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The Short-Term Longitudinal and Reciprocal Relationships between Peer Victimization on Facebook and  
Adolescents' Well-Being

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## PEER VICTIMIZATION ON FACEBOOK AND ADOLESCENTS' WELL-BEING

### Abstract

Although studies have shown that depressive symptoms, life satisfaction, and adolescents' online peer victimization are associated, there remain critical gaps in our understanding of these relationships. To address these gaps, the present two-wave panel study ( $N_{\text{Time1}} = 1,840$ ) (1) examines the short-term longitudinal and reciprocal relationships between peer victimization on Facebook, depressive symptoms and life satisfaction during adolescence, and (2) explores the moderating role of adolescents' gender, age, and perceived friend support. Self-report data from 1,621 adolescent Facebook users (48% girls;  $M_{\text{Age}} = 14.76$ ;  $SD = 1.41$ ) were used to test our hypotheses. The majority of the sample (92%) was born in Belgium. Cross-lagged analyses indicated that peer victimization on Facebook marginally predicted decreases in life satisfaction, and life satisfaction predicted decreases in the probability of being victimized on Facebook. However, depressive symptoms were a risk factor for peer victimization on Facebook, rather than an outcome. In addition, support from friends protected adolescents against the harmful outcomes of peer victimization on Facebook. Both theoretical and practical implications are discussed.

*Keywords:* adolescents, depressive symptoms, life satisfaction, peer victimization, Facebook

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### Introduction

Adolescence is a transitional period; youth have to adjust to the changing nature of their bodies, explore their identity, and adjust to their shifting relationships with parents and peers (e.g., Steinberg, 2005). Although not every adolescent experiences turbulence, research shows that adolescence is a time when life satisfaction starts declining (e.g., Goldbeck, Schmitz, Besier, Herschbach, & Henrich, 2007), and depressive symptoms begin to increase (e.g., Angold, Erkanli, Silberg, Eaves, & Costello, 2002). Exposure to negative peer experiences presents a significant threat amidst this general decrease in well-being (Prinstein, Boergers, & Vernberg, 2001); such experiences include both physical (e.g., being pushed or hit) and non-physical (e.g., rumors being spread) acts (Paquette & Underwood, 1999). Whereas physical forms of negative peer acts decrease during adolescence, negative non-physical peer acts, often referred to as indirect, social, or relational victimization, continue to be present and tend to become more complex throughout adolescence (Crick et al., 2001). The advent of social networking sites such as Facebook have presented yet another venue where adolescents experience negative peer interactions (e.g., Dredge, Gleeson, & de la Piedad Garcia, 2014).

Correlational studies have revealed that such online peer victimization is negatively associated with adolescents' psychosocial well-being (e.g., Landoll, La Greca, & Lai, 2013), which have been found to be a precursor of more severe health problems, such as depression later in life (e.g., Copeland, Shanahan, Costello, & Angold, 2010). Sumter, Valkenburg, Baumgartner, Peter, and van der Hof (2015) for instance, reported that online peer victimization was related to lower levels of psychosocial well-being (i.e., less life satisfaction, more loneliness and less social self-esteem). In the present study, we further explored this relationship, with two goals in mind. First, we used a longitudinal design to specifically address the potential reciprocity of the association between peer victimization on Facebook and adolescents' psychosocial well-being. Second, we explored the moderating role of adolescents' age, gender, and perceived friend support on the reciprocal relationships between peer victimization on Facebook and psychosocial well-being. Thus, the present study will not only provide a more accurate picture of the role of Facebook in the (declining) well-being of adolescents, it will also help to identify groups of youth who may potentially be at risk in this context.

### Psychosocial Well-Being During Adolescence

Amidst the various changes during adolescence (e.g., Steinberg, 2005), it has been well documented that youth's psychosocial well-being is at risk. Self-report data reveal that life satisfaction is marked by a sharp decrease during early and mid-adolescence (i.e., 11-16 years) (Goldbeck et al., 2007); Natsuaki, Biehl, and Ge (2009) showed that between the ages of 12 and 23, depressed mood followed a  $\cap$ -shaped trajectory, with a peak

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in mid-adolescence. The decline in general well-being during early adolescence may be due to the feelings of stress engendered by the pubertal transition occurring at this stage of life. In contrast, late adolescence is a period of increasing maturity and progression of social status, and a reduction in the distress of early adolescence (Ge, Natsuaki, & Conger, 2006). In addition to these age differences, there are gender differences with girls scoring lower on life satisfaction (Bisegger, Cloetta, von Rueden, Abel, & Ravens-Sieberer, 2005) and higher on depressive symptoms (Angold et al., 2002); one reason for this trend may be the more critical self-perception of girls, as a result of their more dramatic physical changes during puberty (Goldbeck et al., 2007).

Of particular relevance to well-being at this time is the increasing salience of peer relationships (Brown & Larson, 2009) with adolescents spending less time at home with their parents and more time with their peers (Steinberg, 2005). Research on the relationship between adolescents' peer relationships and their psychosocial well-being has revealed that different aspects of peer relationships may differentially predict adolescents' well-being (La Greca & Harrison, 2005). For instance, studies have shown that adolescents who experience positive interactions with close friends (e.g., La Greca & Lopez, 1998) report lower levels of social anxiety. In contrast, peer victimization (e.g., Desjardins & Leadbeater, 2011) and negative interactions in best friendships (e.g., La Greca & Harrison, 2005) have been found to predict depressive symptoms. Thus, adolescent well-being may be enhanced from some aspects of peer relationships such as positive interactions with best friends, whereas it may be threatened by other aspects such as peer victimization, the focus of this paper.

### **Online Peer Victimization During Adolescence**

With the increasing popularity of online peer communication among adolescents (e.g., Lenhart, 2015), negative peer interactions now also occur online. Used extensively by adolescents (Lenhart, 2015), social networking sites have provided yet another venue for such negative experiences (e.g., Dredge et al., 2014). Negative online peer interactions can be studied either from the perspective of the perpetrators (e.g., Kwan & Scoric, 2013) and/or of the victims (e.g., Sumter, Baumgartner, Valkenburg, & Peter, 2012). Since the present study focuses exclusively on negative peer relationships from a victim's perspective, the term 'peer victimization' is used throughout, as it best captures the negative experiences that we are interested in.

Online peer victimization may be particularly harmful, because of the characteristics of online communication environments, such as high perceived anonymity, low supervision, large audience, and no limits of time and space (e.g., Dempsey, Sulkowski, Nichols, & Storch, 2009; Tennant, Demaray, Coyle, & Malecki, 2015). The specific features of Facebook also make it an ideal platform for online peer victimization for a variety of reasons. First, Facebook allows users to send private messages, share photos, comment on others'

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wall posts, organize group events, etc. Although all these tools facilitate social interaction between Facebook users, this increased social interaction also goes hand in hand with an increased risk of being victimized, as users can easily send a harmful message or post an embarrassing picture or insulting comment via Facebook. Second, Facebook users have access to large amounts of social information. According to the Pew Research Center (Madden, Lenhart, Duggan, Cortesi, & Gasser, 2013), youth are sharing more information about themselves than they did in the past, making them especially vulnerable to peer victimization, entailing the misuse of this personal information. Third, Tokunaga (2011) argues that the ambiguous and elastic notion of Facebook "friends" could cause interpersonal problems, for instance, through the rejection of a friend request or the exclusion of a friend.

These specific Facebook features may not only stimulate negative peer experiences, their widespread availability via smartphones may even further intensify the negative interactions, as Facebook users are nowadays in "constant contact" with other users. Consequently, while prevalence rates of adolescents' peer victimization behaviors on Facebook vary between studies, they are generally high. Kwan and Skoric (2013) showed that 59% reported experiencing at least one form of bullying in the past year on Facebook; Dredge et al. (2014) found that three out of four participants reported experiencing at least one victimization experience on Facebook in the preceding six months. Examples included receiving nasty Facebook messages, being insulted on Facebook, and deliberate exclusion by other Facebook users. Prior research reported an increase in online victimization during early adolescence, up to the age of 14, followed by a decrease (Sumter et al., 2012). In addition, studies have repeatedly shown that girls are more likely to be victimized online (e.g., Olenik-Shemesh, Heiman, & Eden, 2012), probably because compared to boys, they spend more time online (Lenhart, 2015).

### **The Relationship between Online Peer Victimization and Adolescents' Well-Being**

Cross-sectional self-report data have shown that online peer victimization during adolescence is associated with symptoms of depression (e.g., Olenik-Shemesh et al., 2012) and lower life satisfaction (e.g., Sumter et al., 2015). In addition, recent studies have found that online peer victimization is related to depressive symptoms, above and beyond traditional offline peer victimization (e.g., Bonanno & Hymel, 2013). Longitudinal studies have demonstrated a similar association between online peer victimization and adolescents' depressive symptoms (e.g., Hemphill, Kotevski, & Heerde, 2015) and life satisfaction (e.g., Sumter et al., 2012). For instance, online peer victimization in grade 10 was related to depressive symptoms in grade 11 (Hemphill et al., 2015).

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Different explanations have been advanced to explain how peer victimization may present threats to adolescents' well-being. In one view (Hammen, 2006), interpersonal stress and conflict such as victimization may interfere with important developmental processes, such as pubertal changes, which in turn may stimulate the development of depressive symptoms. For instance, adolescents face an increased risk of victimization, at a time when they are also coping with pubertal changes. Both peer victimization (e.g., Ybarra, Mitchell, Wolak, & Finkelhor, 2006), as well as "off-time" pubertal timing (i.e., earlier or later maturation than same-sex peers) (e.g., Ge, Conger, & Elder, 1996; 2001) have been related to emotional distress. As a result, distress may be particularly intensified when early or late matures are victimized by their peers, heightening the future risk of developing depressive symptoms. In line with this suggestion, studies have found that early maturing girls who are victimized by their peers, may be more likely to experience higher level of depressive symptoms (e.g., Compian, Gowen, & Hayward, 2009). Another set of explanations suggest that online peer victimization drives psychosocial well-being by way of victimized youth's interpretation of online peer victimization. Victimized youth may interpret negative online peer acts as negative peer evaluation or social exclusion, which may reinforce negative self-evaluations (Crick & Bigbee, 1998) or create a diminished sense of belonging or relatedness to others (Baumeister & Leary, 1995). In line with this suggestion, studies have shown that victimized adolescents have a more negative self-concept than non-victimized adolescents (e.g., Hawker & Boulton, 2000) which, in turn, has a harmful impact on adolescents' overall well-being (Karatzias, Chouliara, Power, & Swanson, 2006).

### **The Reverse Relationship: Does Well-Being Predict Adolescents' Online Peer Victimization?**

While the unidirectional influence of online peer victimization on adolescents' well-being has been frequently examined (e.g., Hemphill et al., 2015), less attention has been paid to the study of the reverse relationship from well-being to victimization, particularly within an online context. Only a few studies have investigated a bi-directional relationship in the context of online peer victimization (Gómez-Guadix, Orue, Smith, & Calvete, 2013; Pabian & Vandebosch, 2015; van den Eijnden, Vermulst, van Rooij, Scholte, & van de Mheen, 2014), and no study to date has explicitly done so in the context of victimization on Facebook and, more importantly, by including direct indicators of well-being. However, prior studies have examined the bi-directional relationship between online peer victimization and social anxiety (Pabian & Vandebosch, 2015; van den Eijnden et al., 2014). Insights from these studies are relevant given that social anxiety and the indicators of well-being used here are closely-related types of internalizing problems during adolescence (e.g., Zahn-Waxler, Klimes-Dougan, & Slattery, 2000). Although these studies found no support for a reciprocal relationship, they

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did find support for opposite unidirectional relationship, as social anxiety predicted online peer victimization, but online peer victimization did not predict social anxiety (Pabian & Vandebosch, 2015; van den Eijnden et al., 2014).

Several reasons have been advanced to explain why depressed or dissatisfied adolescents may be at risk for peer victimization. First, adolescents who are less satisfied with their life or feel depressed may be less able to defend themselves against online victimization, and may thus become easy targets for perpetrators. Specifically, youth with low well-being may not be able to effectively defend themselves in response to peer victimization because they have less developed social skills (Segrin & Taylor, 2007). Adolescent perpetrators may take notice of such poor social skills, when choosing their victim. In line with this reasoning, studies have reported that individuals with such lower level of social skills may be at risk of being victimized (e.g., Crawford & Manassis, 2011). Second, depressed or dissatisfied adolescents may interact in unfavorable ways, as they often are passive, fearful or even hostile in day-to-day interactions with their peers (e.g., Rudolph, Ladd, & Dinella, 2007). Due to such non-social ways of interacting, peers may take notice of depressed adolescents' vulnerability, in turn making them the perfect target for victimization behaviors. Therefore, in line with these suggestions (Rudolph et al., 2007) and based on prior studies (e.g., Pabian & Vandebosch, 2015), the present study will examine the reverse impact of depressive symptoms/life satisfaction on adolescents' peer victimization on Facebook.

### **Factors Moderating the Relationship between Online Peer Victimization and Adolescents' Well-being**

A secondary aim of the present study is to identify groups that may be particularly vulnerable for the harmful effects of online peer victimization and poor well-being. Although prior studies support a direct relationship between online peer victimization and adolescents' well-being, there is evidence that not all adolescents who are depressed, dissatisfied with their life, or experience negative online interactions are at risk. Thus, a secondary goal of the present study is to explore the moderating influence of perceived friend support, gender, and age.

First, perceived friend support, defined as the "information leading the subject to believe that he is cared for and loved ... esteemed and valued ... and belongs to a network of communication and mutual obligation" (Cobb, 1976, p. 300), could help victims of negative online peer acts to cope with their aversive experiences. During adolescence, youth develop the capability for intimacy, trust, openness, and self-disclosure to their friends (Brown & Larson, 2009; Buhrmester & Prager, 1995). Consequently, peers become an important source of social support during adolescence and may be considered an even more important source of support than

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parents (Hay & Ashman, 2003). Research has shown that perceived friend support helps adolescents cope with stressful events, such as peer victimization or poor well-being, which is in line with the buffering hypothesis (Cohen & Wills, 1985). According to this hypothesis, perceived emotional support protects adolescents from the harmful impact of stressful events. In line with this model, a cross-sectional survey conducted by Storch and Masia-Warner (2004) found that relational victimization was more strongly associated to loneliness among girls who reported receiving low levels of prosocial behavior (i.e., the frequency with which adolescents are recipients of peers' caring acts), than among girls who reported receiving high levels of prosocial behavior.

Although studies thus far show that perceived emotional support may protect adolescents against the harmful impact of stress on their psychosocial well-being (Auerbach, Bigda-Peyton, Eberhart, Webb, & Ho, 2011), less is known about the buffering role of perceived emotional friend support in the relationship between online peer victimization and adolescents' well-being. To date, only few studies have examined the buffering role of perceived emotional support for victims of online harassment (Sumter et al., 2015; Tennant et al., 2015), while no study thus far investigated whether perceived emotional friend support protects adolescents from the harmful risk of poor well-being on their experience of negative online interactions.

Second, research has shown that girls report more negative emotional consequences of online peer victimization compared to boys (e.g., Schultze-Krumbholz, Jäkel, Schultze, & Scheithauer, 2012; Sumter et al., 2015). Girls may be more likely to be affected by online peer victimization, as online peer victimization is a form of relational aggression targeting peer relationships and girls are particularly vulnerable to social relationship threats (Schultze-Krumbholz et al., 2012). Although it appears that girls may be more vulnerable to the negative consequences of online peer victimization, less is known about the moderating role of age in the reciprocal relationships between peer victimization on Facebook and adolescents' well-being. To fill these gaps, the present study will explore the moderating role of adolescents' gender and age within the reciprocal relationships between online peer victimization and adolescents' well-being.

### **The Present Study**

The primary goal of the present two-wave panel study with a six-month interval among 12- to 19-year-olds was to examine the short-term longitudinal and reciprocal relationships between peer victimization on Facebook (i.e., negative Facebook experiences from the victims' perspective) and adolescents' psychosocial well-being (i.e., depressive symptoms and life satisfaction). Given that adolescence is characterized by a decrease in satisfaction with one's life (e.g., Goldbeck et al., 2007) and an increase in depressive symptoms (e.g.,



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Angold et al., 2002), it is especially relevant to focus on these specific psychosocial well-being indicators in relation to peer victimization on Facebook.

The study seeks to address critical gaps in our understanding of online victimization and adolescent well-being. Whereas most studies on the relationship between online peer victimization and adolescents' psychosocial well-being have been cross-sectional, longitudinal research, examining the bi-directional relationships is scarce (Gámez-Guadix et al., 2013). To address this gap and to provide a deeper understanding of potential longitudinal and bi-directional associations between peer victimization that occurs on social networking sites and adolescents' psychosocial well-being, the present study will (1) examine the short-term longitudinal and reciprocal relationships between peer victimization on Facebook and adolescents' psychosocial well-being, and (2) explore the moderating role of adolescents' gender, age, and perceived friend support on these associations.

Based on the literature we reviewed above, we propose following hypotheses. Hypothesis 1a expects that peer victimization on Facebook at Time 1 will increase adolescents' depressive symptoms at Time 2. Similarly, Hypothesis 1b expects that peer victimization on Facebook at Time 1 will decrease adolescents' satisfaction with life at Time 2. In addition, Hypothesis 2a expects that depressive symptoms at Time 1 will increase adolescents' peer victimization at Time 2. Similarly, Hypothesis 2b proposes that life satisfaction at Time 1 will decrease adolescents' peer victimization on Facebook at Time 2. Furthermore, drawing on earlier research (e.g., Auerbach et al., 2011), which has shown that perceived emotional support can protect adolescents from the harmful impact of stressful events, the present study hypothesizes that perceived friend support will buffer these reciprocal relationships. Hypothesis 3 thus expects that peer victimization on Facebook will be more strongly associated with internalizing problems among youth who report the lowest levels of perceived friend support compared to those who report the highest levels of support. Finally, based on prior findings (e.g., Schultze-Krumbholz et al., 2012), which indicated that girls may be especially vulnerable for the harmful impact of online peer victimization, we will test whether gender and age moderate these reciprocal associations. Research Question 1 therefore explores the moderating role of gender on these reciprocal relationships, whereas Research Question 2 examines the moderating role of age.

### **Method**

#### **Sample and Participant Selection**

Participants were 12- to 19-year-olds from 15 randomly selected Flemish high schools, i.e., the northern part of Belgium. They completed paper-and-pencil questionnaires during regular school hours, at two different

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time points, six months apart (March - October 2014). Approval for the survey was granted by the Institutional Review Board of the host university. Informed consent was obtained in accordance with the customary guidelines in Belgium. The data reported here are from a larger longitudinal panel study on the relationships between adolescents' Facebook use and well-being.

The baseline sample included 1,840 adolescents; 1,577 participated in the second wave, and 1,235 participated in both waves (67% of the first wave). As this study examines the relationship between negative peer experiences on Facebook and adolescents' well-being, we only included the 88% ( $N_{\text{Time1}} = 1,621$ ) of the respondents who had a Facebook account at Time 1 or Time 2 in our analyses. At baseline, 52% of these participants were boys, and 48% were girls, with a mean age of 14.76 years ( $SD = 1.41$ ). In addition, 44% of this sample followed a general educational program, which is representative of the Flemish secondary school population (45%; Flemish Department of Education, 2015). Furthermore, 62% of the respondents reported that their mothers' highest level of education was a post-secondary degree, 33% reported that their mothers had graduated from secondary school, and 5% reported that their mothers graduated from elementary school or had no diploma. Similarly, the majority of the respondents reported that their fathers had a post-secondary degree (55%); 39% reported that their fathers had a secondary school degree and 6% reported that their fathers graduated from elementary school or had no diploma. The majority of this sample (92%) was born in Belgium, 5% in a European country, and 3% in a non-European country.

To assess whether attrition may have biased our final sample, we examined differences between those who participated in both waves and those who participated in only one wave. A multivariate analysis of variance (MANOVA) using Pillai's trace revealed significant differences,  $V = .02$ ,  $F(5, 1320) = 6.60$ ,  $p < .001$ ,  $h_p^2 = .02$ . Follow-up univariate analyses showed that adolescents who participated in both waves scored lower on depressive symptoms at Time 1 ( $M = 1.79$ ;  $SD = .61$  versus  $M = 1.91$ ;  $SD = .65$ ),  $F(1, 1519) = 12.80$ ,  $p < .001$ , and negative Facebook experiences at Time 1 ( $M = 1.41$ ;  $SD = .49$  versus  $M = 1.53$ ;  $SD = .60$ ),  $F(1, 1454) = 16.12$ ,  $p < .001$ . In addition, adolescents who participated in both waves scored higher on life satisfaction at Time 1 ( $M = 4.99$ ;  $SD = 1.32$  versus  $M = 4.63$ ;  $SD = 1.48$ ),  $F(1, 1575) = 24.71$ ,  $p < .001$ .

### Measures

**Demographic Variables.** Participants responded to questions about gender and age.

**Time Spent on Facebook.** Participants completed four questions about their time spent on Facebook. On a 11-point Likert Scale (i.e., *0 hours* (= 0); *0.5h* (= 1); *0.5h-1h* (= 2); *1h-1.5h* (= 3); *1.5h-2h* (= 4); *2h-2.5h* (= 5); *2.5h-3h* (= 6); *3h-4h* (= 7); *4h-5h* (= 8); *More than 5 hours* (= 9) and *I am always logged in to Facebook*

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(i.e., *I'm constantly 'online' and available for interaction*) (= 10), participants estimated how much time they spend on Facebook on a regular *weekday* (Mon–Thurs), and *weekend day* (Sat–Sun). We distinguished Wednesdays from regular weekdays, because Wednesday is the only weekday when participants had a half-day at school and thus may spend more time on Facebook compared to a regular weekday. We also distinguished Fridays from regular weekdays, because Friday is the start of the weekend and therefore parents may allow more time on Facebook compared to a regular weekday. A composite score of the daily time on Facebook was computed by calculating the average of the time spent on a typical weekday, weekend day, Wednesdays, and Fridays.

**Negative Facebook Experiences.** We adapted the Social Networking Peer Experiences Questionnaire (SN-PEQ) to a Facebook context (Landoll et al., 2013). On a five-point Likert Scale ranging from *never* (= 1) to *a few times a week* (= 5), participants rated the occurrence of 12 aversive Facebook experiences over the past two months (e.g., “How often did a peer post mean things about you on Facebook?”). The average of the 12 items showed good internal consistencies in both waves ( $\alpha_{\text{Time 1}} = .91$ ;  $\alpha_{\text{Time 2}} = .90$ ).

**Depressive Symptoms.** Depressive symptoms were measured using the ten-item version of the Center for Epidemiological Studies Depression Scale for Children (CES-D) (Irwin, Haydari, & Oxman, 2012). Using a four-point Likert Scale (*Never* (= 1) – *Very often* (= 4)), participants rated how often they identified with each statement (e.g., “The last week, how often did you felt too tired to do things?”). An estimate of adolescents’ depressive symptoms was created based on the average of the ten items ( $\alpha_{\text{Time 1}} = .87$ ;  $\alpha_{\text{Time 2}} = .87$ ).

**Life Satisfaction.** Using a seven-point Likert Scale from *strongly disagree* (= 1) to *strongly agree* (= 7), participants rated the five items of the Satisfaction with Life Scale (Diener, Emmons, Larsen, & Griffin, 1985) (e.g., “I am satisfied with my life”). By summing the item scores and dividing the sum by the total of items, an estimate of adolescents’ life satisfaction was created ( $\alpha_{\text{Time 1}} = .90$ ;  $\alpha_{\text{Time 2}} = .90$ ).

**Perceived Friend Support.** On a seven-point Likert Scale, ranging from *strongly disagree* (= 1) to *strongly agree* (= 7), participants rated the four-item friend subscale of the Multidimensional Scale of Perceived Social Support (MPSS; Zimet, Dahlem, Zimet, & Farley, 1988) (e.g., “When you are feeling down or in a difficult situation ... my friends try to help me”). By summing the item scores and dividing the sum by the total number of items, an estimate of adolescents’ perceived friend support was created ( $\alpha_{\text{Time 1}} = .94$ ;  $\alpha_{\text{Time 2}} = .94$ ).

### Data Analysis Plan

First, to examine gender and age trends in adolescents’ well-being (i.e., depressive symptoms and life satisfaction) and negative Facebook experiences, we conducted a two-way MANOVA, with gender and age as

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between-subjects factors. In line with Steinberg (2005), we categorized age into three levels: young adolescents (12-13 years), middle adolescents (14-16 years), and late adolescents (17-19 years). The baseline sample consisted of 22% young adolescents ( $N_{\text{Time1}} = 395$ ), 67% middle adolescents ( $N_{\text{Time1}} = 1,242$ ), and 11% late adolescents ( $N_{\text{Time1}} = 202$ ).

Second, to test our hypotheses we used structural equation modelling in AMOS. Following Kline (2011), we considered a model to be a good fit when the chi-square-squared-to-degrees-of-freedom ratio ( $\chi^2/df$ ) was below 3, the root-mean-square error of approximation (RMSEA) was below .05 and the comparative fit index (CFI) was above .95. Missing data were estimated using the full information maximum likelihood procedure. In total, we estimated two cross-lagged models as they allow us to test the direction of longitudinal relationships, when controlling for within-construct stabilities from one time point to the next (i.e., autoregressive paths). Our first cross-lagged model included two autoregressive paths (i.e., a path from negative Facebook experiences at Time 1 and depressive symptoms at Time 1 onto their values at Time 2) and two bi-directional paths (i.e., a path from negative Facebook experiences at Time 1 onto depressive symptoms at Time 2 and a path from depressive symptoms at Time 1 onto negative Facebook experiences at Time 2). Similarly, our second cross-lagged model included two autoregressive paths (i.e., a path from negative Facebook experiences at Time 1 and life satisfaction at Time 1 onto their values at Time 2) and two bi-directional paths (i.e., a path from negative Facebook experiences at Time 1 onto life satisfaction at Time 2 and a path from life satisfaction at Time 1 onto negative Facebook experiences at Time 2). In both models, we estimated correlations between latent variables measured at the same time point, and allowed covariances between the measurement errors of the same indicators (e.g., Cole & Maxwell, 2003).

Prior to the analyses, we used measures of skewness (i.e., symmetry of the distribution) and kurtosis (i.e., flatness of the distribution) to screen our data for normality. Generally, a skewness value greater than 1 and a kurtosis value less than -2 or greater than +2 indicates that the distribution varies significantly from normal (Green, Salkind, & Akey, 2000). Based on the calculated skewness values, the following distributions were not within the expected range: negative Facebook experiences T1 [2.94], negative Facebook experiences T2 [2.61], and perceived friend support T2 [1.44]. Similarly, based on the calculated kurtosis values, the following distributions were not within the expected range: negative Facebook experiences T1 [13.23], negative Facebook experiences T2 [9.64], and perceived friend support T2 [2.77]. To address this issue, we applied item parceling for all our latent variables in our cross-lagged SEM models, as item parceling not only corrects for non-normal data, but also reduces the biasing effect of measurement error, which in turn increases the model-data fit and

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enhances parsimony (Bandalos & Finney, 2001; Bandalos, 2002; Little, Cunningham, Shahar, & Widaman, 2002). To create these item parcels, we conducted separate factor analyses for all our latent variables at both time points and calculated the average factor loading of each item. Based on the sizes of the factor loadings, the items were alternately assigned to two item parcels (Russell, Kahn, Spoth, & Altmaier, 1998). This resulted in two parcels of six items for negative Facebook experiences, two parcels of five items for depressive symptoms, and one parcel of three items for life satisfaction.

To test whether the hypothesized relationships differed between (1) boys and girls, (2) young, middle and late adolescents, and (3) those with low, medium and high levels of perceived friend support, we conducted multiple group comparison tests. Based on a tertiary split (i.e., split in three equal percentiles), we assigned participants to three equal support groups. For all three moderators, a multiple group comparison test was performed, which compared a model in which all structural paths were allowed to vary across groups (i.e., unconstrained model) with a model in which all structural paths were fixed to be equal across groups (i.e., constrained model). If  $\Delta \chi^2$  was significant ( $p < .05$ ), we conducted a path-by-path analysis to examine whether the relationships differed significantly between the two groups. We compared an unconstrained model with a model where the hypothesized relation was constrained to be equal across groups. If  $\Delta \chi^2$  was significant ( $p < .05$ ) or marginally significant ( $p < .10$ ), we concluded that gender, age, and/or perceived friend support moderated the hypothesized relation. This multiple-group analysis resulted in six additional cross-lagged models that were tested. First, we tested two cross-lagged models (i.e., one for depressive symptoms; one for life satisfaction), which examined the moderating influence of adolescents' gender. Second, we examined two cross-lagged models which explored differences between the three age groups. Third, we tested two cross-lagged models that examined the differences between low, medium, and high levels of perceived friend support.

## Results

### Descriptive Statistics

Eighty four percent of the participants reported that they had experienced at least one negative interaction with a peer on Facebook over the past two months. The prevalence of the items of the adapted SN-PEQ is shown in Table 1. See Table 2 for a breakdown of all key study variables by age and gender. Bivariate correlations (See Table 3) indicated that the relevant variables were significantly correlated in the expected direction.

[Table 1, 2 and 3 about here]

### Gender and Age Trends

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A MANOVA on psychosocial well-being at Time 1 and negative Facebook experiences at Time 1 revealed significant multivariate main effects for gender,  $V = .02$ ,  $F(3, 1341) = 11.16$ ,  $p < .001$ ,  $h_p^2 = .02$ , and age,  $V = .01$ ,  $F(6, 2648) = 2.06$ ,  $p = .05$ ,  $h_p^2 = .01$ . No significant interactions were found ( $p > .05$ ). Separate ANOVA tests showed significant differences between boys and girls with respect to depressive symptoms at Time 1,  $F(1, 1519) = 49.54$ ,  $p = .000$ ,  $h_p^2 = .03$ , and life satisfaction at Time 1,  $F(1, 1575) = 33.42$ ,  $p = .000$ ,  $h_p^2 = .02$ . Specifically, girls scored significantly higher on depressive symptoms at Time 1 ( $M = 1.94$ ;  $SD = .68$ ), compared to boys ( $M = 1.72$ ;  $SD = .55$ ), whereas boys scored significantly higher on life satisfaction at Time 1 ( $M = 5.06$ ;  $SD = 1.29$ ), compared to girls ( $M = 4.66$ ;  $SD = 1.45$ ). Additionally, significant univariate main effects for age were found only for negative Facebook experiences,  $F(1, 1453) = 1.02$ ,  $p < .05$ ,  $h_p^2 = .01$ . Post hoc tests revealed that young adolescents experienced significantly less negative Facebook experiences at Time 1 ( $M = 1.38$ ;  $SD = .54$ ), compared to middle adolescents ( $M = 1.47$ ;  $SD = .51$ ). (See Table 1).

### Cross-Lagged Models

Gender and time spent on Facebook were included as control variables in our cross-lagged models. We controlled for the baseline values of these variables in each cross-lagged model, by adding them as predictors for the hypothesized endogenous variables and by allowing covariances with each other and other Time 1 variables. Two separate cross-lagged models (i.e., for each well-being indicator) were run.

**Negative Facebook Experiences – Depressive Symptoms.** In line with our expectations, the model-data fit increased substantially when relying on item parcels, rather than items. More specifically, whereas the fit of the initial model for depressive symptoms (i.e., model with items) revealed an adequate fit,  $\chi^2(948) = 4703.50$ ,  $p < .001$ ; RMSEA = .05, CFI = .89;  $\chi^2/df = 4.96$ , the final model (i.e., model with item parcels), shown in figure 1, revealed an excellent fit of the data,  $\chi^2(18) = 31.20$ ,  $p > .001$ ; RMSEA = .02, CFI = 1;  $\chi^2/df = 1.73$ . Given this increased model-data fit and enhanced parsimony, we report the results of the model with item parcels. The results showed that depressive symptoms at Time 1 increased adolescents' negative Facebook experiences at Time 2,  $\beta = .12$ ,  $B = .10$ ,  $SE = .02$ ,  $p < .001$ . No support was found for an impact of negative Facebook experiences at Time 1 on depressive symptoms at Time 2,  $\beta = .05$ ,  $B = .05$ ,  $SE = .03$ ,  $p = .10$ . Thus, although hypothesis 1a could not be confirmed, hypothesis 2a could be fully confirmed.

[Figure 1 about here]

**Negative Facebook Experiences – Life Satisfaction.** Similarly, whereas the fit of the initial model for life satisfaction (i.e., model with items) was adequate,  $\chi^2(562) = 3076.08$ ,  $p < .001$ ; RMSEA = .06, CFI = .92;  $\chi^2/df = 5.47$ , the final model (i.e., model with item parcels), shown in figure 2, yielded a much better fit of the

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data,  $\chi^2(18) = 19.18, p > .001$ ; RMSEA = .01, CFI = 1;  $\chi^2/df = 1.07$ . Given this increased model-data fit and enhanced parsimony, we report the results of the model with item parcels. Results showed that life satisfaction at Time 1 decreased adolescents' negative Facebook experiences at Time 2,  $\beta = -.12, B = -.04, SE = .01, p < .001$ . In addition, negative Facebook experiences at Time 1 marginally decreased adolescents' life satisfaction at Time 2,  $\beta = -.05, B = -.10, SE = .06, p = .06$ . This indicates that hypothesis 1b was marginally supported, whereas hypothesis 2b was fully supported.

[Figure 2 about here]

### Multiple Group Comparisons

To test whether these relationships were moderated by gender, age, and/or perceived friend support, we conducted multiple group comparison tests. First, multiple group comparison tests revealed no significant differences between boys and girls ( $p > .05$ ), nor between young, middle and late adolescents ( $p > .05$ ). Thus, regarding research question 1 and 2, gender and age did not moderate the associations between negative Facebook experiences and adolescents' depressive symptoms/life satisfaction. Second, multiple group comparison tests showed significant differences between those reporting low, medium and high levels of perceived friend support.

On the one hand, the moderated depressive symptoms model showed a good fit to the data:  $\chi^2(57) = 84.27, p = .01$ ; RMSEA = .02, CFI = 1;  $\chi^2/df = 1.48$ . When comparing the unconstrained model with the constrained model, results revealed that the models significantly differed,  $\Delta \chi^2(16) = 28.02, p < .05$ . A path-by-path analysis ( $\Delta \chi^2(1) = 3.55, p = .06$ ) revealed that negative Facebook experiences at Time 1 increased adolescents' depressive symptoms at Time 2 among those with the lowest levels of perceived friend support [ $\beta = .12, B = .12, SE = .05, p < .05$ ], but not among those with medium [ $\beta = -.01, B = -.02, SE = .05, p = .75$ ] or high levels of perceived friend support [ $\beta = .04, B = .05, SE = .06, p = .42$ ]. In addition, adolescents' depressive symptoms at Time 1 increased negative Facebook experiences at Time 2 among those with low [ $\beta = .11, B = .09, SE = .04, p < .05$ ] and medium levels of perceived friend support [ $\beta = .16, B = .12, SE = .04, p < .01$ ], but not among those with the highest levels of perceived friend support [ $\beta = -.03, B = .02, SE = .04, p = .67$ ]. However, the path-by-path analysis showed that the relationship between depressive symptoms at Time 1 and negative Facebook experiences at Time 2 did not significantly differ in the three groups ( $\Delta \chi^2(1) = .20, p > .10$ ).

On the other hand, the moderated life satisfaction model fitted the data well:  $\chi^2(57) = 51.50, p > .05$ ; RMSEA = 0, CFI = 1;  $\chi^2/df = .90$ . Perceived friend support significantly moderated the model,  $\Delta \chi^2(16) = 34.01, p < .01$ . A first path-by-path analysis ( $\Delta \chi^2(1) = 9.02, p < .01$ ) showed that negative Facebook

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experiences at Time 1 decreased adolescents' life satisfaction at Time 2 among those with the lowest levels of social support [ $\beta = -.13$ ,  $B = -.25$ ,  $SE = .09$ ,  $p < .01$ ], but not among those with medium [ $\beta = .05$ ,  $B = .15$ ,  $SE = .10$ ,  $p = .15$ ] or high levels of perceived friend support [ $\beta = -.04$ ,  $B = -.09$ ,  $SE = .11$ ,  $p = .39$ ]. In addition, low life satisfaction at Time 1 increased negative Facebook experiences at Time 2 among those with low [ $\beta = -.14$ ,  $B = .04$ ,  $SE = .02$ ,  $p < .01$ ] and medium levels of perceived friend support [ $\beta = -.14$ ,  $B = -.04$ ,  $SE = .02$ ,  $p < .05$ ], but not among those with the highest levels of perceived friend support [ $\beta = .05$ ,  $B = .01$ ,  $SE = .02$ ,  $p = .41$ ]. However, the path-by-path analysis showed that the relationship between life satisfaction at Time 1 and negative Facebook experiences at Time 2 did not significantly differ in the three groups ( $\Delta \chi^2(1) = .003$ ,  $p > .10$ ). Based on these findings, hypothesis 3 could be partially confirmed, as perceived friend support fulfilled a buffering role in the association between peer victimization on Facebook and internalizing symptoms, but was not a moderator in the opposite relationship.

[Figure 3, 4 and 5 about here]

### Discussion

Recent studies have shown that online peer victimization is related to poor psychosocial well-being. However, many of these studies have focused on the unidirectional impact of general online peer victimization on adolescents' well-being (e.g., Sumter et al., 2015). Given the widespread use of Facebook by adolescents (Lenhart, 2015), and the fact that it affords an ideal platform for engaging in negative peer acts (e.g., Dredge et al., 2014), questions arise as to whether (1) adolescents' negative experiences on Facebook predict lowered well-being, and/or (2) whether adolescents' well-being predicts being victimized on Facebook. To address these questions, we tested cross-lagged models that examined the short-term longitudinal and reciprocal relationships between peer victimization on Facebook and adolescents' psychosocial well-being (i.e., depressive symptoms and life satisfaction). In addition, no study to date has specifically explored the conditions under which negative Facebook experiences may be reciprocally associated with adolescents' well-being. To address this gap, we tested the moderating role of adolescents' age, gender, and perceived friend support on the reciprocal relationships between peer victimization on Facebook and adolescents' well-being.

Our results showed a reciprocal relationship between life satisfaction and well-being such that peer victimization on Facebook was a marginally significant predictor of lower life satisfaction, and low life satisfaction positively predicted being victimized on Facebook. In addition, a unidirectional relationship was found between depressive symptoms and peer victimization on Facebook, suggesting that depressive symptoms are a risk factor for peer victimization on Facebook, rather than an outcome. Although age and gender did not



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moderate the relationship between peer victimization on Facebook and well-being, perceived friend support was found to protect adolescents against the harmful impact of negative Facebook experiences.

Consistent with prior survey data, an overwhelming majority (88%) of our respondents reported having a Facebook account and spending between 1.5 and 2 hours amount of time with it. Eighty four percent of the youth who reported having an account on Facebook also reported that they had experienced at least one negative interaction with a peer via Facebook in the last two months. The victimization rate found in our study is comparable to rates of social networking site victimization previously reported in the literature (e.g., 82%; Landoll et al., 2013). Our results add to a growing body of evidence that online contexts, and in particular Facebook, may be an important venue for adolescent peer interaction, especially negative ones (Kowalski et al., 2014). Previous work has also suggested that Facebook may be the online context where such negative interactions are most likely to occur (e.g., Rice et al., 2015), and so our results are especially relevant.

Although prior work has found that girls are more likely to be victimized online, we did not find any significant gender difference in this regard. Our findings are in line with others, who have also not found any gender difference in victimization rates on Facebook (Dredge et al., 2014; Kwan & Skoric, 2013). Consistent with prior work, which has reported that victimization peaks among 14-year olds (e.g., Tokunaga, 2010), we found that middle adolescents were more likely to experience negative interactions on Facebook compared to young adolescents. In addition, in line with previous studies (e.g., Angold et al., 2002; Bisegger et al., 2005), girls were more likely to experience depressive symptoms and to feel dissatisfied with their lives compared to boys.

### **The Relationship between Peer Victimization on Facebook and Adolescents' Well-Being**

As expected, peer victimization on Facebook marginally predicted decreases in adolescents' life satisfaction. These results are consistent with prior studies examining the longitudinal impact of online peer victimization on adolescents' psychosocial well-being (e.g., Sumter et al., 2012). Although this finding was only marginally significant, it suggests that victimized youth might interpret negative peer acts on Facebook as negative peer evaluations. Such negative peer evaluations, in turn, might stimulate youth's negative self-evaluation (Crick & Bigbee, 1998) or even decrease youth's feelings of belonging or relatedness to others (Baumeister & Leary, 1995), which may result in a decreased life satisfaction. An additional explanation (e.g., Rudolph et al., 2007) refers to the fact that peer victimization may lead to lower life satisfaction, because victimized youth might feel helpless or hopeless to stop perpetrators' negative online acts. These explanations

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should be investigated further, as no studies thus far have specifically examined the mediating role of negative self-evaluation within this association, nor looked at the role of feelings of helplessness or hopelessness.

Contrary to our expectations, peer victimization on Facebook did not predict increases in depressive symptoms. This finding is also in contrast to Gámez-Guadix et al. (2013), who found that online peer victimization is an important risk factor for the development of adolescents' depressive symptoms. Although our findings differ from studies examining the reciprocal associations between *online* peer victimization and adolescents' depressive symptoms (Gámez-Guadix et al., 2013), they are, however, in line with studies examining the reciprocal associations between *offline* peer victimization and depression during adolescence (e.g., Kochel, Ladd, & Rudolph, 2012; Leadbeater & Hoglund, 2009), as well as studies focusing on *online* peer victimization and social anxiety (Pabian & Vandebosch, 2015; van den Eijnden et al., 2014). These studies on online peer victimization and social anxiety all found that the impact of online peer victimization on social anxiety disappeared after taking the opposite relationship into account. Given the substantial overlap between online and offline peer victimization (Sumter et al., 2012), as well as the close relationship between social anxiety and depressive symptoms (e.g., Zahn-Waxler et al., 2000), the above findings provide empirical support for our results.

However, the finding that depressive symptoms predicts peer victimization on Facebook, rather than the other way around, might be explained by (1) the focus of the present study on peer victimization on Facebook, and (2) the fact that life satisfaction, more than depressive symptoms, is related to negative experiences on Facebook. First, we believe that this unidirectional impact of depressive symptoms on adolescents' peer victimization on Facebook, might be explained by the study's focus on peer victimization on Facebook, rather than a focus on general online peer victimization behaviors. While perpetrators can behave anonymously on the Internet, anonymous perpetration is far more difficult in a Facebook setting. Perpetrators can usually be immediately identified, on the basis of the available information on the profile page, and thus they may act differently compared to other online settings. For instance, while victimization behaviors on the Internet may be more explicit (e.g., sending someone (anonymous) aggressive messages), victimization behaviors on Facebook may be much more implicit (e.g., excluding someone from a Facebook group). Thus, it is possible that such implicit negative acts on Facebook require more than six months to result in increased depressive symptoms, compared to the more explicit negative acts in general online settings.

Second, we believe that this one-way influence of depressive symptoms on adolescents' peer victimization on Facebook might be explained by the fact that life satisfaction relates more strongly to negative

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experiences on Facebook, than depressive symptoms. Studies have shown that Facebook provides users an ideal setting to share what's happening in their life (e.g., through status updating) and to know what's happening in other people's lives (e.g., through passive browsing). Therefore, various aversive peer acts on Facebook, such as 'exclusion from a Facebook event' may especially contribute to youth's feeling that others are having better lives, while they themselves have been left out. These implicit references to one's life in these negative peer acts may partly explain why negative peer acts may marginally predict lower life satisfaction, but are unrelated to depressive symptoms.

### **The Reverse Relationship: Does Well-Being Predict Adolescents' Peer Victimization on Facebook?**

In line with our expectations, the results showed that adolescents' well-being is predictive of an increased risk of being victimized online. Our findings are consistent with studies linking depression (Gómez-Guadix et al., 2013), and social anxiety (e.g., Pabian & Vandebosch, 2015) with online peer victimization. Our results however extend the literature, first, by revealing that life satisfaction may be an additional predictor of adolescents' online peer victimization, and, second, by examining this association in a Facebook context.

Our findings thus support our suggestion that socially vulnerable adolescents, that is those who score low on life satisfaction, but high on depressive symptoms, may be at higher risk to be victimized on Facebook. A possible explanation, which should be further examined in future research, relates to depressed/dissatisfied adolescents' lack of an effective defense mechanism against perpetrators. As theorized in a variety of studies (e.g., Sweeting, Young, West, & Der, 2006), perpetrators may interpret an expression of life dissatisfaction or depressive symptoms as a sign of weakness. This sign of weakness, in turn, may stimulate perpetrators' perception that these dissatisfied or depressed peers are unable to defend themselves properly, making them the ideal targets for aversive online acts. Although scholars thus far have speculated that the lack of an efficient defense mechanism might explain this negative impact of low psychosocial well-being on adolescents' peer victimization, future research is needed to investigate this possibility. An additional explanation, proposed by Leadbeater and Hoglund (2009) speculates that low well-being youth might develop negative self-attributions (e.g., "it is my fault"), as well as compare themselves negatively with others, when being victimized. These negative self-attributions and negative comparison behaviors may lead depressed and dissatisfied teens to self-report more peer victimization, compared to non-depressed or satisfied youth.

### **Age and Gender as Moderators**

We did not find empirical support for the moderating role of age in the reciprocal associations between online peer victimization and adolescents' psychosocial well-being. Although no study thus far has tested the

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moderating role of age in these reciprocal associations, there were indications in the literature to expect stronger associations among middle adolescents, as both peer victimization (Sumter et al., 2012), depressive symptoms (Natsuaki et al., 2009) and life dissatisfaction (Goldbeck et al., 2007) seem to peak during this adolescent period. However, no support was found for the moderating role of age. This finding may be partly due to the fact that the group of middle adolescents were overrepresented in our sample. The underrepresentation of the other age groups made comparisons between the three age groups difficult. In addition, the reciprocal relationships between online peer victimization and adolescents' psychosocial well-being were similar among boys and girls. The lack of gender moderation may be because the boys and girls in our sample reported similar rates of peer victimization on Facebook, a finding consistent with that reported in prior work (Dredge et al., 2014; Kwan & Skoric, 2013). Taken together, the study findings indicate that there is reciprocal association between adolescents' peer victimization on Facebook and life satisfaction, and a unidirectional relationship between adolescents' depressive symptoms and online peer victimization, regardless of gender or age.

### **Perceived Friend Support as a Moderator**

The present study further aimed to test the buffering hypothesis (Cohen & Wills, 1985), by examining whether perceived friend support moderated the reciprocal relationships between peer victimization on Facebook and adolescents' psychosocial well-being. Our results confirmed that perceived friend support was effective in moderating the harmful impact of online peer victimization on participants' depressive symptoms and life satisfaction. High levels of perceived friend support offered protection against developing depressive symptoms or low life satisfaction after being victimized via Facebook. It reaffirms the importance of one or more friend(s) during adolescence, as one or more solid friendships are capable of enhancing adolescents' perceptions of friend support, which may serve as an efficient buffer against the harmful impact of negative Facebook experiences.

However, perceived friend support did not serve as a moderator for the reverse relationship, suggesting that such support may not serve as a protective factor for adolescents who experience high levels of depressive symptoms or life dissatisfaction. It may be that close friends who typically provide support may be the ones initiating the negative Facebook interactions; indeed in Waasdorp & Bradshaw's (2015) study approximately 33% of respondents indicated that someone they had viewed as a friend was responsible for the distressing cyber communication. Thus it is likely that variables other than perceived friend support, may moderate the association between adolescents' well-being and peer victimization on Facebook, and should be investigated in future studies. One likely candidate is parent support and research should examine whether support from family members may be effective, especially when the source of victimization are close friends. Another variable is

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participants' own online aggression and van den Eijnden et al. (2014) has pointed out that it is important to examine the moderating role of online aggression in the relationship between online peer victimization and psychosocial problems, as victims can also engage in online aggressive behaviors. It is possible that the impact of poor well-being on peer victimization on Facebook might be stronger for those who do not engage in online aggression. Future studies should further explore these possibilities.

### **Implications for Theory and Practice**

The results of the present study have important theoretical, as well practical implications. First, they attest to the importance of studying online peer interactions to understand the role of the peer-group in adolescent well-being. In particular, they add to a growing body of work, which shows that like offline peer interactions (e.g., Kochel et al., 2012), online interactions can present threats to well-being, especially for some adolescents. Although our results showed that peer support can buffer adolescents against the harmful outcomes of negative online interactions, we did not examine where the support was received – online or offline. An important question is how positive online peer interactions, including those that provide support may help to protect youth from victimization and other threats to their well-being. Second, the present study extends Mikami, Szewedo, Allen, Evans, and Hare (2010) developmental theory of cross-situational continuity in adolescents' social behavior. According to Mikami et al. (2010), youth display continuity in patterns of interpersonal communication over time and across different contexts, as they found that behavioral adjustment at ages 13-14 years was predictive of similar problem behavior on their social networking sites at ages 20-22 years. In line with this theory, our findings showed that youth indeed display cross-situational continuity in the online domain, as adolescents with poor well-being were especially likely to be victimized online.

The study's results also have practical implications. Although we did not compare youth's negative interactions in other online venues, research suggests that youth are more likely to be victimized on Facebook and through text messaging (Rice et al., 2015). Because such negative interactions on Facebook can be repeatedly viewed, often in the public space, even a single instance can be a source of discomfort, and as our results demonstrate, may have longer term associations to well-being. Adolescents, but also parents, educators, and teachers should therefore be made aware of these risks related to negative peer interactions on Facebook. In addition, we recommend that tools, such as digital literacy training, on how to interpret and deal with such negative experiences on Facebook should be set up. This digital literacy training should emphasize the need for positive interactions on Facebook and should also teach youth to be more mindful about their Facebook activities so as to reduce actions that may be perceived negatively by peers. Additionally, interventions to reduce peer

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victimization on Facebook should incorporate attempts to stimulate social support perceptions, as friend support can protect youth against the negative outcomes of being victimized online.

### **Strengths and Limitations**

An important strength of the present study is its longitudinal design and sample size. While the majority of studies, examining the association between peer victimization and adolescents' well-being, rely on cross-sectional data, the current study used longitudinal panel data gathered among a large number of adolescents. Although this short-term longitudinal design goes above conclusions based on cross-sectional data, causal inferences, however, still cannot be made. In addition, although independent lines of research have frequently linked online peer victimization to low psychosocial well-being among adolescents, this study was the first to examine the reciprocal associations between peer victimization on a particular social networking site and adolescents' psychosocial well-being. Lastly, the present study contributes to the literature by examining the moderating role of adolescents' gender, age, and perceived friend support on these reciprocal associations, as previous studies have primarily focused on main effects (e.g., Landoll et al., 2013).

However, there are three main limitations in the current study that must be addressed. First, the present study used a self-report questionnaire to assess adolescents' online peer victimization, depressive symptoms, and life satisfaction, as objective reports of victimization are difficult to assess. Although respondents were assured that their responses to the questionnaire would be treated anonymously and confidentially, the responses might be biased. In order to provide additional support for these self-report data, we recommend that future studies use parent, peer, or teacher reports to assess adolescents' victimization on Facebook, depressive symptoms and life satisfaction. Second, although prior studies report similar patterns of attrition (de Graaf, Bijl, Smit, Ravelli, & Vollebergh, 2000), there was a significant drop-out between Time 1 and Time 2. However, as participants who dropped out felt more depressed and were less satisfied with their life, it is likely that our associations would be even stronger if there was no drop-out between the two waves. Third, although offline and online peer victimization are closely related (Sumter et al., 2012), the present study did not control for amount of offline peer victimization in the final models. Future research is needed to examine whether online peer victimization continues to be associated to adolescents' psychosocial well-being, even after taking offline peer victimization into account.

### **Conclusion**

We believe the present study contributes to a deeper understanding of the reciprocal relationships between peer victimization on Facebook and adolescents' psychosocial well-being. Depressive symptoms and

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life dissatisfaction were found to be predictors of peer victimization on Facebook, whereas peer victimization on Facebook served as a marginally significant predictor of adolescents' life dissatisfaction. However, perceived friend support buffered this harmful impact of peer victimization on Facebook. The findings from our study provide further evidence that negative experiences have extended to social networking sites. By revealing that vulnerable teens are particularly likely to become victimized on social networking sites, the present study contributes to the identification of potential risk groups of peer victimization on Facebook. Intervention programs should focus on such high risk groups and must enhance awareness of the risks related to the use of social networking sites, as well the opportunities (i.e., perceived friend support) that can protect vulnerable youth against these risks.

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Table 1

*Prevalence of Negative Facebook Experiences at Time 1.*

A peer...	Once or twice (%)	A few times (%)	Once a week (%)	Many times a week (%)
1. ...I wanted to be friends with on Facebook ignored my friend request.	43	20	1	0.5
2. ...removed me from his/her list of Facebook friends.	35	11	1	0.5
3. ...made me feel bad by not listing me in his/her "Top Friends" list on Facebook.	13	7	2	0.5
4. ...posted mean things about me on a public Facebook page.	13	8	1	0.5
5. ...posted pictures of me on Facebook that made me look bad.	29	26	3	2
6. ...spread rumors about me or revealed secrets I had told them using public Facebook posts.	11	7	2	1
7. ...sent me a mean message on Facebook.	19	13	2	1
8. ...pretended to be me on Facebook and did things to make me look bad/damage my friendships.	9	6	2	1
9. ...prevented me from joining a group on Facebook that I really wanted to be a part of.	9	6	1	1
10. I found out that I was excluded from a party or social event over Facebook.	10	5	2	1
11. ...I was dating, broke up with me using Facebook.	14	6	1	1
12. ...made me feel jealous by "messaging" with my girlfriend/boyfriend on Facebook (i.e., posting pictures together, writing messages on their Facebook wall, etc.).	15	9	2	1

*Note.*  $N_{Time1} = 1,621$

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Table 2

*Descriptive Statistics.*

				Boys (53%)	Girls (47%)	Young adolescents (22%)	Middle adolescents (67%)	Late adolescents (11%)
	Min	Max	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)
Average daily time spent on FB (T1)	1	11	5.01 (2.89)	4.53 (2.76)	5.54 (2.94)	4.82 (2.84)	5.10 (2.94)	4.81 (2.69)
Negative FB experiences (T1)	1	5	1.45 (.53)	1.48 (.60)	1.42 (.44)	1.38 (.54)	1.47 (.51)	1.48 (.62)
Negative FB experiences (T2)	1	5	1.43 (.49)	1.43 (.55)	1.39 (.37)	1.43 (.55)	1.41 (.43)	1.41 (.50)
Depressive symptoms (T1)	1	4	1.83 (.63)	1.72 (.55)	1.94 (.68)	1.79 (.64)	1.84 (.63)	1.81 (.60)
Depressive symptoms (T2)	1	4	1.78 (.59)	1.65 (.50)	1.91 (.63)	1.75 (.61)	1.79 (.59)	1.74 (.51)
Life satisfaction (T1)	1	7	4.87 (1.39)	5.06 (1.29)	4.66 (1.45)	4.94 (1.45)	4.81 (1.39)	5.10 (1.17)
Life satisfaction (T2)	1	7	5.02 (1.30)	5.22 (1.20)	4.88 (1.34)	5.07 (1.35)	5.04 (1.28)	5.06 (1.16)
Perceived friend support (T1)	1	7	5.91 (1.15)	5.68 (1.22)	6.15 (1.02)	5.90 (1.20)	5.89 (1.16)	6.04 (.97)

*Note.* FB = Facebook; T1 = Time 1; T2 = Time 2;  $N_{\text{Time1}} = 1,621$



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Table 3

*Zero-Order Inter-Correlations.*

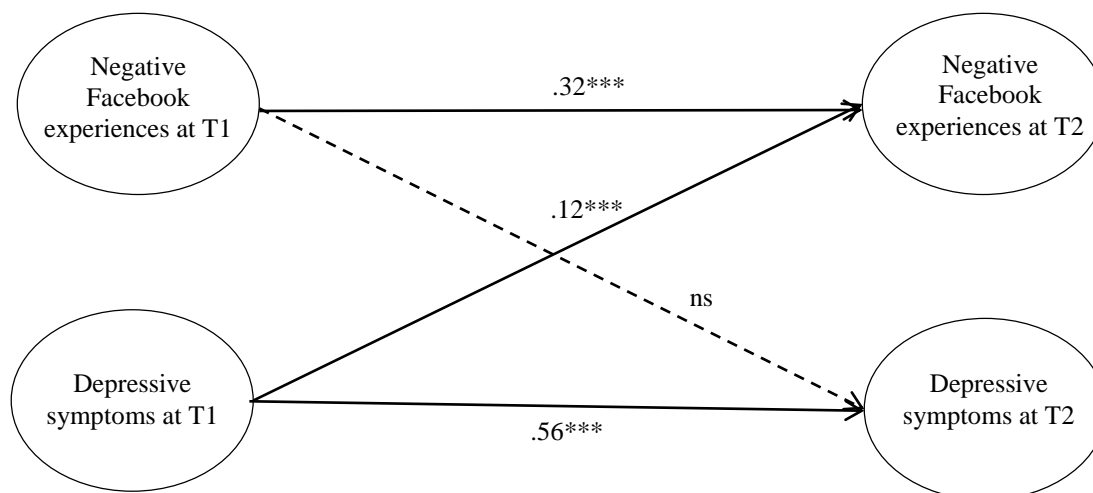
	1	2	3	4	5	6	7	8
1. Average daily time spent on FB (T1)	1	.19**	.10**	.15**	.11**	-.13**	-.09**	.08**
2. Negative FB experiences (T1)		1	.36**	.29**	.18**	-.17**	-.15**	-.12**
3. Negative FB experiences (T2)			1	.19**	.27**	-.16**	-.15**	-.11**
4. Depressive symptoms (T1)				1	.55**	-.58**	-.45**	-.27**
5. Depressive symptoms (T2)					1	-.42**	-.58**	-.11**
6. Life satisfaction (T1)						1	.63**	.26**
7. Life satisfaction (T2)							1	.16**
8. Perceived friend support (T1)								1

*Note.* FB = Facebook; T1 = Time 1; T2 = Time 2;  $N_{\text{Time1}} = 1,621$

\* $p < .05$ ; \*\* $p < .01$

## PEER VICTIMIZATION ON FACEBOOK AND ADOLESCENTS' WELL-BEING

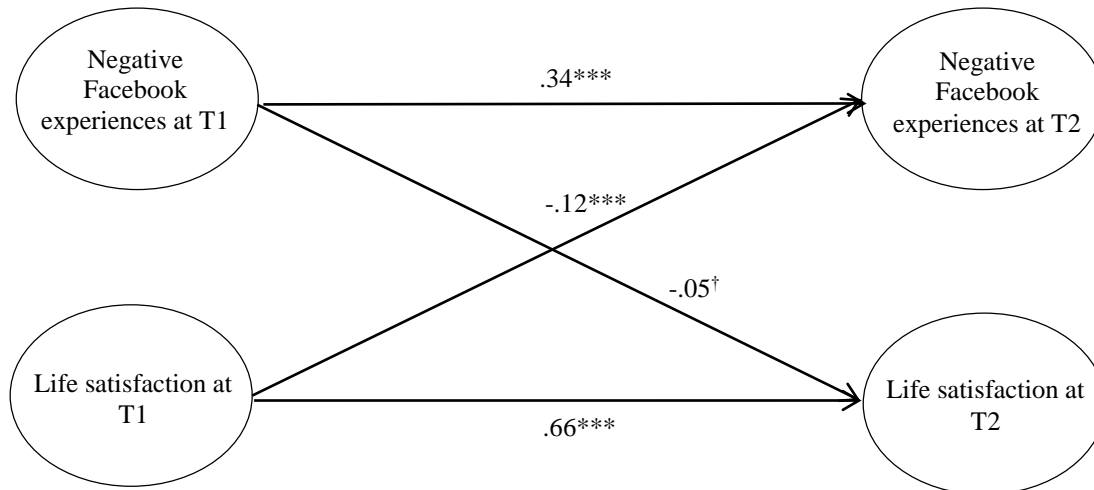
Figure 1. Final model examining the reciprocal relationships between negative Facebook experiences and adolescents' depressive symptoms. Note: values reflect standardized coefficients. All paths are significant at  $p < .05$ . For clarity, error terms, covariances, control variables, and measurements are not shown.



\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$

## PEER VICTIMIZATION ON FACEBOOK AND ADOLESCENTS' WELL-BEING

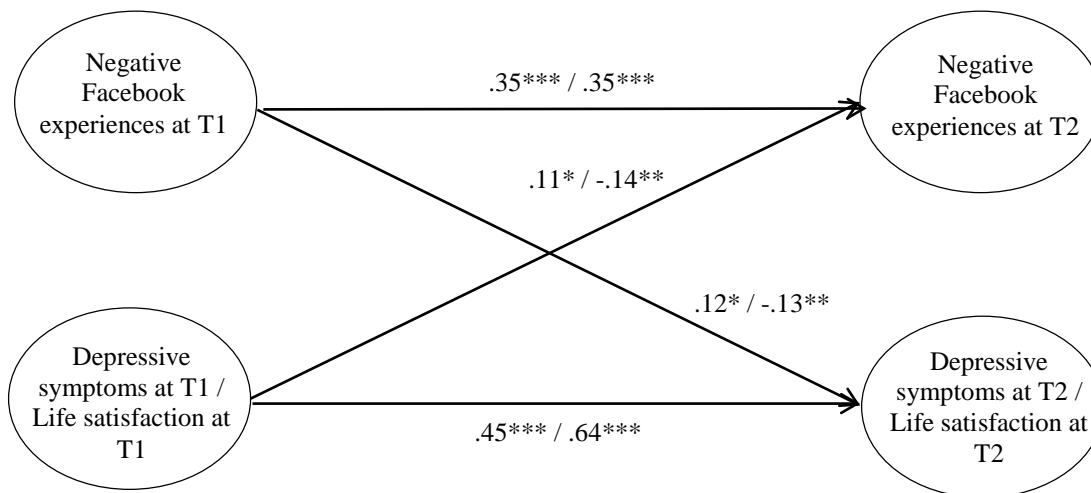
Figure 2. Final model examining the reciprocal relationships between negative Facebook experiences and adolescents' life satisfaction. Note: values reflect standardized coefficients. All paths are significant at  $p < .05$ ; all paths are marginally significant at  $p < .10$ . For clarity, error terms, covariances, control variables, and measurements are not shown.



$^{\dagger}p = .06$ ;  $*p < .05$ ;  $**p < .01$ ;  $***p < .001$

## PEER VICTIMIZATION ON FACEBOOK AND ADOLESCENTS' WELL-BEING

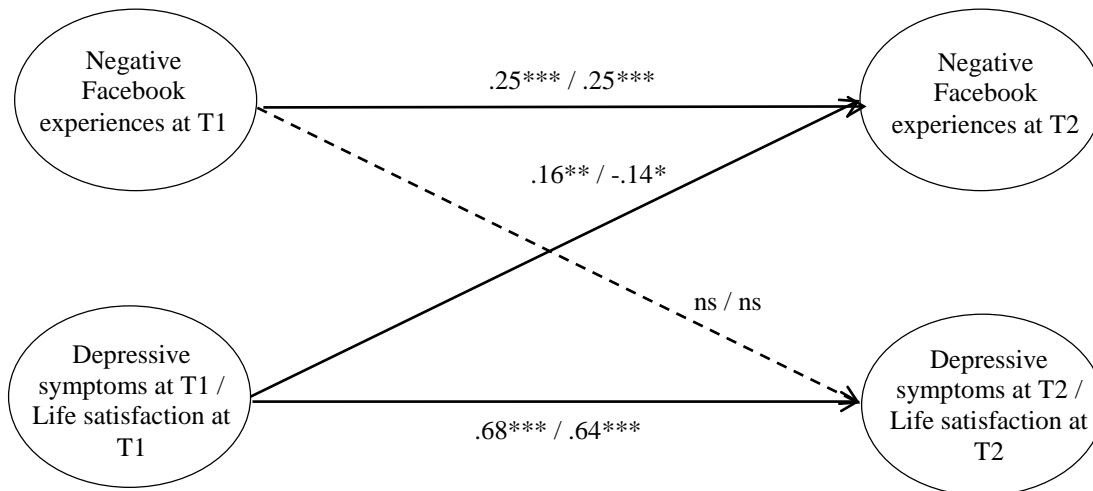
Figure 3. Final model examining the reciprocal relationships between negative Facebook experiences and adolescents' depressive symptoms / life satisfaction among those with the *lowest* levels of perceived friend support. *Note:* values reflect standardized coefficients. All paths are significant at  $p < .05$ . For clarity, error terms, covariances, control variables, and measurements are not shown.



\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$

## PEER VICTIMIZATION ON FACEBOOK AND ADOLESCENTS' WELL-BEING

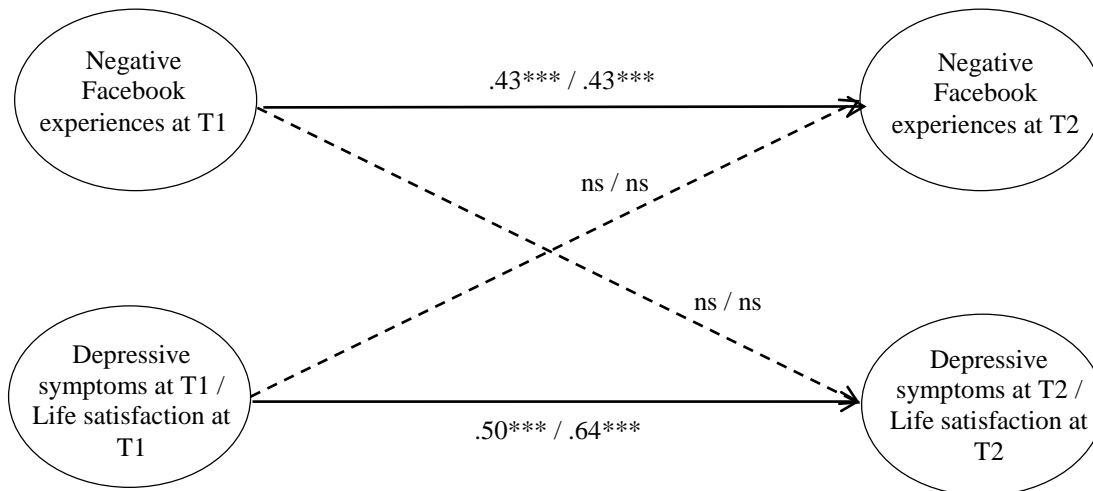
Figure 4. Final model examining the reciprocal relationships between negative Facebook experiences and adolescents' depressive symptoms / life satisfaction among those with *medium* levels of perceived friend support. *Note:* values reflect standardized coefficients. All paths are significant at  $p < .05$ . For clarity, error terms, covariances, control variables, and measurements are not shown.



\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$

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Figure 5. Final model examining the reciprocal relationships between negative Facebook experiences and adolescents' depressive symptoms / life satisfaction among those with the *highest* levels of perceived friend support. *Note:* values reflect standardized coefficients. All paths are significant at  $p < .05$ . For clarity, error terms, covariances, control variables, and measurements are not shown.



\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$