unwanted online sexual solicitation from the other two adolescent age groups ($p < .01$) but not from the three adult groups ($p < .001$). Female participants aged 14 to 17 differed from the youngest and the two oldest female age groups, but not from the young female adults (18-29 year olds). The mean scores (standard deviations) and significant differences among the age groups can be found in Table 2.1. Additional t-test analyses revealed that females aged 12-29 were significantly more sexually solicited online than males in this age group. No significant gender differences emerged for adults aged 30 and older (see Figure 2.1).

In sum, unwanted online sexual solicitation developed differently for males and females during adolescence and adulthood. Whereas levels of unwanted online sexual solicitation for males were very low throughout the lifespan, levels of unwanted online sexual solicitation for females differed according to age. Females, aged 14 to 29, were sexually solicited on the internet most often.

Figure 2.1. Mean Scores of Unwanted Online Sexual Solicitation for Males and Females across the Lifespan.



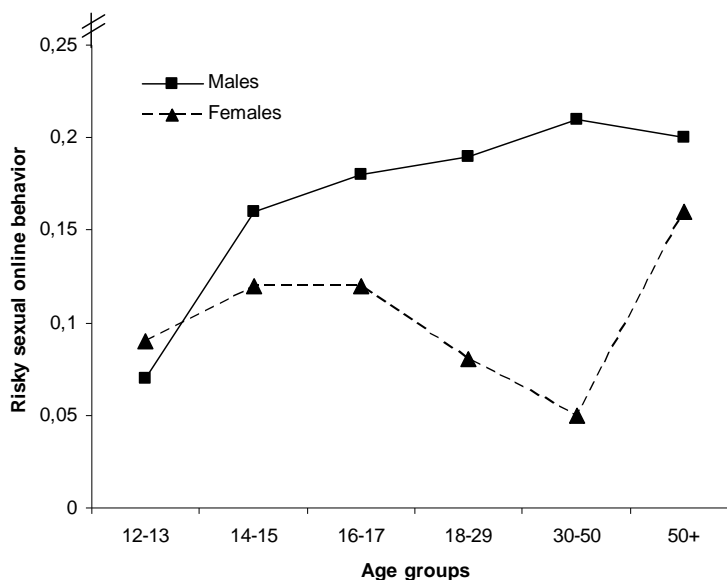
Note. The scale of unwanted online sexual solicitation ranges from 0 (*never*) to 4 (*six times or more*).

Age and Gender Differences in Risky Sexual Online Behavior

Research question 2 asked how risky sexual online behavior differs for males and females across the lifespan. The ANOVA yielded a significant main effect for age, $F(5, 2791) = 2.81, p < .05, \eta^2 = .005$, and for gender, $F(1, 2791) = 10.74, p < .01, \eta^2 = .004$, but no significant interaction effect. These main effects remained also after controlling for the frequency of internet use. The additional main effect for internet communication, $F(1, 2790) = 47.86, p < .001, \eta^2 = .02$, suggested that participants who used the internet more frequently, also engaged in more online sexual risks.

Post hoc tests revealed that for males, the youngest age group took significantly fewer risks than the late adolescent group ($p < .05$) and the middle adult group (30-50 year olds, $p < .05$). There were no other significant differences between the age groups. There were also no significant differences for the prevalence of risky sexual online behavior among the female age groups (see Table 2.1). Additional t-test analyses revealed that the only significant gender difference in risky sexual online behavior occurred for the middle adult group (30-50 years old, see Figure 2.2).

Figure 2.2. Mean Scores of Risky Sexual Online Behavior for Males and Females across the Lifespan.



Note. The scale of risky sexual online behavior ranges from 0 (*never*) to 4 (*six times or more*).

Age and Gender Differences in the Perception of Risks and Benefits of Risky Sexual Online Behavior

Research question 3 asked how the perceptions of online sexual risks and benefits develop across the lifespan. To answer research question 3 we conducted two ANOVAs with perceived risks and perceived benefits as dependent variables. For perceived risks, the ANOVA yielded a significant main effect for age, $F(5, 2791) = 17.17, p < .001, \eta^2 = .03$, for gender, $F(1, 2791) = 94.33, p < .001, \eta^2 = .03$, and an interaction effect for age and gender, $F(5, 2791) = 2.52, p < .05, \eta^2 = .01$. Post hoc tests indicated that for males, the youngest age group perceived significantly more risks than all other age groups ($p \leq .05$). The two other adolescent groups and the adult groups did not differ in their risk perception, except for the oldest adult group that perceived more risks than the middle adult group. For females, a similar pattern arose. The youngest female adolescents perceived more risks of risky sexual online behavior than all other age groups, except the oldest adults. The oldest age group did also perceive significantly more risks than the young female adults ($p < .05$). The other female groups did not differ in their perceptions of risks (see Table 2.1). Additional t-test analyses revealed that females perceived more risks of risky sexual online behavior than males across all age groups.

The ANOVA for perceived benefits also yielded significant main effects for age, $F(5, 2791) = 15.81, p < .001, \eta^2 = .03$ and gender, $F(1, 2791) = 14.54, p < .001, \eta^2 = .01$ and a significant interaction effect for age and gender, $F(5, 2791) = 2.27, p < .05, \eta^2 = .004$. The significant age group differences are presented in Table 2.1. Males 30 and older perceived significantly more benefits than females. No other gender differences could be observed.

Discussion

The first aim of this study was to investigate age and gender differences in unwanted online sexual solicitation across the lifespan. Despite widespread assumptions that adolescents are more vulnerable online than adults, it has never been tested whether adolescents are more at risk than adults in terms of unwanted online sexual solicitation. This study is the first to compare age and gender differences in unwanted online sexual solicitation with representative samples of adolescents and adults. Our findings indicate that for males, levels of unwanted online sexual solicitation did not differ across the lifespan. That is, adolescent males were not more often sexually solicited online than adult males. For females, however, incidences of unwanted online sexual solicitation did differ across the lifespan. Middle and late adolescent females were sexually solicited most often

on the internet. This latter finding is in line with previous research (Mitchell et al., 2008; Ybarra, Espelage et al., 2007).

Our study extends previous research by showing that incidences of unwanted online sexual solicitation did not sharply decrease after adolescence. Young female adults (18-29 year olds) did not differ in their levels of unwanted online sexual solicitation from older adolescents (14-17 year olds). Therefore, not only adolescent girls, but also young female adults should be considered risk groups for unwanted online sexual solicitation.

Female adolescents and female emerging adults may be the predominant victims of unwanted online sexual solicitation for two reasons. First, young females may just be the main target group for perpetrators of sexual solicitation. Second, specific online activities may increase the risk of receiving unwanted online sexual solicitation. For example, female adolescents and emerging adults use the internet mainly for communication rather than entertainment (Weiser, 2000). Our findings suggest that more frequent use of online communication, such as chatting and instant messaging, increases the chance of unwanted online sexual solicitation. Thus, the preference for online communication of young females may have increased their risk of receiving unwanted online sexual solicitation. Moreover, prior research has shown that young females use the internet to self-disclose and to share intimate details online (Mazur & Kozarian, 2010; Moreno et al., 2009; Schouten et al., 2007). Online self-disclosure may help them to relate to others and to form their identity, one of the main challenges during adolescence and emerging adulthood (Calvert, 2002). However, in their online self-presentation some girls may give implicit or explicit cues to others that may provoke sexual requests even if they did not intend to do so (Moreno et al., 2009).

Although age differences in the prevalence of unwanted online sexual solicitation were not as distinct as expected, incidences of unwanted online sexual solicitation may still have different consequences for girls and women. While these incidences may be as undesirable for a 13 year old girl as for a 29 year old woman, younger girls may be more emotionally and cognitively vulnerable to such messages than adults. In contrast to an inexperienced young girl, a woman in her late 20s may be better able to cope with such incidences. This suggests that, although adolescents and emerging adults do not differ much in their levels of unwanted online sexual solicitation, adolescents may be more vulnerable and more in need for protection than adults.

The second aim of our study was to investigate age and gender differences in risky sexual online behavior. Our study is one of the first to investigate this specific kind of online risk behavior for males and females across the lifespan. Findings suggest that for females engagement in risky sexual online behavior did not differ across the lifespan. Female adolescents engaged in the same amount of risk behavior as female adults. For

males, however, we found increased levels of risk behavior for late adolescents in contrast to early adolescents. Levels of online risk behavior for late adolescents and adults remained stable over the lifespan. This finding is in contrast to offline risk behavior that typically peaks during adolescence (Steinberg, 2007). Thus, risky sexual online behavior does not seem to follow the typical developmental trajectories of risk behavior but remains on the same level during late adolescence and adulthood.

One reason for the relative stability of engagement in risky sexual online behavior may be that engagement in risky sexual online behavior reflects stable personality characteristics, such as extraversion or curiosity that are only slightly age dependent (Giambra, Camp, & Grodsky, 1992). According to this reasoning adolescents and adults who engage in online sexual risks share the same underlying characteristics. Another possibility is that in contrast to other risk behaviors which may lose their fascination after some time, sexual interest does not decline after adolescence (DeLamater & Friedrich, 2002). Sexuality remains an important part of adulthood and by engaging in risky sexual online behavior these sexual needs may be satisfied. Finally, it could also be that differences between adolescent and adult use of the internet for sexual risk behavior could not be revealed because adolescents did not have the possibilities to use the internet for such behavior as much as they wanted because their internet use may be restricted and monitored by their parents (Livingstone & Haddon, 2008; Mitchell, Finkelhor, & Wolak, 2005; Rai et al., 2003).

The finding that adolescents were not more risk prone than adults does not suggest that risk taking in adolescence can be neglected. From a normative perspective, risk behavior has different meanings for adolescents and adults (Parsons et al., 1997). For example, for adults it might be considered normative to give away private information when searching for sexual partners online. This is based on the assumption that adults are able to cope with potentially negative consequences of such behavior. In contrast, for adolescents such behavior is considered to be more problematic because negative consequences may be detrimental to their development. Thus, although adolescents seem to behave similar to adults online, the potentially negative consequences of these behaviors may still be more problematic for adolescents than for adults.

Despite their potentially negative consequences, it is important to note that risk behaviors help to fulfill important developmental tasks during adolescence (Igra & Irwin, 1996; Jessor, 1992). Risk behaviors may help the adolescent to affirm autonomy and maturity, to gain peer acceptance, and to cope with anxiety and frustration (Jessor, 1992). Especially, sexual risk behaviors may be functional because sexuality belongs to the main developmental tasks individuals have to face during adolescence. Online sexual risk behaviors, therefore, may help adolescents to experiment with sexuality and to develop a

sexual identity (Breakwell & Millward, 1997). Thus, engagement in risky sexual online behavior does not necessarily have to be detrimental to adolescent development but could also facilitate healthy development.

Similar to age differences, also gender differences were not very distinct. Risky sexual online behavior tended to be higher among males, but this gender difference was only significant for the middle adult age group (30-50 year olds). During adolescence and emerging adulthood levels of male and female risky sexual online behavior did not differ. This finding is in contrast to previous research that has revealed gender gaps in sexuality and risk behavior (Byrnes et al., 1999).

This non-existing gender gap for young people in our study may be partly due to our Dutch sample. Recent studies have found narrowing gender gaps in sexuality in several liberal western countries, including the Netherlands (Meston, Trapnell, & Gorzalka, 1996; Schalet, 2000). This may be due to changing attitudes about traditional gender roles in liberal, western societies (Meston et al., 1996). In the Netherlands, teenage sexuality is considered a normal and natural part of development (Schalet, 2000). Thus, adolescent girls may experiment with their sexuality similar to boys. Therefore, within-sex variance in sexual risk behavior may be much more important than between sex variance to explain such behavior (Breakwell & Millward, 1997; Buzwell & Rosenthal, 1996). In cultures that still hold traditional gender roles, gender may still be important in explaining sexual online behavior. For example, a survey among Taiwanese adolescents has shown that female adolescents were much less willing to sexually self-disclose online than males because they still endorse the traditional female stereotype (Chiou & Wan, 2006).

The final aim of this study was to reveal age and gender differences in the perception of risks and benefits of risky sexual online behavior. In line with previous research on risk perception, females tended to perceive more risks and fewer benefits than males (Cohn et al., 1995; Hillier & Morrongiello, 1998). In contrast to expectations, adolescents did not perceive fewer risks and more benefits than adults. Older adolescents (14-17 years) did not differ in their risk perception and engagement in risky sexual online behavior from adults. The youngest participants (12-13 years) actually perceived the most risks and fewest benefits. In contrast to public and parental concerns, adolescents – especially the youngest ones – seem to be very risk-aware in terms of risky sexual online behavior. An explanation of this risk-awareness of young adolescents is that they have less experience with actual behavior and are more responsive than older adolescents to what they are told by parents and teachers (Millstein & Halpern-Felsher, 2002). Older adolescents have more experience with this behavior, and may observe that it not necessarily leads to negative consequences. Lack of experience may also explain why risk perceptions tended to increase for the oldest age group (50+). Adults older than 50 may

have the least experience with the internet and may base their risk judgment not on their own experiences but on media coverage about this issue (Ponte, Bauwens, & Mascheroni, 2009).

Limitations and Suggestions for Future Research

Our study has several limitations that need to be addressed in future research. First, our data is cross-sectional. Therefore, we cannot rule out that age differences are due to cohort effects instead of developmental effects. Second, our measures of unwanted online sexual solicitation and risky sexual online behavior were limited to only few items. Although our items were based on previous research and theoretical considerations, they do not present established measurements. The interpretation of our results should, thus, be limited to the online behaviors we measured. To advance this research field, future studies should develop and validate new scales to measure online risk behavior and perceptions.

Third, although participants in this study were selected by probability sampling from an online panel that was also randomly sampled originally, we can not fully preclude the possibility of a self-selection bias for people who participate in an online panel. There is a small chance that people who eventually agree to participate in online samples may still differ in some unknown characteristics from people who do not agree to be part of an online panel. Moreover, we do not know why some people refused to answer the questionnaire. Although the response rate of 84% was sufficiently high, there might still have been a systematic bias.

Finally, we did not assess the psychological consequences, neither of receiving unwanted online sexual solicitation nor of risky sexual online behavior. Therefore, we cannot draw any conclusions about the dangers of experiencing and engaging in these behaviors. Previous research has shown that only a minority of incidences of unwanted sexual solicitation on the internet takes on serious forms (Mitchell et al., 2007b), and that negative experiences are related to the number of problematic online behaviors rather than specific online behaviors (Ybarra, Mitchell et al., 2007). These earlier findings suggest that most of the behaviors may not lead to negative consequences, unless adolescents engage in such behaviors more frequently. Future research is needed to disentangle the relationship between online sexual behaviors and negative (or positive) consequences.

Conclusion

In conclusion, this study has produced three important new insights. First, incidences of unwanted online sexual solicitation for females peaked in adolescence but were still prevalent among emerging adults. Second, adolescents behaved similarly to adults in terms of risky sexual online behavior. In contrast to public concerns, adolescents did not engage in

more online sexual risk than adults. Third, all participants – and especially the youngest – were very risk aware. Adolescents, therefore, did not perceive fewer risks or more benefits than adults. Generally, our results suggest that most adolescents are well aware of potential online threats. This study suggests that the fears and expectations of adults about the sexual risk behavior of adolescents online are largely unfounded. This is not to say that risky sexual online behavior does not occur, but it is certainly not a mass phenomenon among adolescents.

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