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Gender Differences in the Factors Explaining Risky Behavior Online

Hagit Sasson[1] · Gustavo Mesch[1]

Abstract In searching for the social and cognitive antecedents of risky online behaviors, some studies have relied on the theory of planned behavior. According to the theory, three components serve as predictors of a given behavior—attitudes toward the behavior (beliefs that people hold about a given behavior), subjective norms (perceptions of what significant others think about the behavior) and perceived behavior control (perceptions about the ease or difficulty of engaging in a particular behavior). However, none of these studies considered the possibility that these factors work differently for boys and girls. We constructed models of the possible antecedents (attitudes, subjective norms and perceived behavior control) of risky behavior online and tested them using a representative sample of 495 sixth to eleventh grade students (46 % female) in a large city in Israel. We measured risky behavior online with items indicating the frequency of posting personal details, sending an insulting message and meeting face-to-face with a stranger met online. Structural equation modeling revealed that peers' subjective norms (beliefs that friends approve of engaging in risky online behaviors), parents' subjective norms (beliefs that parents accept involvement in risky online behaviors) and perceived behavior control were related to boys' risky behavior online, whereas for girls, only parents' subjective norms had such an association. Expanding the models to include other factors underscored that family factors were most strongly associated with girls' risky behavior online.

Introduction

The use of online communication has become an integral part of adolescents' social interactions with their peers and parents. A recent survey conducted by the Pew Research group in the US reported that 92 % of all teens aged 13–17 go online daily and 76 % use social media (Lenhart 2015). Adolescents use social media to express themselves and communicate with their peers (Subrahmanyam and Smahel 2011). Online social interactions with peers provide emotional support, encouragement and advice (Dolev-Cohen 2012) but at the same time could expose teens to higher risks of harassment, cyberbullying and sexual solicitation. This is particularly true of online activities that involve contact with strangers, content production (such as posting personal photographs or video clips) and activities in which teens disclose personal information (Mesch 2009).

In searching for the social factors that can shed light on adolescents' risky online behavior, studies have relied on the theory of planned behavior (Ajzen 1991) to understand the association between attitudes, subjective norms (i.e., what significant others think about the investigated behavior), perceived behavior control (i.e., perceptions about the ease of engaging in the investigated behavior), and cyberbullying (Heirman and Walrave 2012; Pabian and Vandebosch 2014) and sexting (Walrave et al. 2014). However, none of these studies paid attention to gender differences in the factors explaining risky behavior online.

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This lack of attention to gender differences is surprising in light of past studies demonstrating that boys and girls use the Internet differently (Lau and Yuen 2013; Notten and Nikken 2014). Boys are more likely to engage in risky behaviors online such as disclosing personal information on their social media profiles (Madden et al. 2013), meeting face-to-face with strangers first met online (NCTE 2008) and bullying others (Heiman et al. 2014).

In addition, one weakness of the theory of planned behavior is its vague reference to subjective norms (i.e., what significant others think or do). Adolescence is a period in which teens are separating from their parents and becoming closer to their peers (Sasson and Mesch 2014). While parents are committed to protecting their children from danger, friends might encourage them to explore the boundaries of acceptable behavior. General references to subjective norms disregard the inherent tension between parents and friends during this developmental stage. Thus, studies must differentiate between the subjective norms of peers and parents.

Hence, the goals of this study are twofold. First, we investigate whether there are gender differences in the contribution of the norms of the participants' parents and friends as well as perceived behavior control and attitudes to risky online behavior. Second, we examine whether gender differences are related to the quality of the relationships within the family. These questions are very important because they can illuminate the differing influences of parents and friends on adolescents' online behavior. The results can help us identify the underlying mechanism driving adolescents to engage in risky behaviors online.

Theoretical Framework

The Theory of Planned Behavior

Ajzen's (1991) theory of planned behavior offers a general model that has proven to be very effective in predicting health related actions (Gibbons et al. 2012). This theory maintains that all behaviors are planned, meaning that individuals consider the potential consequences of their activities before they decide to act. This decision process involves an assessment of the behavior based on relevant factors (attitudes, subjective norms and perceived behavior control), and their combination determines the intention to engage in the behavior, which is the only antecedent to the behavior itself.

Attitudes toward the behavior refer to beliefs that people hold (Heirman and Walrave 2012). They are shaped by the expected consequences of a particular behavior (Montano and Kasprzyk 2008). Thus, a person who believes that a

behavior might have positive results develops positive attitudes toward this behavior. Indeed, previous studies provide support for this theoretical approach. For example, in their study of teens' disclosure of information online, Mesch and Beker (2010) found a positive correlation between positive attitudes toward sharing information on the Internet and engaging in such behavior. Boulton et al. (2012) examined whether attitudes toward traditional bullying and cyberbullying are predictors of these behaviors among 405 college students. Their findings indicate that less positive attitudes toward bullying behavior and bullies are reflected in less involvement in such practices. As for gender, girls had less positive attitudes toward traditional bullying, online bullying behavior and aggressors, and more positive attitudes toward victims than boys (Boulton et al. 2012).

Subjective norms are beliefs about the extent to which individuals' significant others (i.e., family and friends) confirm or repudiate their behavior (Ajzen 1991). According to the social norms theory, adolescents' behavior is affected by what their peers think or do, and are the source for adopting personal beliefs about accepted norms and social expectations. Studies indicate that norms and risky online behavior are linked. For example, Hinduja and Patchin (2013) found that adolescents who reported that many of their friends bullied others using technological means were more likely to harass their friends themselves. On the other hand, adolescents who thought that such behavior would lead to sanctions from parents or teachers were less likely to be involved in cyberbullying. Another study examining the effect of peers on adolescents' risky online sexual behavior confirmed that the perception of what peers approve or disapprove of determines individual involvement in risky online sexual behavior (Baumgartner et al. 2011). Furthermore, a study that explored the differential contribution of peer norms and parental mediation to the involvement of adolescents in risky online behavior found that perceived peer norms about such actions were significantly and positively related to involvement in them (Sasson and Mesch 2014).

The term "perceived behavioral control" refers to individuals' perceptions about the ease or difficulty of engaging in a particular behavior, which derives from their belief in their ability to control this behavior (Ajzen 1991). Other aspects related to perceived behavioral control are the behavior itself and the context in which it occurs. The use of the Internet as a private act, the anonymity of being online and the unlikelihood of being caught (Kowalski and Limber 2007) may also contribute to the decision to take part in risky online behaviors. The online environment creates emotional distance and reduces the inhibitions that might arise in face-to-face encounters (Suler 2004). Previous studies have established a direct link between perceived behavioral control and involvement in sending text

messages or sexting (Walrave et al. 2014), and uploading video clips (Park et al. 2011). In a similar vein, Heirman and Walrave (2012) found a positive relationship between perceived behavioral control and cyberbullying intentions. In an attempt to explain this link, the researchers claimed that one of the motives for cyberbullying is the feeling that there are very few constraints that hinder people from engaging in this behavior.

Finally, there is a great deal of empirical evidence supporting the association between past behavior and future behavior. A strong correlation between past behavior and current behavior attests to the temporal stability of the particular behavior (Ajzen 2011). Therefore, adding past behavior to the theory of planned behavior model can substantially improve the predictive power of the model (Cestac et al. 2011).

Gender Differences in Online Behaviors

The research literature points to major differences between boys and girls in their online activity patterns (Lau and Yuen 2013). Girls use the Internet more for communication (messaging, blogs and social networking; Pujazon-Zazik and Park 2010). Whereas boys are more likely to upload videos, girls are more likely to upload photographs on social networking sites (Lemish et al. 2009). As to gender differences in risky online behaviors, recent studies show that boys tend to disclose personal information online and be more involved in risky online behaviors than girls (Lau and Yuen 2013; Notten and Nikken 2014). Madden et al. (2013) found that girls who use Facebook are more likely to make their profile private, whereas boys are more likely to make their profile public.

The Role of Parents and Friends in Risky Behaviors

During adolescence, one of the most important developmental tasks is the achievement of personal autonomy and independence. In this period, the role that parents play in monitoring their children's activities and limiting their involvement in non-normative activities declines as teens strive for autonomy (Steinberg 2008).

An important part of the bond that links adolescents with their families is parental warmth, support and emotional bonding, known as family cohesion (Olson et al. 1983). The term implies the positive involvement of parents with their children, as reflected in their supportive behavior and affection (Sasson and Mesch 2014). Adolescents who report being close to their parents are less likely to engage in risky or deviant behavior (Hoeve et al. 2009).

Like parents, peers can function as a source of support as well as a source of endangerment (Michael and Ben-Zur 2007). During adolescence, friends become central in the life of young adults, and adolescents start to see themselves as part of the peer group that influences their attitudes, norms and behaviors. Indeed, peers are considered to have a prominent influence on adolescents' violent and aggressive behavior (Baxendale et al. 2012), as well as on online sexual behavior and cyberbullying (Baumgartner et al. 2011; Pabian and Vandebosch 2014).

While many studies have explored the influence of parents and peers on teens' risk-taking behaviors, only a few have focused on gender differences in this context. Most of them indicate that girls are more influenced by their parents' attitudes, warmth and advice than boys. For example, Kelly et al. (2011) found that family conflicts predict alcohol use for girls but not for boys.

Another aspect of parent–child relationships is parental supervision. On the Internet, parental supervision is reflected in restrictions on both time and content. Livingstone and Helsper (2008) found that girls reported more parental supervision than boys. Furthermore, parents reported using more active and monitoring methods for their daughters' online activities (Sonck et al. 2013). Another study exploring parental monitoring of media indicated that parents were more likely to have stopped their daughters from playing video games. The researchers argued that these differences reflect parents' being more protective of their daughters than their sons (Gentile et al. 2012).

It is important to note that the differing effects of parents and peers on the risky online behaviors of boys and girls have not yet been studied. For that reason, we rely on studies exploring similar health risk behaviors to present our theoretical perspective. Some scholars have argued that gender differences in parent–child relationships might reflect gender differences in socialization processes (Kelly et al. 2011). According to the gender intensification hypothesis (Hill and Lynch 1983), adolescents face increased socialization pressures to conform to culturally defined gender roles, leading them to develop different gender-role identities (Priess et al. 2009). Boys are socialized to become autonomous and independent, whereas girls are socialized into interpersonal connectedness and emotional closeness (Kelly et al. 2011). Therefore, girls may perceive high levels of parental support and discipline as compatible with traditional gender roles (Marshal and Chassin 2000). Conversely, boys may regard such parental behavior as a threat to their autonomy and independence, incompatible with traditional male gender roles. Such an attitude may cause them to embrace their peers' values (Marshal and Chassin 2000).

In a similar vein, Michael and Ben-Zur (2007) demonstrated that risk taking by boys was mainly related to a strong orientation toward the peer group, whereas an aversion to risk taking among girls was related to positive relationships with their parents. Furthermore, a more recent study that examined the effect of parental monitoring and

peer activity on adolescents' substance use found that, when using such drugs, the presence of peers was more important for boys than girls, implying the strong influence that friends have on boys. On the other hand, girls who had a strong relationship with their parents were less likely to engage in substance use, implying that they were more affected by their parents (Kiesner et al. 2010).

The Current Study

In this study, we explored gender differences in the relationship between attitudes, parents' and peers' subjective norms about risky online behaviors, perceived behavioral control and the engagement in such behaviors. We assessed these differences by creating separate models for boys and girls and compared the results. According to the theory of planned behavior (TPB), attitudes, subjective norms and perceived behavior control affect the involvement in a given behavior. The expectation is that more favorable perceptions will be associated with an increase in the odds of engaging in a particular behavior (Ajzen 1991). Building on this theory, we posited that positive attitudes, perceived behavior control and perceptions of peer support for engaging in risky online activities would be positively related to becoming involved in such practices and to intentions to engage in such practices (Hypothesis 1). Nevertheless, given that parents want to minimize the dangers of the Internet for their children, we expected that the stronger the perceptions of parents' disapproval of engaging in risky online activities, the less likely adolescents would be to engage in such practices and to express intentions of doing so (Hypothesis 2).

As the empirical literature has demonstrated, intentions to engage in a behavior are linked to the engagement in the behavior in the past (Ajzen 2011). Based on this finding, we posited that, the greater the involvement in risky online activities in the past year, the stronger the intentions of becoming involved in such behaviors (Hypothesis 3).

There is also a substantial body of research emphasizing gender differences in online behavior. For example, Notten and Nikken (2014) found that male adolescents are more involved in online communication than girls. Based on these findings, we expected that boys would be more likely than girls to engage in risky online behavior (Hypothesis 4).

The second aim of this study was to explore whether gender differences in risky behaviors online are linked to the youngsters' relationships with their families and friends. There is some evidence that boys are more susceptible to peer influence about risk taking behaviors, whereas girls are more influenced by their relationships with their parents (Michael and Ben-Zur 2007). Therefore, we posited that boys' risky behavior online would be more

related to the influence of their peers, whereas such behavior in girls would be more related to their family relationships. For girls, the greater the family cohesion and supervision, the less likely they will be to engage in such behavior (Hypothesis 5).

Methods

Procedure

We collected data from students in grades six through eleven in 13 different schools in a large city in Israel. The research ethics committee of the Ministry of Education reviewed and approved the study after taking into consideration all the psychological and legal implications of the study. According to their instructions, parents were sent a letter informing them about the purpose of the survey and requesting permission for their children to participate in the study. Children whose parents opposed their participation did not take part in the study. In addition, the research assistants informed the youngsters that they could choose whether or not to participate. Those who expressed a lack of interest were excused and left the computer lab. Participants responded to an online survey that was administered in the schools' computer lab. The survey included 130 questions and took 45 min on average to complete.

Participants

A total of 495 participants aged 10–18 (females = 229, males = 266) were included in the analyses (M = 13.83 years, SD = 1.86). Of the participants, 14.7 % were in sixth grade, 17.4 % in seventh grade, 14.7 % in eighth grade, 16.4 % in ninth grade, 18.0 % in tenth grade, and 18.8 % in eleventh grade. The sample was representative of the student population attending the schools in that city.

Measures

The study's questionnaire contained items referring to the variables of the theory of planned behavior, parental mediation and cohesion with family and friends. The variables were operationalized according to the recommendations listed in Ajzen's TPB Questionnaire Construction[1] and previous studies testing the theory of planned behavior in other contexts, then applied to measure adolescents' risky online behaviors. Parental mediation variables were adopted from the European questionnaire (O'Neill and McLaughlin 2010).

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[1] http://people.umass.edu/aizen/pdf/tpb.measurement.pdf.

Demographics

Gender

Participants indicated their sex. Gender was introduced in the analysis as a dummy variable (boys = 1 and girls = 0).

Intentions of Engaging in Risky Online Behavior

Participants were asked to indicate the frequency with which they intended to engage in four online behaviors in the next year. Responses ranged from 1 (never) to 5 (every day). Items included sending an insulting message, posting personal details, meeting face-to-face with others first met online, and uploading an insulting video clip. Items were analyzed with a factor analysis technique (varimax rotation), and the results indicated that the items belonged to a single universe. Items were combined into a single scale of standardized scores (scale α = .68).

Past Risky Online Behavior[2]

Participants were asked to indicate the frequency with which they had engaged in three online behaviors in the past year. Responses ranged from 1 (never) to 5 (every day). Items included sending an insulting message, posting personal details, and meeting face-to-face with others first met online. Items were combined into a single scale by adding the scores of the individual items (scale α = .81).

Peers' Subjective Norms Regarding Online Risk Behaviors

We measured this variable using a scale that combined the responses to four items indicating the extent of agreement with the statements "Most of my friends think it is OK to": (1) "post personal details online", (2) "upload an offensive clip", (3) "send an offensive message to somebody" and (4) "meet face-to-face with others first met online". In an exploratory factor analysis (varimax rotation) we found that the items belonged to a single universe, and the responses were combined into a single scale of standardized scores (α = .81).

Parents' Subjective Norms Regarding Online Risk Behaviors

We measured this concept using a scale that combined the responses to four items: (1) "My parents tell me not to post personal details online", (2) "My parents forbid me from uploading an offensive clip", (3) "My parents think it is

not worthwhile to send an offensive message to somebody" and (4) "My parents forbid me from meeting face-to-face with others first met online". Responses were made on a Likert scale indicating the extent of agreement with the statements (1—not at all to 5—strongly agree). Exploratory factor analysis (varimax rotation) was used, whose results demonstrated that the items belonged to a single universe, so we combined them into a single scale of standardized scores (α = .78).

Attitudes

We measured this concept using a scale that combined the responses to four items indicating the extent of agreement with the statements "It is OK to": (1) "post personal details online", (2) "upload an offensive clip", (3) "send an offensive message to somebody" and (4) "meet face-to-face with others first met online". Using factor analysis (varimax rotation), we found that the items belonged to a single universe and were able to combine the responses into a single scale of standardized scores (α = .82).

Perceived Behavior Control

We measured this concept using three items. Respondents were asked to indicate the extent of their agreement with the statements: (1) "I would meet face-to-face with a friend first met online", (2) "I would provide my phone number or address in order to participate in a lottery" and (3) "It is easy to send an insulting message online to someone from school who I do not like". The responses were combined into a single scale of standardized scores (α = .53).

Parental Mediation

As mentioned before, we measured this concept using two scales adapted from the study (O'Neill and McLaughlin 2010). These scales reflect two varying approaches to parental discipline–parental supervision and non-intervention.

Parental Mediation Through Supervision Respondents were asked to indicate the extent to which their parents checked their emails or IM accounts, their Facebook profile, their IM or Facebook contact list, and installed software on their computer that blocked non-recommended sites, recorded sites that were visited, and limited the amount of time they could use the Internet. The responses to the items were combined into a single scale by adding the responses to the items (α = .73).

Parental Mediation Through Non-intervention Respondents were asked to indicate the extent to which their parents allowed to them to freely use IM, download music

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[2] The Ministry of Education prohibited us from asking about the frequency of uploading a clip on YouTube.

and clips from the Internet, watch clips on the Internet, have a personal profile on Facebook, post personal information and upload personal pictures and clips online. Responses were combined into a single scale by summing the responses to the items ($\alpha = .84$).

Family Cohesion

We measured this concept using items that reflected its definition as an emotional bond that family members have with each other (Olson et al. 1983). Respondents were asked to indicate their degree of agreement with statements indicating that their family relationships were close, cohesive, attentive, supportive and loving. Adolescents responded using a 5-point Likert scale ranging from 1 (not at all) to 5 (strongly agree). The items were subjected to factor analysis (varimax rotation), resulting in one dimension. Items were standardized, and a summed score was calculated ($\alpha = .94$).

Friends' Cohesion

Respondents were asked to indicate their degree of agreement with items measuring the extent to which their relationships with their friends were close, cohesive, attentive, supportive and loving. Explorative factor analysis (varimax rotation) resulted in one dimension with factor loadings between 0.83 and 0.93. Items were standardized, and a summed score was calculated ($\alpha = .94$).

Results

Table 1 presents the results of a t test for gender differences. As the table shows, significant differences between the genders emerged in almost all of the measures of perceptions and involvement in risky online behaviors. We

expected that boys would be more likely to engage in risky online behavior. As expected, boys' involvement in such behaviors was significantly higher than that of girls. Boys reported a higher score than girls on the scale measuring positive attitudes toward risky online behaviors. Furthermore, the average perception of parents' subjective norms for boys was less than for girls, and they reported that their friends were generally more supportive of taking risks online than girls. We did not find any significant gender differences based on perceived behavior control or parental mediation. However, we did found significant differences based on the level of cohesion of the participants' family and friends, with girls generally reporting higher levels than boys in both categories.

To determine whether there are gender differences in the contribution of social and cognitive factors to adolescents' risky online behavior, we constructed structural equation models using AMOS software. Structural equation modeling increases the reliability of the measures and enables the examination of complex models such as those in this study. We calculated two separate structural models by gender groups. Figure 1 illustrates the structural model for girls and Fig. 2 for boys. Overall, as the many indices in Figs. 1 and 2 illustrate [Fig. 1—$\chi^2(3) = 1.478$, $p > .05$, GFI = .998, CFI = 1.00, REMSEA = .000; Fig. 2—$\chi^2(3) = 3.653$, $p > .05$, GFI = .995, CFI = .999, REMSEA = .029], both measurement models provided a good fit with the data. A comparison of the two models reveals major differences in the standardized regression weights of most of the variables. One of the striking findings is that peers' subjective norms, parents' subjective norms, attitudes and perceived behavior control explain 31 % of the variance in risky online behavior in boys but only 17 % in girls.

To test whether these gender differences are significant, we adopted a two-step approach. First, we created a model in which the path coefficients for both gender groups were unconstrained and compared it to a constrained model

Table 1 Means and standard deviations for all measurements of TPB constructs, family mediation variables and cohesion

	Girls M (SD)	Boys M (SD)	t value
Perceptions about parents' norms	4.22 (.99)	3.74** (1.15)	4.94
Perceptions about friends' norms	1.65 (.81)	1.89** (.94)	−3.01
Attitudes	1.47 (.81)	1.78** (.97)	−4.12
Perceived behavior control	1.85 (.85)	1.95 (.85)	−1.22
Risky online behaviors	1.29 (.54)	1.60** (.91)	−4.70
Intentions to engage in risky online behaviors	1.32 (.50)	1.55** (.70)	−4.12
Family cohesion	4.24 (1.03)	4.03* (1.19)	2.08
Friends' cohesion	4.01 (1.02)	3.69** (1.17)	3.26
Parental mediation—supervision	1.14 (1.50)	1.21 (1.57)	−0.48
Parental mediation—non-intervention	3.52 (1.95)	3.69 (2.06)	−.093

* $p < .05$; ** $p < .01$
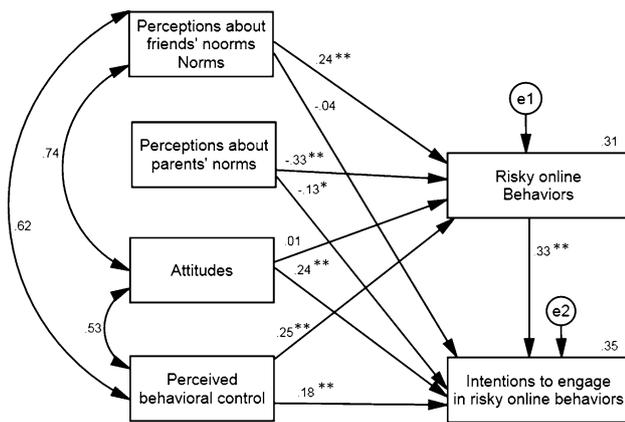
Chi-Square=3.653, df=3, p=.301, GFI=.995, CFI=.999, AGFI=.968, REMSEA=.029

Fig. 1 Illustration of AMOS model of the relationships between the TPB constructs and engaging in online risky behaviors and intentions among boys. *Numbers* indicate unstandardized regression coefficients for paths. *Asterisks* indicate that the represented path were statistically significant. *$p < .05$; **$p < .01$
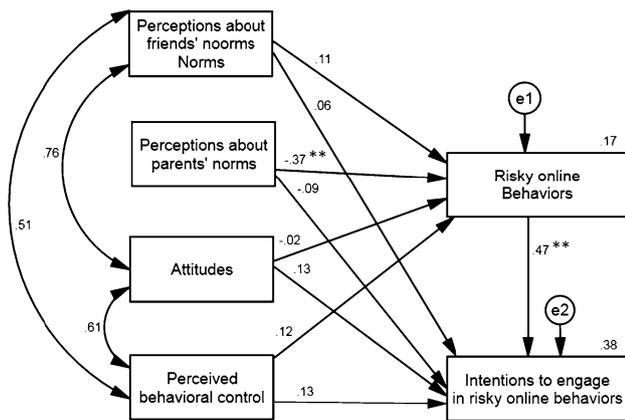
Chi-Square=1.478, df=3, p=.687, GFI=.998, CFI=1.000, AGFI=.985, REMSEA=.000

Fig. 2 Illustration of AMOS model of the relationships between the TPB constructs and engaging in online risky behaviors and intentions among girls. *Numbers* indicate unstandardized regression coefficients for paths. *Asterisks* indicate that the represented path were statistically significant. *$p < .05$; **$p < .01$

where all of the path coefficients were fixed to be equal. Conducting such a comparison allowed us to determine whether the fit indices were significantly different and indicated gender differences in the models. Second, we compared each of the paths, unconstrained and constrained, separately to see whether the coefficients differed significantly. The results indicated that both the unconstrained model [$\chi^2(6) = 5.13$, CFI = 1.00, REMSEA = 0.000] and the constrained model [$\chi^2(15) = 41.023$, CFI = 0.974, REMSEA = 0.059] were good fits with the data, and the difference in the Chi-squares of the two models was significant [$\Delta\chi^2 = 35.89(9)$, $p < .01$]. Thus, we can say that the connections between perceptions of peers' norms,

perceptions of parents' norms, attitudes, perceived behavior control, risky online behavior and intentions are different for boys and girls.

When we compared each of the paths, unconstrained and constrained, separately, several differences emerged. First, the weight for involvement in risky behavior online varied significantly based on gender [$\beta = .47$ for girls, $\beta = .33$ for boys, $\Delta\chi^2(1) = 6.0$, $p < .05$], with girls scoring higher than boys. In other words, the odds of girls who were involved in risky online behavior being involved in such behavior in the future are higher than for boys. Second, perceived behavioral control was positively associated with risky online behaviors among boys ($\beta = .25$, $p < .01$), but not among girls ($\beta = .12$, $p > .05$) and this difference was significant [$\Delta\chi^2(1) = 4.89$, $p < .05$]. Third, friends' subjective norms explained the involvement in risky online behaviors among boys ($\beta = .24$, $p < .01$), but not among girls ($\beta = .11$, $p > .05$), even though this difference was not statistically significant.

Having established the veracity of the general argument that there are gender related differences, we are now able to deal with our research hypotheses. First, we expected that more positive attitudes, perceptions of peer support for engaging in risky online activities and perceived behavior control would be positively related to engaging in such behavior and to the intentions of engaging in such behaviors as well. Our findings partially support these expectations. Peers' subjective norms and perceived behavior control are positively associated with participation in risky online behavior, but only for boys. These findings suggest that boys are more sensitive than girls to the perceptions of their peers' subjective norms. Young men who thought that their peers advocated engaging in risky activities online were more likely to disclose personal information, meet with others who they had met first online and send insulting messages. At the same time, boys who felt it was easy to disclose personal information, meet with others first met online and send insulting messages were more likely to be involved in such behaviors. However, in contrast to our expectations, adolescents who had positive attitudes toward risky online behavior were no more or less likely to engage in risky online activities than those who had less positive attitudes. In addition, attitudes and perceived behavior control were positively associated with intentions to engage in risky behavior online for boys but not for girls. Boys who had more favorable attitudes toward disclosing information, meeting with others first met online, uploading offensive videos and sending insulting messages had greater intentions of getting involved in such behaviors in the future. However, the findings did not support the expected link between perceptions of peer support for engaging in risky online activities and intentions to do so, indicating that boys and girls who have peers with positive

attitudes toward risky online behavior are not inclined to have greater intentions of disclosing personal information, meeting with others first met online, sending insulting messages or uploading offensive video clips.

Next, we tested our hypothesis regarding the link between perceived parents' subjective norms and risky online activities. We expected a negative association between the perception that parents disapproved of engaging in risky online activities and children's involvement in such practices and intentions. The findings provide partial support for this hypothesis. Adolescents who felt that their parents disapproved of their involvement in risky online activities were less likely to engage in such activities, and this was true for boys and for girls. However, the link between perceptions about parents' subjective norms and intentions of engaging in such behaviors was evident only for boys. Young men who felt their parents disapproved of their being involved in risky online activities were less likely to intend to do so. In addition, as expected, the link between engagement in risky online activities and intentions to do so in the future was statistically significant, but as noted earlier, the finding was significantly stronger for girls than for boys.

In sum, among girls, the only factor that explained their risky behavior online with any degree of statistical significance was their perception of their parents' subjective norms. The more girls felt their parents were opposed to their participation in risky online behaviors, the less involvement they had in such behaviors. As for their intentions of engaging in such behavior, the only explanatory variable for girls was their past involvement in risky activities online. Hence, for girls, the model provided only a partial match with the data. There might be other factors in the family context that can provide a better explanation of dangerous behavior online among adolescent girls.

The results indicate that the model based on the TPB theory proved to be a better fit with the activities of boys. Young men take peer norms and perceived behavioral control into account when deciding to disclose personal information, meet face-to-face with others first met online and send insulting messages. Indeed, while the parents' subjective norms had a major impact in explaining risky online behavior among boys and girls alike, in girls this was the *only* factor that was significant, whereas among boys there were other factors as well. Furthermore, attitudes, perceived behavior control and parents' subjective norms also explained the intentions of young men to engage in risky behavior online. These associations were not evident in the girls' model.

In order to test our last hypothesis that boys' risky behavior online would be more related to the influence of their peers whereas girls' risky online behavior would be

more related to family relationships, we created additional structural models by gender groups (Figs. 3, 4). We added four more variables to the basic model—two variables
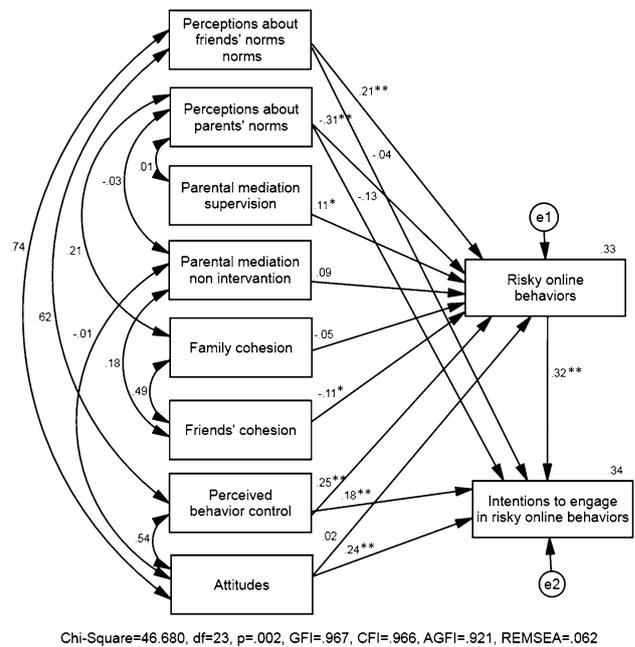
Chi-Square=46.680, df=23, p=.002, GFI=.967, CFI=.966, AGFI=.921, REMSEA=.062

Fig. 3 Illustration of AMOS model of the relationships between the TPB constructs and family constructs and engaging in online risky behaviors and intentions among boys. *Numbers* indicate unstandardized regression coefficients for paths. *Asterisks* indicate that the represented path were statistically significant. *$p < .05$; **$p < .01$

Chi-Square=38.282, df=23, p=.024, GFI=.969, CFI=.974, AGFI=.925, REMSEA=.054
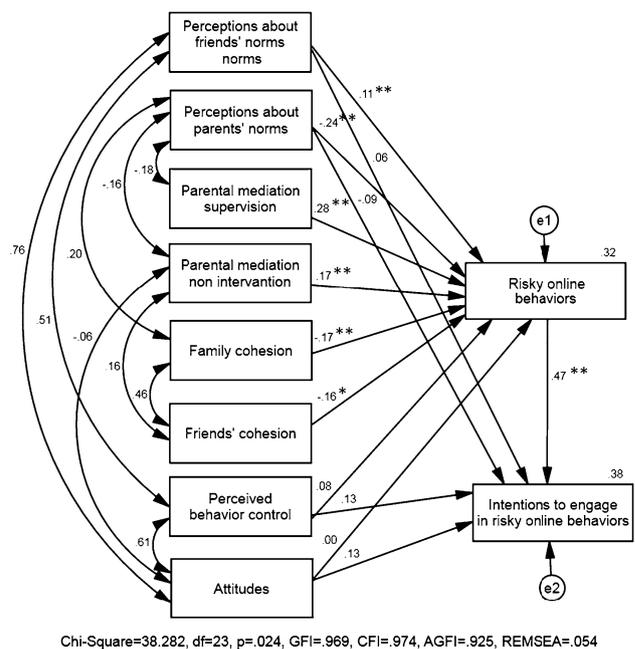
Fig. 4 Illustration of AMOS model of the relationships between the TPB constructs and family constructs and engaging in online risky behaviors and intentions among girls. *Numbers* indicate unstandardized regression coefficients for paths. *Asterisks* indicate that the represented path were statistically significant. *$p < .05$; **$p < .01$

referring to different parental mediation methods (supervision, non-intervention) and two variables referring to cohesion with family and friends. As the many indices indicate [Fig. 3—$\chi^2(23) = 1.664$, $p < .05$, GFI = .969, CFI = .974, REMSEA = .054; Fig. 4—$\chi^2(23) = 2.209$, $p < .05$, GFI = .967, CFI = .966, REMSEA = .062], the girls' model provided a good fit with the data, but there was a slightly less good fit with the data for the boys' model. One interesting finding that emerged from the analysis was that the inclusion of the parental mediation and cohesion variables improved the explained variance in the girls' risky online behavior by 15 % (from 17 % in the base model to 32 % in the extended model), indicating that girls are more concerned about and influenced by their relationship with their parents. The same pattern was not present in the boys, where the additional variables improved the explained variance in risky online behavior by only 2 % (from 31 % in the base model to 33 % in the extended model).

To test whether these gender differences were significant, we adopted the two-step comparison method presented before. The results indicate that both the unconstrained model [$\chi^2(46) = 84.9$, CFI = 0.970, REMSEA = 0.041] and the constrained model [$\chi^2(51) = 124.4$, CFI = 0.949, REMSEA = 0.047] were good fits with data, and the difference in the Chi squares in the two models was significant [$\Delta\chi^2(13) = 39.46$, $p < .01$]. Thus, the extended model with the family and friends variables differs for boys and girls, justifying separate models by gender.

The next step was to compare each of the paths, unconstrained and constrained, separately. The findings revealed three substantial differences. First, the weights for perceived behavioral control were different for boys and girls [$\beta = .25$ for boys, $\beta = .08$ for girls, $\Delta\chi^2(1) = 6.27$, $p < .01$]. Second, parents' subjective norms regarding online risk behaviors differed among boys and girls [$\beta = -.31$ for boys, $\beta = -.24$ for girls, $\Delta\chi^2(1) = 4.81$, $p < .05$] and had a slightly stronger association with risky online behavior for boys than girls. This finding indicates that when adolescents think that their parents would object to them disclosing personal information, meeting with others first met online or sending insulting messages, they are less likely to become involved in these activities. Third, the weights of risky online behavior were significantly different based on gender [$\beta = .32$ for boys, $\beta = .47$ for girls, $\Delta\chi^2(1) = 6.00$, $p < .05$], indicating a stronger association with risky online behavior intentions for girls than boys. These findings support the argument of gendered differences in the extended model as well.

Overall, we can argue that the findings confirm the expectations that girls' risky online behavior is associated with their relationships with their family and friends. For girls, both types of parental mediation were associated with

risky activities online. Parental supervision based on social and technological supervision of their children's online activities was positively associated with participation in risky online activities for girls and boys alike, although the weights were slightly stronger for girls than boys. These finding suggest that the more parents try to restrict their children's online activities, the greater the number of risky online activities, meaning that they find ways to bypass these obstacles. Parental mediation through non-intervention was significantly related to girls' risky online behavior, implying that young women whose parents did not interfere with their online activities were more likely to engage in risky online activities. This association was not valid for boys. Both parental mediation methods—supervision and non-intervention—lead to similar consequences in terms of risky online behavior for girls and imply problematic family relationships. Cohesion with family and friends had a significant negative association with risky online activities for girls but not for boys, suggesting that young women who feel closer to their parents and friends will be less keen to look for warmth and support online, less willing to disclose personal information or meet face-to-face with someone met online.

In summary, boys' involvement in risky online behaviors and their intentions of doing so are best described by a model that includes the factors of peers' subjective norms about risky online behaviors, parents' subjective norms about risky online behaviors, perceived behavior control and attitudes. In contrast, girls' involvement in such behaviors and intentions of doing so are best described by a model that includes the factors of peers' subjective norms about risky online behaviors, parents' subjective norms about risky online behaviors, parental mediation through supervision, parental mediation through non-intervention, family cohesion and friends' cohesion.

Discussion

One of the most widely cited theories in health psychology that has proven very effective at predicting a variety of actions related to health risks is the theory of planned behavior (Gibbons et al. 2012). Therefore, it is not surprising that some scholars have relied on this theory to predict communication technology behaviors such as using IM, social networks and blogs (Baker and White 2010; Hsu and Lin 2008; Pelling and White 2009; Yaobin et al. 2009), uploading video clips (Park et al. 2011), cyberbullying (Heirman and Walrave 2012; Pabian and Vandebosch 2014) and sexting (Walrave et al. 2014). However, no studies have investigated whether the theory is suitable for boys' and girls' risky online behaviors alike. This is somewhat surprising, because studies indicate that boys are

more likely than girls to engage in risky online behaviors (Lau and Yuen 2013; Notten and Nikken 2014). Our findings revealed substantial gender differences in the antecedents to such behavior. The theory of planned behavior is a better fit with the data explaining boys' risky online behaviors and intentions than those of girls. Based on the theory, we expected that positive attitudes, more perceived behavior control and positive perceptions of peer support for engaging in risky online activities would be positively related to doing so and intending to do so. Furthermore, we posited that perceptions of parental disapproval about such activities would reduce the likelihood of youngsters' intending to engage in such activity or actually do so. However, our results indicate that boys' involvement in risky behavior online is associated with perceptions about their peers' subjective norms about online risky behaviors, perceived behavior control and perceived parental norms about online risk behaviors, whereas girls' involvement in such behavior is associated only with the last factor.

The lack of a significant association between perceived peers' attitudes toward dangerous online behaviors and engagement in such activities among girls is somewhat surprising, because scholars emphasize the influence of peers on adolescents' behavior in the virtual world. Hinduja and Patchin (2013) demonstrated that when young students believe that their friends are involved in cyberbullying, they are more likely to bully others themselves. In a similar vein, in two different studies Baumgartner et al. (2010, 2011) established that an assessment of peers' norms was the most influential factor in online sexting, confirming the role that conformity plays in adolescent decisions. Although these studies did not comment on gender differences, other studies showed that girls were more resistant to peer influence, especially regarding involvement in antisocial behaviors in the real world (Steinberg and Monahan 2007). Claes et al. (2005) found an association between an orientation toward peers and involvement in three forms of deviant behavior (physically aggressive antisocial behavior, non-physically aggressive antisocial behavior, and drug use) for boys but not for girls, a result that accords with our findings. Additional support comes from a study by Michael and Ben-Zur (2007), who explored the effect of social factors and personality characteristics on the dangerous behavior of adolescents. Their findings show that, among boys, risk behavior is generally connected to a strong orientation toward peers, whereas, among girls, it is associated with the quality of their relationships with their parents. These studies established that boys' dangerous behavior is associated with the attitudes of their peers, but that they focused on dangerous activities in the real world. Our results demonstrate the reproduction of this pattern in the online world as well.

Inspired by the work of Michael and Ben-Zur (2007), we considered the possibility of shifting the focus from the social context to the family context, particularly for girls' risky online behavior. Therefore, we expanded the models to include additional family variables—parental mediation and cohesion with family and friends. Parents' efforts to mediate their children's use of the Internet might be indicative of the quality of their family relationships, especially during adolescence, a period characterized by growing tensions and conflicts in the family. Some studies have indicated the opposite, that parental mediation through social and technical means is positively related to dangerous behavior online (Sasson and Mesch 2014). Nikken and De-Graaf (2013) showed that restrictive parental mediation increased sexual experiences among girls. Our findings suggest that the use of social and technical means for surveillance and supervision does not reduce risky online behavior. On the contrary, parental mediation through supervision is associated with more risky online behavior, particularly for girls. One explanation for these findings might be that parents who have less influence on and control over their adolescent children attempt to achieve it by monitoring their children's behavior. However, during adolescence, when children are learning to separate from their parents and increase their participation in their peer groups, the technical and social monitoring of their online activities leads to the opposite result. Teens might feel motivated to find ways to bypass the monitoring, resulting in the creation or exacerbation of existing conflicts between parents and children. In their longitudinal study on parental monitoring and deviant behavior among teens, Kerr et al. (2010) found that monitoring efforts do not provide parents with knowledge to protect adolescents from delinquency.

An additional element that can reflect the quality of family relationships is family cohesion. The research literature strongly supports the positive implications of family cohesion for the development of children and their behavior. For example, adolescents who report greater closeness with their parents are less likely to be involved in risky or deviant behavior (Hoeve et al. 2009). Conversely, teens who receive less support from their parents are more likely to turn to the Internet in an attempt to find other adolescents who share their experiences (Mesch and Talmud 2006). As demonstrated in our study, family cohesion is related to risky online behavior. Young women who report less family cohesion are more likely to be involved with others online. Here again, the findings support the argument that girls' involvement in risky online behaviors is linked to parent–child relationships.

Our findings established the relevance of gender differences in the antecedents of risky online behavior. Some scholars have argued that girls are more influenced by

parent–child relationships, whereas boys are more sensitive to peers (Kelly et al. 2011; Michael and Ben-Zur 2007). Explanations for this difference include the gender intensification hypothesis that posits that adolescents face increased pressure to conform to culturally informed gender roles (Priess et al. 2009). Others have maintained that, because they are more affected by emotional closeness, poor family relationships have negative consequences for girls (Kelly et al. 2011), evident in alcohol consumption (Choquet et al. 2008) and emotional distress (Soloski and Berryhill 2015). Drawing on this theory and findings, we can assume that girls who feel less cohesive with their parents and friends will turn to the Internet to look for attention and emotional support, and during this process will engage in risky online behavior. Further research is needed to explore these complex relationships.

Our results should be considered in light of several limitations. First, this study was designed as a cross-sectional one and, therefore, does not allow us to infer casual associations. Longitudinal studies are needed to determine causality. Second, scholars divide Internet risks for adolescents into three main categories: Contact risks, content risks and commercial risks (Moor et al. 2008 in Valcke et al. 2011). This study focused only on contact risks, so it cannot be generalized to other kinds of online risks. Third, we assessed perceived behavior control and risky behavior online with three items, each referring to sending an insulting message, disclosing personal information and meeting face-to-face with others first met online. Although these items provided a reasonable measure of perceived behavior control and a reliable assessment of risky behavior online, studies that broaden and improve the measure will provide additional important information.

Conclusion

The study presents important and unique findings. The results indicate that boys' risky online behavior and intentions are linked to subjective norms about risky online behavior, attitudes and perceived behavior control, whereas girls' involvement in dangerous behavior online is mainly linked to family relationships. Based on these results, we suggest that the theory of planned behavior is more suitable for explaining boys' risky behavior online, implying that future studies using this theory should take gender into account.

On a practical level, we also suggest that intervention programs designed to promote safe use of the Internet should be planned and executed separately for boys and girls. Girls who engage in risky online behavior are a distinct group with special characteristics. They have less cohesive and supportive relationships with their parents and friends. This observation can help care giving or professionals such as school consultants and educators identify girls at risk of becoming involved in risky online behavior and providing them with support from a significant adult figure.

Author Contributions H.S. conceived the study, participated in its design and coordination, set up the data collection, performed the statistical analysis and interpretation of the data, and drafted the manuscript. G.M. participated in the design of the study, helped in the interpretation of the data, drafted the manuscript and revised it. Both of the authors read and approved the final manuscript.

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