



Full Length Article

Adolescents' comments in social media: Why do adolescents receive negative feedback and who is most at risk?



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ABSTRACT

Receiving negative peer feedback in social media may have negative consequences for adolescents' psychosocial development and well-being. Therefore, the first aim of this study was to investigate online behavior (i.e., online social exploration, risky online self-presentation) that predicts receiving negative online peer feedback. The second aim was to examine three types of precursors that may predict this online behavior and, indirectly, negative feedback: (a) developmental (i.e., sex, age), (b) dispositional (i.e., sensation seeking, inhibitory control), and (c) social precursors (i.e., peer problems, family conflict). We collected survey data among 785 Dutch adolescents (10–15 years old). Our results showed that adolescents who engaged in online social exploration and risky online self-presentation more often, were more likely to receive negative peer feedback. Online social exploration was more prevalent among the older adolescents and adolescents characterized by higher sensation seeking and more family conflict. In addition, risky online self-presentation was more prevalent among adolescents high in sensation seeking. Consequently, these adolescents' online behavior, indirectly, made them more at risk of receiving negative peer feedback in social media.

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1. Introduction

Social acceptance in the peer group and approval by peers and close friends are crucial to the development of adolescents' self-concept (i.e., their ideas of who they are) and self-esteem (i.e., the evaluations of their self-concept). Especially early and middle adolescence are characterized by an increased focus on the self (Elkind & Bowen, 1979). In this period, adolescents can be extremely preoccupied with how their peers perceive them. As a consequence, they are highly sensitive to feedback from their peers, and especially to negative peer feedback (Thomaes et al., 2010).

A large part of adolescents' communication with friends and peers takes place through the Internet and, specifically, social media (Madden et al., 2013). Social media give adolescents ample opportunity to learn how to present themselves by adjusting and optimizing their online profiles in a way that elicits positive feedback from their peers (Donoso & Ribbens, 2010; Ellison, Heino, & Gibbs, 2004; Valkenburg & Peter, 2011). In addition, social media are typically designed to stimulate positive feedback on one another's selves, in particular through comments and likes on

messages and photos. It is, therefore, not surprising that most adolescents receive mainly positive feedback on their online profiles (Valkenburg, Peter, & Schouten, 2006), and that this positive feedback stimulates their self-concept and self-esteem (Thomaes et al., 2010; Valkenburg et al., 2006).

Although in social media positive reactions from peers are far more common than negative ones, earlier research has shown that a small number of adolescents, about seven percent, mainly receive negative feedback on their online profiles (e.g., Valkenburg et al., 2006), and that their self-esteem can suffer from receiving negative online peer feedback (Thomaes et al., 2010; Valkenburg et al., 2006). There are several explanations why online feedback may be more harmful than face-to-face feedback. First, the reduced audiovisual cues in online communication may make people feel less inhibited (Walther, 1996) and, therefore, negative feedback can be harsher than in face-to-face communication (Kiesler, Siegel, & McGuire, 1984; Suler, 2004). Second, online feedback is more public than face-to-face feedback (Valkenburg & Peter, 2011). Although adolescents can adjust the privacy settings of their profiles (boyd, 2008), they often have a large group of contacts who can see their profiles (Jacobsen & Forste, 2011), and who can distribute content of these profiles to others who do not have access to the profile (boyd, 2008). This means that online feedback can be seen by more – and possibly more unknown – people than face-to-face feedback. Third, compared to face-to-face feedback,

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online feedback is more persistent and visible to others long after it has been communicated (Boyd, 2008), which may also increase its impact.

Earlier studies give reason to assume that negative online peer feedback in pre- and early adolescence can be at least as detrimental for psychosocial development as offline negative peer feedback (Kiriakidis & Kavoura, 2010; Tokunaga, 2010; Valkenburg et al., 2006). It is, therefore, important to know whether certain online behaviors evoke negative reactions and, if so, who engages in these online behaviors. After all, if we are able to identify these particular adolescents, we will be better able to design prevention and intervention strategies. Therefore, the present study focuses on identifying online behavior related to receiving negative online peer feedback, as well as several characteristics (i.e., demographic, dispositional, and social characteristics) of adolescents who engage in online behavior that may result in negative feedback.

1.1. Online behavior and negative feedback

Although previous studies have shown that negative online feedback can have a negative effect on adolescents' self-concept and self-esteem, to our knowledge, none of these studies have examined the specific processes or causes that may lead to receiving negative feedback. An important first step, therefore, is to investigate how adolescents who frequently receive peer negative feedback from their peers differ in their online behavior from other adolescents. Do adolescents who get negative feedback behave in a less inhibited way? Do they take more risks in their online communication and self-presentation? To answer these questions, the first aim of this study is to investigate which online behaviors predict the frequency of receiving negative feedback in social media (i.e., social network sites).

Social network sites typically encourage adolescents to form a network of friends, for instance by initiating conversations and new social contacts, as well as by showing pictures of themselves in their online profiles. On the one hand, such online activities have been suggested to support crucial goals in adolescence related to social competence and identity development (Valkenburg & Peter, 2011). On the other, the more adolescents reveal about themselves, the more feedback this can generate. Although social initiation and posting of personal pictures can elicit positive reactions from others, the likelihood of receiving negative feedback is higher compared to other "safer" online behavior. Adolescents who engage in these behaviors may, consequently, be more vulnerable to negative consequences (e.g., Berson, Berson, & Ferron, 2002; Livingstone & Helsper, 2007), such as receiving negative online peer feedback, or being victimized online (Mesch, 2009). In the present study, we, therefore, hypothesize two behaviors as potential predictors of receiving negative feedback: (a) online social exploration and, (b) risky online self-presentation.

Online social exploration refers to exploring new social contacts and initiating conversations through social media. This includes communication with known peers (e.g., asking whether someone wants to do something fun with you) as well as less known or even unknown peers (e.g., commenting on messages of people you do not know very well). Risky online self-presentation can be defined as posting pictures of oneself with a strong focus on sexuality and physical attractiveness. It concerns pictures in which adolescents appear good-looking or sexy (e.g., by posing in a provocative or sexy way, or by being scantily dressed in the picture). Both online social exploration and risky online self-presentation typically involve more risk than activities that can be expected to have more certain – and usually also more positive – outcomes, such as talking to friends or posting relatively neutral pictures of oneself. The current study, therefore, investigates whether adolescents' online social exploration and risky online self-presentation predict

negative feedback from peers. We expect that online social exploration (H1a) and risky online self-presentation (H2b) predict a higher risk of receiving negative online peer feedback.

1.2. Potential precursors of risky online behavior

Previous literature stresses the importance of investigating the role of individual differences when investigating media use and possible media effects (Valkenburg & Peter, 2013). Aside from gender and age, which are frequently investigated as individual difference factors, the Differential Susceptibility to Media Effects Model (DSMM) also points to dispositional factors (e.g., personality) and social factors (e.g., family and peer influence) that make individuals more susceptible to media effects. Based on this theoretical model and previous research, we examine the role of three types of precursors of risky online behavior: (a) demographic (i.e., sex, age), (b) dispositional (i.e., sensation seeking, inhibitory control), and (c) social (i.e., peer problems, family conflict). These precursors are expected to directly influence online social exploration and risky online self-presentation, which, in turn, increase the likelihood of receiving negative peer feedback. The second aim, therefore, is to examine the indirect effects of these three types of precursors on negative online peer feedback.

1.2.1. Demographic factors

With respect to demographic precursors of risky online behavior, this study investigates two variables: sex and age.

1.2.1.1. Sex. Boys generally display more risky behavior in everyday life compared to girls (Gullone, Moore, Moss, & Boyd, 2000). They also seem to engage in more online risks than girls, for example through sharing personal information online (Livingstone & Helsper, 2007), engaging in sexual online risk behavior (Baumgartner, Valkenburg, & Peter, 2011), and visiting chat rooms and forums, which typically involve interactions with strangers (Sasson & Mesch, 2014). In addition, boys and men may be more inclined to experiment with the information they post in their online profiles compared to girls and women (Orchard, Fullwood, Galbraith, & Morris, 2014). Experimentation in itself implies trying out new options, of which the outcome (i.e., the positivity or negativity of other's reactions) is less certain. Such behavior may, in turn, increase the likelihood of receiving negative feedback.

On the other hand, girls may take more risks than boys in their online physical self-presentation, which can also, subsequently, provoke negative reactions from peers. For example, they more often post sexual pictures of themselves than boys (Manago, Graham, Greenfield, & Salimkhan, 2008). This relatively risky way of presenting themselves can prompt negative comments from peers. However, because the empirical evidence on the relationship between sex and risky online behavior is not consistent enough to formulate a hypothesis, we explore the following research question: Do boys or girls have a higher tendency to engage in online social exploration or (RQ1a) and risky online self-presentation (RQ1b), which, in turn, increases the risk of receiving negative online peer feedback?

1.2.1.2. Age. Early and middle adolescents (12–15 years old) may be more likely to receive negative online feedback than pre- (10–11 years old) and late adolescents (16–18 years old). In early to middle adolescence, there is an increase in risk behavior, which peaks in middle adolescence and decreases in late adolescence (e.g., Steinberg, 2005). Adolescents' online risk behavior also seems to follow this typical curvilinear risk behavior trajectory (Baumgartner, Sumter, Peter, & Valkenburg, 2012). This suggests that early and, especially, middle adolescents may take more risks in how they communicate and present themselves in social media

compared to preadolescents and older adolescents. As a consequence of such experimentation with social behavior, these adolescents may more often receive negative comments from their peers. The sample of the current study includes adolescents from 10 years old (i.e., preadolescents) to 15 years old (i.e., early and middle adolescents). Therefore, we hypothesize that age predicts a higher tendency to engage in online social exploration (H2a) and risky online self-presentation (H2b), which, in turn, increases the risk of receiving negative online peer feedback.

1.2.2. Dispositional factors

A second type of precursors concerns adolescents' personality or disposition. Two dispositional factors that may be related to online risky behavior are: (a) adolescents' tendency to seek sensation in the form of new and exciting experiences (i.e., sensation seeking), and (b) the extent to which they have difficulty inhibiting their impulses (i.e., inhibitory control).

1.2.2.1. Sensation seeking. Adolescence is characterized by increased sensation seeking (Arnett, 1994; Steinberg, 2004; Zuckerman, Eysenck, & Eysenck, 1978). Individual variation in sensation seeking has often been the focus of studies into adolescents' risk behavior, which have consistently shown that adolescents with a higher tendency to seek sensation are more likely to engage in different types of risk behavior, such as reckless driving, sexual behavior, drug use, and minor criminal behavior (e.g., Arnett, 1996). Similarly, it is likely that adolescents' tendency to seek sensation extends to their online behavior. Adolescents high in sensation seeking spend more time online (Lin & Tsai, 2002), which increases the likelihood of experiencing online risks (Livingstone & Helsper, 2007). In addition, adolescents with a higher tendency to seek sensation have been shown to take more risks in their online behavior (Baumgartner et al., 2012; Livingstone & Helsper, 2007; Lu, 2008). Consequently, this may increase the risk of receiving negative reactions from peers. We, therefore, hypothesize that adolescents who seek more sensation have a higher tendency to engage in online social exploration (H3a) and risky online self-presentation (H3b) compared to adolescent who seek less sensation, which, in turn, increases the risk of receiving negative online peer feedback.

1.2.2.2. Inhibitory control. Adolescents with a deficiency of inhibitory control are less able to suppress behavior that is inappropriate in a particular context (Barkley, 1997, 1999). Problems with inhibitory control are uncovered by impulsive behavior (Schachar & Logan, 1990), and have been related to a higher risk of several addictive behaviors (e.g., Nigg et al., 2006; Vitaro, Arseneault, & Tremblay, 1999). It is likely that adolescents who have difficulty inhibiting their behavior in face-to-face situations also have more problems controlling their behavior in online interactions. Inhibitory control and impulsivity are associated with a higher risk of Internet addiction (e.g., Burnay, Billieux, Blairy, & Larøi, 2015; Cao, Su, Liu, & Gao, 2007; Dong, Lu, Zhou, & Zhao, 2010), and may also increase the possibility of experiencing online risks (Livingstone & Helsper, 2007). Inhibition problems may also be related to the inability to inhibit specific online behavior, such as sharing information and actions related to self-presentation, such as posting inappropriate messages or photos. In the same fashion, adolescents with low inhibitory control may more often initiate interactions with relative strangers. Subsequently, such disinhibited and risky online behavior can evoke negative feedback. We, therefore, hypothesize that adolescents with lower inhibitory control have a higher tendency to engage in online social exploration (H4a) and risky online self-presentation (H4b) compared to adolescents with higher inhibitory control, which, in turn, increases the risk of receiving negative online peer feedback.

1.2.3. Social factors

Two factors in adolescents' social environment may be predictive of risky online behavior: (a) the extent to which adolescents have problems in their relationships with peers (i.e., peer problems) and the level of conflict within adolescents' families (i.e., family conflict).

1.2.3.1. Peer problems. Peer problems can, for instance, include not getting along very well with peers, not having close friends, or even being bullied or tormented by peers. Earlier research has already shown a direct link between lower peer attachment and problematic (i.e., frequent) Internet use (i.e., frequent use; Moreau, Laconi, Delfour, & Chabrol, 2015). In addition, adolescents' offline negative interactions and experiences with peers may also be reflected online, for example by being socially excluded in social media or by receiving negative reactions on what they share online. This is supported by studies showing that adolescents who are victimized face-to-face are also more likely to be victimized or bullied online (Fredstrom, Adams, & Gilman, 2011; Wolak, Mitchell, & Finkelhor, 2003; Ybarra, Espelage, & Mitchell, 2007). This relationship between offline and online peer relationships also suggests that specific behavioral patterns of adolescents with problematic peer interactions are visible both offline and online. Adolescents with peer problems are more likely to have a relatively dysfunctional way of interacting with peers (Parker & Seal, 1996). As a consequence, they might behave in a more socially awkward way in social media, for example by posting inappropriate pictures or messages, which could evoke negative comments. In addition, they may be less satisfied with their offline social lives, and, therefore, feel more comfortable initiating relationships online (Bessière, Kiesler, Kraut, & Boneva, 2008; Livingstone & Helsper, 2007). We, therefore, hypothesize that adolescents with more peer problems have a higher tendency to engage in online social exploration (H5a) and risky online self-presentation (H5b) compared to adolescents with fewer peer problems, which, in turn, increases the risk of receiving negative online peer feedback.

1.2.3.2. Family conflict. Preadolescents from high-conflict families have a stronger preference for violent media content (Fikkers, Piotrowski, Weeda, Vossen, & Valkenburg, 2013; Vandewater, Lee, & Shim, 2005). This preference for relatively stimulating media content may also be expressed in more extreme or risky use of online social media, such as risky online self-presentation and initiating contact with strangers, which may lead to receive negative reactions. Furthermore, adolescents from high-conflict families may feel the need to escape from for their stressful family environments. Children and adolescents who experienced communication problems with their parents, as well as those with lower life satisfaction, showed more risky online behavior (Livingstone & Helsper, 2007). We, therefore, expect that adolescents with more family conflict have a higher tendency to engage in online social exploration (H6a) and risky online self-presentation (H6b) compared to adolescents with less family conflict, which, in turn, increases the risk of receiving negative online peer feedback.

2. Method

2.1. Sample and procedure

After we received approval from the sponsoring institution's Institutional Review Board, a large, private survey research institute in the Netherlands collected survey data from September to November 2012. The research institute recruited 516 families with at least two adolescents between 10 and 15 years old. For families with more than two children between 10 and 15 years old, only

two children participated in this study. Families were recruited in urban and rural regions across the Netherlands. The online questionnaire for this study was part of a broader survey on media use and its consequences. Complete survey data of the study variables were available for 785 individual adolescents (52.2% girls, $M_{\text{age}} = 12.56$, $SD_{\text{age}} = 1.33$). In some cases, we had complete survey data of only one of the adolescents in the family. Of the adolescents who were in the final sample, 81.0% were sibling pairs. Before the implementation of the survey, parental consent and adolescents' informed consent were obtained. Adolescents were notified that the questions would be about media and how they feel and act in their daily lives, and that the answers would be analyzed anonymously.

2.2. Measures

2.2.1. Negative online peer feedback

We measured adolescents' frequency of receiving negative online peer feedback with four items. Two items concerned feedback on messages and two concerned feedback on pictures. The frequency of receiving negative feedback on *messages* was measured as follows: "How often do you get negative reactions to messages that you posted on social network sites (on your own profile or on another's profile)..." (a) "from good friends" and (b) "from people you don't know very well?". The frequency of receiving negative reactions on *pictures* was measured with the following two questions: "How often do you get negative reactions to pictures that you are in..." (a) "from good friends" and (b) "from people you don't know very well?". For all four questions, the response options were: 0 (*never*), 1 (*almost never*), 2 (*sometimes*), 3 (*often*), and 4 (*very often*). We created a scale based on the average of the four individual items. Cronbach's alpha of the scale was .82 ($M = 1.58$, $SD = 0.55$).

2.2.2. Online social exploration

We developed the items on adolescents' online social exploration based on a subscale of an existing social competence scale (Valkenburg & Peter, 2008), which measured adolescents' ability to initiate offline relationships and interactions. We adapted the scale in order to measure adolescents' tendency to engage in similar social initiation activities through social network sites. The scale consisted of four items: "How often do you do the following things on social network sites?" (a) "invite someone to become friends" (b) "comment on a message or picture of someone you don't know that well" (c) "send a message to someone you don't know that well" (d) "ask someone whether he/she wants to do something fun with you." Items were measured on a 5-point scale with the following response options: 1 (*never*), 2 (*almost never*), 3 (*sometimes*), 4 (*often*), and 5 (*very often*). Based on the average of the four individual items, we created a composite scale ($M = 2.11$, $SD = 0.68$), which proved to be internally consistent (Cronbach's alpha = .73). Further information about psychometric characteristics of the scale can be found on <http://www.ccam-ascor.nl>.

2.2.3. Risky online self-presentation

The risky online self-presentation items were based on research into adolescents' sexy online self-presentation (e.g., Crescenzi, Araña, & Tortajada, 2013; Hall, West, & McIntyre, 2012; Van Oosten, Peter, & Boot, 2014). The scale consisted of four items: "How often do you post pictures on social network sites..." (a) "in which you look good?" (b) "in which you look sexy?" (c) "in which you wear swimwear or underwear?" (d) "in which you have a provocative posture?" Items were measured on a 5-point scale: 1 (*never*), 2 (*almost never*), 3 (*sometimes*), 4 (*often*), and 5 (*very often*). We created a scale based on the average of the four items, which led to a Cronbach's alpha of .62 ($M = 1.63$, $SD = 0.60$). Further

information about the psychometric characteristics of this scale can be found on <http://www.ccam-ascor.nl>.

2.2.4. Sensation seeking

Our measure of sensation seeking was based on the Brief Sensation Seeking Scale (BSSS; Hoyle, Stephenson, Palmgreen, Lorch, & Donohew, 2002) with a few additional items by Jensen, Weaver, Ivic, and Imboden (2011). We asked adolescents to indicate the extent to which the following five statements were true for/applicable to them: (1) "I like friends that do exciting things," (2) "I would like to bungee jump once," (3) "I like doing scary things," (4) "I like doing new and exciting things, even if they are forbidden," and (5) "I am the first of my friends who tries new things." Response options were: 1 (*completely not true*), 2 (*not true*), 3 (*a little not true/a little true*), 4 (*true*), and 5 (*completely true*). We created a scale based on the average of the individual items. Cronbach's alpha of the scale was .81 ($M = 2.92$, $SD = 0.92$).

2.2.5. Inhibitory control

Inhibitory control was measured using a subscale of the Behavior Rating Inventory of Executive Function (BRIEF; Gioia, Isquith, Guy, & Kenworthy, 2000), as used by Huizinga and Smidts (2011). The scale consisted of 12 items. Examples of items are: "I blurt out things," "I lose control more easily than my friends," and "I don't think about the consequences when I do something." The items were measured on a 3-point scale with the response options: 1 (*never*), 2 (*sometimes*), and 3 (*always*). Based on the average of the 12 individual items, we created a scale, with higher scores indicating more problems with inhibitory control. Cronbach's alpha of the scale was .83 ($M = 1.61$, $SD = 0.35$).

2.2.6. Peer problems

We measured peer problems with a subscale of the Strengths and Difficulties Questionnaire (SDQ; Goodman, 2001), which consists of five items: (1) "I am rather solitary. I tend to play alone or do not mind other one's affairs," (2) "I have at least one good friend," (4) "Other teens my age generally like me," (3) "Other children or teens bully or torment me," and (5) "I get along better with adults than with teens my age." Adolescents indicated the extent to which these statements applied to them by answering with one of the following response options: 1 (*not true*), 2 (*a little true*), and 3 (*definitely true*). Based on the average of the individual items, we created a scale, with higher scores indicating more peer problems. Cronbach's alpha of the scale was .47 ($M = 1.37$, $SD = 0.34$).

2.2.7. Family conflict

Family conflict was measured using five items from the conflict subscale of the Family Environment Scale (Jansma & Coole, 1996; Moos & Moos, 1994). Adolescents were asked to indicate how often family members do the following things at home: (1) criticize each other, (2) hit each other, (3) argue, (4) curse, and (5) become so angry they start throwing things. Response categories were: 1 (*never*), 2 (*almost never*), 3 (*sometimes*), and 4 (*often*). Scores were averaged to create a scale with higher scores indicating greater family conflict. Cronbach's alpha of the scale was .73 ($M = 2.19$, $SD = 0.55$).

2.3. Data analysis

To investigate the indirect effects of the three types of precursors on the frequency of receiving negative online peer feedback through online social exploration and risky online self-presentation, we used structural equation modeling in *Mplus*. Fig. 1 illustrates the statistical model. In the structural equation model, all precursors were included and were allowed to covary, as were the two mediators. The outcome variable, frequency of

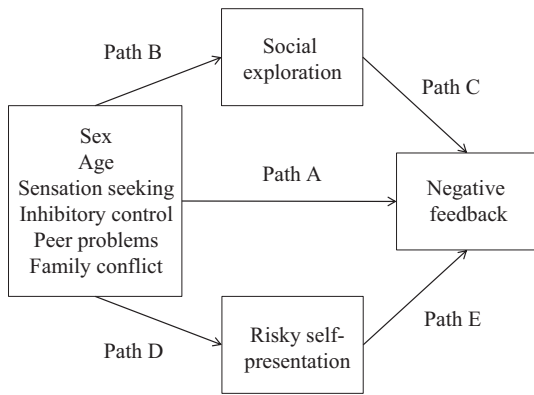


Fig. 1. Conceptual model of the indirect effects of six precursors on negative feedback.

receiving negative feedback, was highly skewed, with most adolescents reporting that they never received negative reactions on social network sites. Furthermore, although the response options of the items ranged from 1 (*never*) to 5 (*very often*), the scores of the scale did not exceed 3.33 (closest to *sometimes*). Therefore, we created a binary outcome variable with two values: 0 (*has never received negative feedback*), 1 (*has received negative feedback*), which we used in a logistic structural equation model. Paths in our conceptual model (see Fig. 1) leading to negative peer feedback (Path A, C, and E) were estimated based on robust weighted least squares (WLSMV) approach, expressed in probit regression coefficients. All other paths in the model were estimated based on ordinary least square regression, expressed in unstandardized regression coefficients. To correct for the clustered nature of our data (i.e., two adolescents within one family) we used robust clustering, which adjusts the standard errors of the regression coefficients to compute robust clustered standard errors.

3. Results

3.1. Descriptive statistics

Table 1 shows how often adolescents received negative online peer feedback, and how often they engaged in online social exploration and risky online self-presentation (average rounded scores).

Table 1
Percentages of receiving negative online peer feedback, and engaging in online social exploration and risky online self-presentation.^a

		Never (%)	Almost never (%)	Sometimes (%)	Often (%)	Very often (%)
Negative feedback	Boys	39	49	13	0	0
	Girls	49	46	5	0	0
	10–11 yrs	48	45	7	0	0
	12–15 yrs	43	48	9	0	0
	Total	44	47	8	0	0
Social exploration	Boys	17	46	33	4	0
	Girls	12	56	28	3	<1
	10–11 yrs	21	57	20	1	<1
	12–15 yrs	11	49	36	5	0
	Total	15	51	30	3	<1
Risky self-presentation	Boys	45	42	12	1	<1
	Girls	34	58	7	<1	<1
	10–11 yrs	48	41	9	1	<1
	12–15 yrs	34	55	10	<1	<1
	Total	39	50	10	<1	<1

^a Percentages are based on rounded average scores (e.g., “on average never”, “on average almost never”).

The table shows that, on average, 44% of adolescents never received negative online peer feedback, 47% of adolescents reported that this almost never happened, and 8% sometimes received negative feedback. No adolescents reported receiving feedback on average “often” or “very often”. In addition, online social exploration was not very common, with the largest groups of adolescents reporting to engage in such behavior, on average, almost never or sometimes. Risky online self-presentation was even less common, with most adolescents scoring, on average, never or almost never. In addition to the frequencies for the complete sample, Table 1 also shows the frequency of receiving negative feedback, online social exploration, and risky online self-presentation separately for boys and girls, and for preadolescents (10–11 years old) and early adolescents (12–15 years old).

3.2. Rank-order correlations

Table 2 shows Spearman’s rank-order correlations between all variables in the study. As the table shows, online social exploration and risky online self-presentation were both positively related to negative feedback, so the data supported H1a and H1b. Table 2 also shows that online social exploration was positively related to adolescents’ age, sensation seeking, inhibitory control, and family conflict, negatively related to peer problems, and unrelated to sex. Furthermore, girls engaged in risky online self-presentation more often than boys, and risky online self-presentation was positively related to adolescents’ age, sensation seeking, and inhibitory control, but negatively related to peer problems, and not related to family conflict.

3.3. Assessing indirect effects

We investigated whether the three types of precursors were indirectly related to receiving negative online peer feedback through the tendency to engage in (a) online social exploration and (b) risky online self-presentation. Table 3 shows the estimates of the different direct and indirect paths in the model.

3.3.1. Sex

Results showed no sex differences in social online exploration and risky online self-presentation. Consequently, there were no significant indirect effects of sex on negative feedback through both online risky behaviors. However, results showed a direct

Table 2
Spearman's correlation coefficients between all study variables.

	1	2	3	4	5	6	7	8	9
1. Negative feedback ^{a,c}	1								
2. Sex ^{b,c}	.14***	1							
3. Age	.07	-.05	1						
4. Sensation seeking	.14***	-.14**	.12**	1					
5. Inhibitory control	.19***	-.10**	-.03	.31***	1				
6. Peer problems	.07*	-.09**	-.11**	-.03	.13***	1			
7. Family conflict	.14***	-.02	.04	.15***	.32***	.16***	1		
8. Social exploration	.27***	-.00	.25***	.28***	.15***	-.12**	.15***	1	
9. Risky self-presentation	.26***	.08*	.12**	.23***	.10**	-.11**	.06	.46***	1

^a 0 = did not receive feedback, 1 = received feedback.
^b 1 = boys, 2 = girls.
^c Relationship between sex and negative feedback: $\chi^2 = 9.34^{**}$.
 * $p < .05$.
 ** $p < .01$.
 *** $p < .001$.

Table 3
Direct and indirect effects of the precursors on negative feedback, online social exploration, and risky online self-presentation.

	Path A (X → Y)		Path B (X → M1)		Path D (X → M2)		Indirect effect through M1 (X → M1 → Y)			Indirect effect through M2 (X → M2 → Y)		
	Coef	(SE)	B	(SE)	B	(SE)	Coef	(SE)	95% CI	Coef	(SE)	95% CI
Sex ^a	-.24	(0.08)***	.05	(.04)	.07	(.04)	.02	(.02)	-.02, .04	.03	(.02)	-.02, .02
Age	.02	(0.03)	.10	(.02)***	.02	(.01)	.03	(.01)***	.01, .05	.01	(.01)	-.00, .02
Sensation seeking	.02	(0.05)	.17	(.03)***	.14	(.02)***	.06	(.02)***	.02, .08	.05	(.01)***	.02, .07
Inhibitory control	.38	(0.13)**	.11	(.07)	.04	(.06)	.04	(.02)	-.04, .07	.02	(.02)	-.04, .05
Peer problems	.30	(0.13)*	-.22	(.07)**	-.15	(.06)*	-.08	(.03)*	-.15, -.03	-.06	(.03)*	-.12, -.01
Family conflict	.11	(0.08)	.14	(.04)**	.04	(.04)	.05	(.02)**	.00, .08	.01	(.01)	-.02, .04

^a 1 = boys, 2 = girls; X = independent variable; Y = negative feedback; M1 = mediator 1: online social exploration; M2 = mediator 2: risky online self-presentation; Coef = Coefficient, CI = Confidence interval.
 * $p < .05$.
 ** $p < .01$.
 *** $p < .001$.

effect of sex on negative feedback, indicating that boys were more likely to receive negative feedback than girls.

3.3.2. Age

Age had a significant effect on online social exploration, indicating that as adolescents' age increased, they engaged in this behavior more often. Age also indirectly predicted receiving negative feedback through online social exploration. In contrast, age did not affect risky online self-presentation. In addition, there was no direct effect of age on negative feedback. The data, thus, supported H2a, but not H2b.

3.3.3. Sensation seeking

Results indicated that sensation seeking had a positive effect on online social exploration and risky online self-presentation. Furthermore, sensation seeking had a positive indirect effect on negative feedback, so it predicted receiving negative feedback through increased online social exploration and risky online self-presentation. However, sensation seeking did not have a direct effect on negative feedback. H3a and H3b were thus supported.

3.3.4. Inhibitory control

Problems with inhibitory control did not affect online social exploration and risky online self-presentation. However, results did indicate a positive direct effect of inhibitory control on negative feedback. Thus, H4a and H4b did not receive support.

3.3.5. Peer problems

Contrary to our expectations, results demonstrated a significant negative effect of peer problems on online social exploration and risky online self-presentation, which, in turn, predicted receiving negative feedback. So, whereas the results showed a

positive direct effect of peer problems on negative feedback, they also indicated a negative indirect effect of peer problems on negative feedback through both online social exploration and social self-exploration. H5a and H5b were thus not supported.

3.3.6. Family conflict

Family conflict had a positive effect on online social exploration. In addition, family conflict indirectly predicted negative feedback, so adolescents with more family conflict were more likely to receive negative feedback through increased online social exploration. Family conflict did not have a significant effect on risky online self-presentation, and, thus, was not indirectly related to negative feedback through risky online self-presentation. Furthermore, family conflict did not have a direct effect on negative feedback. H6a thus received support, whereas H6b was not supported.

4. Discussion

The first aim of the current study was to investigate whether certain online behavior (i.e., online social exploration, risky online self-presentation) increases the risk of receiving negative peer feedback in social media. The second aim was to examine who is most at risk by investigating three types of precursors that may predict this online behavior and, indirectly, negative feedback: (a) demographic (i.e., sex, age), (b) dispositional (i.e., sensation seeking, inhibitory control), and (c) social precursors (i.e., peer problems, family conflict). Overall, our results indicate that receiving negative feedback is predicted by adolescents' tendency to engage in online social exploration and risky online self-presentation. Adolescents who engage in these risky online behaviors are characterized by older age, more sensation seeking, fewer peer problems, and more family conflict.

4.1. Risky online behavior predicts negative feedback

In line with previous research (Valkenburg et al., 2006), our study showed that the prevalence of receiving negative peer feedback in social media was low, with only 8% of adolescents who sometimes received negative reactions from peers. Still, as expected, this small group was characterized by more risky online behavior. Although exploring new social contacts and conversations in social media and showing pictures of themselves focusing on their physical attractiveness may support important developmental goals in adolescence (Valkenburg & Peter, 2011), their disclosing character also seems to evoke negative feedback from peers. It thus seems that previous studies correctly labeled such behaviors as risky (e.g., Berson et al., 2002; Livingstone & Helsper, 2007; Sasson & Mesch, 2014). Subsequently, we investigated which adolescents (based on several demographic, dispositional, and social factors) engaged in these online behaviors that would put them more at risk of receiving negative feedback.

4.2. Demographic precursors of online risky behavior and negative feedback

Our results showed that boys were more likely to receive negative feedback than girls. However, this effect was not due to differences in risky online behaviors between boys and girls. While earlier studies suggested that boys engage in risky online behavior more often (Baumgartner et al., 2011; Livingstone & Helsper, 2007; Orchard et al., 2014; Sasson & Mesch, 2014), and other studies suggested that girls engage more in risky online self-presentation (e.g., De Vries & Peter, 2013; Manago et al., 2008), our findings showed that boys and girls just as frequently engage in risky online behavior (i.e., social exploration and risky online self-presentation). This implies that mechanisms other than these behaviors may explain why boys receive more negative online peer feedback. A possible explanation might be related to differences in communication style between boys and girls. Previous research has shown that females are more likely to use an online communication style expressing support and attenuation, and that males seem to be less concerned with politeness, and are more likely to criticize or insult others (Herring, 1994, 1996). Thus, boys might be more likely to send negative comments than girls. As adolescents mostly communicate online with same-sex friends (Bonetti, Campbell, & Gilmore, 2010), this may cause boys to receive more negative comments.

In addition, in line with previous studies (e.g., Baumgartner et al., 2012; Livingstone & Helsper, 2007), our results showed that age was related to increased online social exploration, which, in turn, led to more negative feedback. However, in contrast to previous research (e.g., Valkenburg, Schouten, & Peter, 2005), our results showed no relationship between age and risky online self-presentation. This lack of differences may be due to the young age of our sample (10- to 15-year-olds). It is possible that, as adolescents enter late adolescence, they recognize the riskiness of some behaviors (e.g., explicitly sexy self-presentation) more than others (e.g., online social exploration in their extended peer network). Future studies should, therefore, further investigate adolescents' risk perceptions in relation to their engagement in different types of risky behavior in social media.

4.3. Dispositional precursors of risky online behavior and negative feedback

Sensation seeking did not directly lead to negative feedback. Instead, it indirectly influenced negative feedback by its stimulating effect on both online social exploration and risky online self-presentation. In line with previous research (e.g., Baumgartner

et al., 2012), these results confirm how individual differences in sensation seeking not only affect adolescents' offline behavior (e.g., Arnett, 1996), but also their behavior while using social media.

Concerning inhibitory control, our results suggest that adolescents with more inhibitory control problems are more likely to receive negative online peer feedback. Previous research suggested that inhibitory control decreases adolescents' ability to inhibit the frequency of their social media use (Burnay et al., 2015; Cao et al., 2007; Dong et al., 2010) and, subsequently, the risk of negative online experiences (Livingstone & Helsper, 2007). However, in the current study, inhibitory control did not seem to affect adolescents' ability to inhibit specific online behavior, at least not social exploration or risky online self-presentation. Adolescents' problems with inhibitory control may be displayed through other aspects of their online behavior, which are subject to impulsiveness, such as sharing awkward or inappropriate textual messages (e.g., status updates) on their profiles, which may be an important question in future research.

4.4. Social precursors of risky online behavior and negative feedback

Our findings with respect to the predictive role of peer problems are somewhat contradictory. Adolescents with more peer problems were more likely to receive negative feedback. This is in line with studies into the relationship between online and offline victimization (Fredstrom et al., 2011; Wolak et al., 2003; Ybarra et al., 2007). Adolescents with peer problems may compensate for their poor offline situation by using social media more frequently (Moreau et al., 2015), and engage in more risky online behavior (e.g., Bessi ere et al., 2008; Livingstone & Helsper, 2007). However, against our expectation, our proposed mediators could not explain this relationship. Apparently, other factors may explain the direct positive effect of peer problems on negative feedback. One explanation might be that these adolescents' possible lower social competence affects their online peer interactions, which in turn may lead to negative feedback. Another possible explanation is that adolescents with peer problems seek new social contacts through online platforms that are unconnected to their existing social network, and that this enhances the risk of receiving negative reactions.

The indirect effect of family conflict on negative feedback through online social exploration suggests that adolescents from high-conflict families may use online communication to escape from for their family environments by seeking out and initiating new contacts in social media (Livingstone & Helsper, 2007), which puts them more at risk of receiving negative feedback. In previous research, preadolescents with high levels of family conflict were found to have a stronger preference for stimulating (i.e., violent) media content (Fikkers et al., 2013; Vandewater et al., 2005). However, our study suggests that adolescents seem to have a stronger need for contact with or support from peers or people outside their families or existing peer group, rather than the riskiness associated with disclosing themselves visually in social media.

4.5. Implications and directions for future research

As previous research has mainly focused on possible consequences of negative online peer feedback (e.g., Thomaes et al., 2010; Valkenburg et al., 2006), the current study contributes to existing research in two important ways. First, we identified which online behaviors are particularly related to receiving negative online peer feedback. We add to previous studies into adolescents' risky online behavior (Berson et al., 2002; Livingstone & Helsper, 2007; Mesch, 2009; Sasson & Mesch, 2014) by linking specific

behaviors to the risk of receiving negative feedback messages from peers. Knowing which behaviors are most likely to induce negative online feedback is essential for prevention and intervention strategies, as it gives directions on which online activities should be the focus of such strategies aimed at preventing and reducing possible negative consequences of adolescents' social media use.

Second, we explored individual differences that predict which adolescents engage in risky online behaviors that may lead to negative feedback. Whereas most earlier studies have only included demographic factors such as sex and age as individual differences, we have explored dispositional and social factors that make adolescents susceptible to receiving negative feedback based on the Differential Susceptibility to Media Effects Model (DSMM; Valkenburg & Peter, 2013). Differentiating between these types of individual characteristics leads to a fuller understanding of which adolescents are particularly vulnerable to negative experiences as a result of their online communication. To our knowledge, the current study is the first to link specific risky behavior that may lead to negative online peer feedback to characteristics of adolescents who are most likely to engage in such behavior, and show indirect effects of these characteristics on negative online feedback through this behavior.

Based on the results of the current study, there are at least two directions for future research. First, in this study, not all of adolescents' characteristics that were related to negative feedback were also related to increased online social exploration or risky online self-presentation. In future studies it is, therefore, important to investigate other types of risky online behavior (e.g., self-promoting content, or negative content) that may predict receiving negative feedback in social media. Such results would further guide future prevention and intervention strategies to help adolescents at risk. Second, research that replicates our findings in a longitudinal design is needed to acquire more insight into the causal nature of the relationships between the precursors, risky online behavior, and negative online peer feedback. We found that, fortunately, only a small group of adolescents frequently receive negative comments in social media. Still, it is important to give attention to this specific group. As researchers argue that the consequences of negative online feedback may be more harmful than face-to-face feedback (Kiriakidis & Kavoura, 2010; Tokunaga, 2010; Valkenburg et al., 2006), it is crucial that future studies investigate what the long-term consequences can be for this small group of adolescents.

4.6. Conclusion

In addition to benefits, it is important to investigate risks of social media use, and, especially, factors that increase the likelihood of experiencing negative consequences. The present study, therefore, explored which adolescents are more susceptible to receiving online negative feedback from their peers. We did this by investigating which online behaviors are related to negative feedback and who engages in these behaviors. Our study suggest that risky online behavior can make adolescents more likely to receive negative peer feedback, and that individual differences predict which adolescents engage in such risky behavior more often. This way, the current study forms a first step in discovering the behavior and characteristics of adolescents who are most at risk to receive negative feedback in social media.

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