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Helpful or Harmful? The Different Relationships between Private Facebook
Interactions and Adolescents' Depressive Symptoms

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Abstract

The present study aims to provide greater insight into the role of two aspects of online peer interactions –perceived online social support and online co-rumination– in the short-term longitudinal relationship between private Facebook interactions and adolescents’ depressive symptoms. Special attention is given to gender differences. To test our hypotheses, a two-wave panel study was set up ($N_{\text{Time1}} = 1,840$). Using structural equation modeling, results showed that private Facebook interactions were concurrently positively related to boys’ and girls’ online co-rumination and online co-rumination was positively associated with boys’ and girls’ depressive symptoms. In addition, results revealed that private Facebook interactions were predictive of relative increases in boys’ and girls’ perceptions of online social support over time (i.e., six months later). Perceptions of online social support in turn were predictive of relative decreases in girls’ depressive symptoms over time. The discussion focuses on the understanding and implications of these findings.

Keywords: private Facebook interactions, perceived online social support, online co-rumination, depressive symptoms, adolescence

Helpful or Harmful? The Different Relationships between Private Facebook Interactions and Adolescents' Depressive Symptoms

Adolescence is a developmental period in which the prevalence of depressive symptoms increases substantially (e.g., Natsuaki, Biehl, & Ge, 2009). Depressive symptoms often precede major depressive disorders which in turn are associated with various risks, including depression later in life (e.g., Copeland, Shanahan, Costello, & Angold, 2010). Given this high prevalence and detrimental outcomes, we believe it is highly important to examine factors that are related to the development of depressive symptoms in adolescence.

Peer relationships play an important role in adolescents' psychological development (e.g., la Greca & Harrison, 2005). On the one hand, peer friendships can reduce the risk for the development of depressive symptoms, as friends can increase adolescents' perceptions of social support (e.g., Bokhorst, Sumter, & Westenberg, 2010). Perceived emotional support refers to "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). Although social support seekers can derive support from a number of sources, friends are perceived as one of the most supportive sources during adolescence (e.g., Bokhorst et al., 2010). This perceived friend support, in turn, has been shown to protect adolescents against the development of depressive symptoms (e.g., Rueger, Malecki, & Demaray, 2010).

On the other hand, some aspects of peer friendships can increase the risk for the development of depressive symptoms, as peers are also the ideal partners to discuss problems with (e.g., Rose, 2002), and thus, to co-ruminate. Co-rumination refers to "extensively discussing and revisiting problems, speculating about problems, and focusing on negative feelings" (Rose, 2002, p. 1830). Co-rumination is situated at the intersection of rumination and self-disclosure. On the one hand, co-rumination is related to the psychological concept

rumination (i.e., “behaviors and thoughts that focus one’s attention on one’s depressive symptoms and on the implications of these symptoms”; Nolen-Hoeksema, 1991, p. 569).

Both rumination and co-rumination are characterized by a strong, negative focus on problems and negative feelings. Nonetheless, they are clearly distinct as rumination occurs in an intrapersonal setting and co-rumination occurs within an interpersonal setting (Rose, 2002).

On the other hand, co-rumination is also associated with the concept of self-disclosure; both concepts refer to sharing personal thoughts and feelings. Although there is substantial overlap between the two, co-rumination’s resemblance with rumination makes it conceptually and functionally different from self-disclosure (e.g., Calmes & Roberts, 2008). Furthermore, whereas self-disclosure involves social sharing of both positive and negative topics, co-rumination purely comprises talking about problems.

According to the social penetration theory (Altman & Taylor, 1973), self-disclosure increases in both amount and breadth as relationships develop and become more intimate. These intimate disclosures have been frequently linked to various positive relational outcomes (e.g., Sprecher et al., 2004). Like self-disclosure, co-rumination has also been linked to positive relational outcomes, such as higher relationship quality (e.g., Rose, Carlson, & Waller, 2007). However, unlike self-disclosure, co-rumination has also been linked to negative affective outcomes, such as depressive symptoms (e.g., Spendelov, Simonds, & Avery, 2017). Co-rumination can therefore be considered as a specific type of mutual self-disclosure, that can have both harmful and helpful outcomes.

Thus, whereas some aspects of adolescent friendships may be adaptive in the context of depression (e.g., perceived social support), other aspects may be maladaptive (e.g., co-rumination). However, scholars have argued that, due to the rapid rise of social networking sites (SNSs) (e.g., Lenhart, 2015), adolescents’ peer interactions have expanded to an online context. Especially Facebook (FB) may be frequently used for peer communication (Lenhart,

2015), as various FB activities allow quick and easy interaction with friends. For instance, one study has shown that private FB activities (e.g., messaging) are especially used for peer interactions (Smock, Ellison, Lampe, & Wohn, 2011).

The present study therefore aims to examine two specific aspects of online peer interactions, i.e., perceived online social support and online co-rumination. More specifically, this study aims to investigate the indirect relationships (1) between private FB interactions, perceived online social support, and adolescents' depressive symptoms, and (2) between private FB interactions, online co-rumination, and adolescents' depressive symptoms, with special attention to gender differences.

In this study, we sought to build on and extend prior research on the relationship between FB use and adolescents' well-being in three ways. First, by examining two opposing indirect pathways, the study provides a broader understanding of the outcomes of adolescents' private FB interactions. Second, by investigating whether these indirect pathways differ between boys and girls, the study fills a critical gap of scholarly knowledge. This knowledge, in turn, may contribute to more advanced theory formation. Future prevention and intervention programs can subsequently target their efforts at those teens at risk. Third, by using a two-wave panel design, the study allows for insights into the short-term longitudinal relationship between private FB interactions and subsequent depressive symptoms, and possible influences of control variables can be ruled out.

Private FB Interactions and Adolescents' Depressive Symptoms

Due to the immense popularity of SNSs, Internet users' way of communicating has significantly changed over time. As a result, the American Academy of Pediatrics raised concerns about the impact of SNSs on children and adolescents' mental health (O'Keeffe & Clarke-Pearson, 2011). In line with these concerns, researchers began to examine the relationship between time spent on SNSs and young people's depressive symptoms.

However, results are inconsistent, as studies found positive relationships (e.g., Sampasa-Kanyinga & Lewis, 2015), but also no associations (e.g., Simoncic, Kuhlman, Vargas, Houchins, & Lopez-Duran, 2014) between time spent on SNSs and teens' well-being.

We expect that these inconsistent findings may be partly explained by the lack of nuance in previous studies. First, these studies mainly focused on general SNS use, such as the amount of time spent on FB (e.g., Simoncic et al., 2014). However, time spent on FB can be filled out in various ways, as some users mainly passively browse through others' FB profiles, whereas others primarily actively interact with their FB friends. In line with a scholarly call for more research on the outcomes of specific types of FB use (e.g., Smock et al., 2011), the present study will specifically focus on private FB interactions or "activities that facilitate direct interactions between the user and other FB friend(s) in a private FB setting" (e.g., a chat conversation via FB Messenger) (Frison & Eggermont, 2015b, p. 4).

Second, prior studies have paid little attention to indirect pathways. However, research has shown, first, that peer interactions have expanded to a SNS context (e.g., Reich, Subrahmanyam, & Espinoza, 2012) and, second, that the private FB platform is especially used for interactions with peers (Smock et al., 2011). We therefore have reasons to assume that specific aspects of online peer interactions –perceived online social support and online co-rumination– may play an important role in the relationship between private FB interactions and the development of depressive symptoms in adolescence.

Perceived Online Social Support and Online Co-Rumination

Based on prior research, we have reasons to assume that perceived social support and co-rumination have expanded to a SNS context. For instance, Hampton, Goulet, Rainie, and Purcell (2011) showed that FB users experienced higher levels of social support compared to other Internet users. In addition, various studies suggest that SNSs are not only used to share information like contact and personal information (e.g., school, address) (e.g., Christofides,

Muise, & Desmarais, 2009; Hinduja & Patchin, 2008; Liu, Ang, & Lwin, 2013), but also to share information about the self, such as thoughts and feelings (Christofides et al., 2012; Egan & Moreno, 2011; Van Gool, Van Ouytsel, Ponnet, & Walrave, 2015). For example, according to Christofides et al. (2009) the majority of undergraduates disclosed contact and personal information on FB, such as birth date (96%) and email address (85%). In addition, Van Gool et al. (2015) found that more than half of adolescent FB users ever disclosed personal information about their peer relationships on FB. Based on what we know from previous studies on self-disclosure through SNSs, it is likely to expect that SNSs may also be used for co-rumination. Although no study thus far empirically tested this claim, one study (Davila et al., 2012) did find associations between frequency of activities on SNSs and co-rumination, hereby providing initial evidence for the assumption that FB offers individuals a new platform for co-rumination.

Social support and co-rumination, however, may be perceived as more intimate when taking place in an online, as opposed to an offline context. This reasoning is based on Walther's (1996) hyperpersonal model, which argues that computer-mediated communication (CMC) affords message senders a wide range of communicative advantages over traditional face-to-face communication. For instance, textual and asynchronous features of CMC afford social media users to easily edit photos and carefully disclose messages, but also to rapidly request and give feedback. As a result of these specific affordances, CMC exchanges are more intimate and expected to lead to more intense connections than face-to-face communication (Walther, 1996).

Furthermore, perceived online social support and online co-rumination may be closely related to one another. Boren (2013), for instance, suggested that co-ruminative messages are perceived as a type of social support. In line with this suggestion, it is feasible that those who co-ruminate with their FB friends may perceive more social support, as talking about

problems repeatedly and in detail may increase one's perception that he or she is appreciated and cared about. In addition, it also is plausible that those who perceive social support from their FB friends may co-ruminate more with them, as one's belief that he or she is appreciated and cared about, may increase the likelihood that he or she will feel more relaxed talking about problems repeatedly and in detail. In line with these expectations, Rose et al. (2007) revealed that co-rumination predicted increased positive friendship quality over time in girls, which in turn, contributed to greater co-rumination in girls.

Private FB Interactions - Perceived Online Social Support - Depressive Symptoms

We expect that FB interactions will predict relative increases in adolescents' perceptions of social support, as FB facilitates quick distribution of content (e.g., Ellison & Vitak, 2015) and connection with other users (e.g., Treem & Leonardi, 2012). More specifically, through FB interactions users cannot only easily broadcast their preferences, knowledge, and behaviors, but also request support at any given point in time. In addition, through FB interactions users can also create connection, as others can easily respond to a social support request on FB. These specific FB affordances hereby increase opportunities for social support seeking and receiving, which in turn may increase adolescent users' perceptions of social support. Interacting in a private FB setting, however, may particularly stimulate adolescents' perceptions of social support, as this type of setting offers users a safe and confidential environment and may therefore be particularly useful for more close, meaningful relations and thus for social support seeking and receiving.

Whereas the majority of prior studies examined associations between perceptions of online social support and young people's general FB use (e.g., FB intensity, time spent on FB, number of FB friends) (e.g., Liu & Yu, 2013; Oh, Ozkaya, & LaRose, 2014), only few studies examined its relationship with specific types of FB use (e.g., Frison & Eggermont, 2015a; Manago, Taylor, & Greenfield, 2012). For instance, in line with our expectations,

Frison and Eggermont (2015a) found a positive association between private FB activities and adolescents' perceptions of online social support.

Furthermore, we expect that perceived online social support will predict relative decreases in adolescents' depressive symptoms. Similar processes in the offline context have been explained by the main effects model (Cohen & Wills, 1985). This model proposes that greater levels of perceived social support directly enhance individuals' well-being, regardless of the experienced amount of stress. In line with this model, research has found that perceived friend support is associated with lower levels of adolescents' depressive symptoms (e.g., Rueger, Malecki, & Demaray, 2010). Regarding perceived online social support, some cross-sectional studies revealed non-significant associations between perceived online social support and college students' well-being (e.g., McCloskey, Iwanicki, Lauterbach, Giammittorio, & Maxwell, 2015), whereas others reported positive associations (e.g., Frison & Eggermont, 2015ab; Wright, 2012). However, no study thus far examined the longitudinal association between perceived online social support and adolescents' depressive symptoms.

Hypothesis 1: Private FB interactions will negatively predict depressive symptoms, through perceived online social support.

Private FB Interactions – Online Co-Rumination – Depressive Symptoms

We expect that FB interactions will predict relative increases in adolescents' online co-rumination. In line with this expectation, the literature already suggests that SNS interactions can stimulate self-disclosure (e.g., Trepte & Reinecke, 2012). We believe that the private FB platform in particular may be a useful setting for extensively discussing and revisiting problems, as private interactions may be perceived as more trustworthy than public interactions (Valenzuela, Park, & Kee, 2009). In line with this assumption, adolescents report that intimate online exchanges indeed occur through private media channels, such as the private messaging features on FB (Davis, 2012). In addition, Bazarova and Choi (2014)

found that FB users disclosed more intimate information in private communication compared to public status updates and wall posts. Similarly, Utz (2015) revealed that private conversations on SNSs were rated as more intimate than own and friends' status updates.

Building on these insights, it is therefore likely to expect that private FB interactions may also stimulate online co-rumination. Although prior studies found positive associations between FB use and users' tendency to ruminate (Tran & Joormann, 2015), to our knowledge, only one study thus far examined and found support for an association between FB use and individuals' tendency to co-ruminate (Davila et al., 2012).

Furthermore, we expect that online co-rumination will predict relative increases in adolescents' depressive symptoms. This expectation builds on research that demonstrated cross-sectional (e.g., Rose, 2002; Starr & Davila, 2009) and longitudinal (e.g., Hankin, Stone, & Wright, 2010; Rose et al., 2007) associations between offline co-rumination and adolescents' depressive symptoms. For instance, Hankin et al. (2010) found that co-rumination predicted teens' depressive symptoms over a period of five months. However, no study thus far examined the longitudinal relationship between online co-rumination and adolescents' depressive symptoms.

Hypothesis 2: Private FB interactions will positively predict depressive symptoms, through online co-rumination.

Gender Differences

As prior research consistently showed that female FB users report more private FB interactions (e.g., Joiner et al., 2014) and that girls report a greater increase in their depressive symptoms over time (e.g., Hankin & Abramson, 1999), the present study will also explore whether the hypothesized indirect relationships differ between boys and girls. Although some cross-sectional studies have examined gender as a moderator in the relationship between active SNS use and depressive symptoms (e.g., Simoncic et al., 2014), no study thus

far investigated whether the indirect relationships between private FB interactions and adolescents' depressive symptoms differ between boys and girls.

First, we expect that the indirect relationship between private FB interactions, perceived online social support, and adolescents' depressive symptoms will be stronger for girls than for boys, as studies have pointed out gender differences in online social support (e.g., Wright et al., 2013), with females being more satisfied with their FB social support than males. Although studies examined the direct associations between active FB use and young people's perceptions of social support (e.g., Manago et al., 2012), only one study thus far paid attention to gender differences within this relationship (Frison & Eggermont, 2015a), revealing positive relationships for girls, but not for boys. More support has been found for a moderating role of gender within the association between perceived friend support and depression, both in an offline (e.g., Kendler, Myers, & Prescott, 2005) and online (Frison & Eggermont, 2015a) context, revealing stronger relationships for girls.

Second, we expect that the indirect relationship between private FB interactions, online co-rumination, and adolescents' depressive symptoms will be stronger for girls than for boys, as girls tend to engage in longer dyadic interactions (e.g., Benenson et al., 1997) and disclose more about themselves in these interactions (e.g., Rose & Rudolph, 2006). Also in an online context, boys' and girls' online self-disclosure differs (Davis, 2012; Valkenburg, Sumter, & Peter, 2011). For instance, Davis (2012) revealed that adolescent girls were more likely than adolescent boys to report engaging in intimate online exchanges. In addition, different studies explored gender as a moderator in the association between offline co-rumination and adolescents' depressive symptoms. Although some of them failed to find different associations between co-rumination and depressive symptoms for girls and boys (e.g., Hankin et al., 2010; Starr & Davila, 2009), Rose et al. (2007) did reveal a significant relationship between co-rumination and future depressive symptoms in girls, but not in boys.

Hypothesis 3: The hypothesized relationships will be stronger for girls than for boys.

Method

Procedure

Participants completed paper-and-pencil questionnaires at two time points, with a six-month interval. In March 2014, the first data collection was conducted in 15 randomly selected high schools in [region deleted for peer review], the northern part of [country deleted for peer review]. In October 2014, a second questionnaire was administered in the same schools. Informed consent was obtained in accordance with the customary guidelines in [country deleted for peer review]. Respondents were asked to fill out separate identification forms at Time 1 and Time 2 in order to track them over time. Ethical approval for the study procedures was received from the institutional review board of the host university.

Participants

At baseline, 1,840 adolescents filled out the questionnaire. In the second wave, 1,577 adolescents participated. A total of 1,235 students completed the questionnaires for both waves (67% of the first wave). As this study focuses on a specific FB usage pattern (i.e., private FB interactions), we only included those participants who had a FB account at Time 1 and Time 2 in our analyses ($N_{\text{Time1}} = 1,621$). At baseline, these participants (52% boys) ranged in age from 12 to 19 years ($M = 14.76$; $SD = 1.41$). At Time 1, participants answered questions about their gender, age, time spent on FB, private FB interactions, online co-rumination, perceived online social support, and depressive symptoms. At Time 2, participants again answered questions about online co-rumination, perceived online social support, and depressive symptoms.

Attrition at the six-month follow-up was primarily due to change of school or school absence on the day of the assessment. In order to examine whether attrition biased our sample, we examined differences between participants who completed both questionnaires

and participants who completed only one. A multivariate analysis of variance (i.e., MANOVA) with all baseline measures as dependent variables revealed significant differences between those who participated in both waves and those who participated in one wave only ($V = .01$, $F(5, 1206) = 2.42$, $p < .05$, $h_p^2 = .01$). Follow-up univariate analyses (i.e., ANOVA) showed that adolescents who participated in both waves scored lower on depressive symptoms ($M = 1.79$; $SD = .60$), compared to those who participated in one wave only ($M = 1.92$; $SD = .66$), $F(1, 1556) = 12.06$, $p = .001$. This might have led to an underestimation of the associations found in this study. For instance, inclusion of the dropouts in the second wave could have resulted in stronger relationships, because of the higher scores on depressive symptoms.

Measures

Control variables. Participants responded to questions about gender and age. In addition, participants completed four questions about their time spent on FB on a 11-point Likert Scale (i.e., 0h (=0); 0.5h (=1); 0.5–1h (=2); 1–1.5 h (=3); 1.5– 2h (=4); 2–2.5 h (=5); 2.5–3h (=6); 3–4h (=7); 4– 5h (=8); more than 5h (=9); and I am always logged into FB (i.e., I’m constantly ‘online’ and available for interaction) (=10). Participants estimated how much time they spend on FB on a regular weekday (Mon–Fri) and weekend day (Sat–Sun). We distinguished Wednesdays from regular weekdays, because Wednesday is the only weekday when participants have a half-day at school and thus may spend more time on FB compared to a regular weekday. A composite score of the daily time spent on FB at Time 1 was computed by calculating the average of the time spent on a typical weekday, weekend day, Wednesday and Friday.

Private FB interactions. To measure adolescents’ private FB interactions, we consulted and adapted the two-item subscale ‘active private FB use’ of the Multidimensional Scale of Facebook Use (MSFU; Frison & Eggermont, 2015b). As we are particularly

interested in private FB interactions, we added two items to this subscale. Using a seven-point Likert Scale (1 = *never* to 7 = *several times per day*), participants were asked: “How often do you chat with someone on FB?”, “How often do you send someone a personal message on FB?”, “How often do you receive a personal message on FB?” and “How often do you reply to a personal message on FB?”. Principal component analysis indicated that all items loaded on one factor (eigenvalue = 3.41; explained variance = 85.19%; $\alpha_{\text{Time1}} = .94$). Based on the average of these items, an estimate of participants’ private FB interactions at Time 1 was created.

Online co-rumination. The Co-Rumination Questionnaire (CRQ; Rose, 2002) is a 27-item self-report questionnaire that measures the extent to which youth typically co-ruminate with their closest, same-sex friend using a five-point Likert Scale (1 = *not at all true* to 5 = *really true*). Nine content areas are covered, including (a) frequency of discussing problems, (b) discussing problems instead of engaging in other activities, (c) friend encouraging discussion of problems, (d) target child encouraging friend to discuss problems, (e) discussing the same problem repeatedly, (f) speculation about causes, (g) speculation about consequences, (h) speculation about parts of the problem that are not understood, and (i) focusing on negative feelings. Item scores sum up to one total score. For the present study, a short version with nine items -one for each of the nine content areas- was used (Hankin et al., 2010) and each item was slightly adapted to measure online co-rumination. For example, the item “When we talk about a problem that one of us has, we’ll talk about every part of the problem over and over” now reads “When we chat on FB about a problem that one of us has, we’ll talk about every part of the problem over and over”. Previous research has indicated that the nine-item version has good internal consistency (e.g., Hankin et al., 2010). Internal consistency of these adapted set of items was high ($\alpha_{\text{Time1}} = .94$; $\alpha_{\text{Time2}} = .93$). Therefore an index of participants’ online co-rumination at Time 1 and Time 2 was

created, based on the average of these nine items.

Perceived online social support. To assess participants' perceptions of online social support, we adapted the family subscale of the Multidimensional Scale of Perceived Social Support (MSPSS; Zimet, Dahlem, Zimet, & Farley, 1988) to a FB context. Using a five-point Likert Scale (1 = *strongly disagree* to 5 = *strongly agree*), participants were asked to evaluate four items: "When you are feeling down or in a difficult situation ...". The items were: (1) "I can find help on FB", (2) "I can find the emotional help and support that I need on FB", (3) "I can talk with someone on FB about my problems", and (4) "I can find someone on FB that helps me take decisions". The items showed high internal consistency ($\alpha_{\text{Time1}} = .96$; $\alpha_{\text{Time2}} = .96$). The mean score was used as an index of adolescents' perceived online social support at Time 1 and Time 2.

Depressive symptoms. Depressive symptoms were measured using the 10-item version of the Center for Epidemiological Studies Depression Scale for Children (CES-D) (Irwin, Haydari, & Oxman, 2012). Each item is rated on a four-point Likert Scale (1 = *not at all* to 4 = *a lot*) (e.g., "The last week, how often did you felt too tired to do things?"). Based on principal component analysis, three items were deleted because they produced factor loadings less than .50. All remaining items loaded on one factor (Time 1: eigenvalue = 3.53; explained variance = 50.43%; $\alpha_{\text{Time1}} = .83$; Time 2: eigenvalue = 3.50; explained variance = 50.03%; $\alpha_{\text{Time2}} = .83$). An index of adolescents' depressive symptoms at Time 1 and Time 2 was created, based on the average of the seven items.

Data Analysis Plan

Our hypotheses were tested with structural equation modeling (AMOS), using the full information maximum likelihood procedure. To determine the goodness-of-fit of the models, we used the chi-squared to degrees of freedom ratio (χ^2/df), the root mean square error of approximation (RMSEA), and the comparative fit index (CFI) (Byrne, 2010).

As perceived online social support and online co-rumination were expected to be related to one another, we included two paths in our final model: a path from perceived online social support at Time 1 to online co-rumination at Time 2 and a path from online co-rumination at Time 1 to perceived online social support at Time 2.

All analyses controlled for the baseline values of participants' gender, age and time spent on FB by adding them as predictors for the endogenous variables in our model and by allowing covariances with each other and with other Time 1 variables. In addition, we controlled for prior time points (e.g., depressive symptoms at Time 1 as a predictor of depressive symptoms at Time 2).

Bootstrapping was used to assess the significance of indirect pathways (Cheung & Lau, 2007). Given that the AMOS bootstrapping procedure does not allow the sample to include missing values, the SPSS multiple imputation procedure was performed first (Honaker & King, 2010). This produces multiple data sets in which the missing values are imputed based on the available data. To test for indirect effects, the five imputed datasets were analyzed using the AMOS bootstrapping procedure (i.e., 1000 bootstrap samples; 95% confidence interval (CI)). To calculate the separate indirect effects, we created user-defined estimands.

To test whether the relationships differed between boys and girls, we conducted a multiple group analysis. This analysis compares 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 ($p < .05$), a path-by-path analysis was performed to examine whether the relationships significantly differed between the two groups; we compared an unconstrained model with a model where the hypothesized relationship was constrained to be equal for boys and girls. If

$\Delta \chi^2$ was significant ($p < .05$), we could conclude that gender significantly moderated the relationship.

Results

Descriptive Statistics

Means, standard deviations and range of all variables are presented in Table 1, both for the entire sample and separately for boys and girls. A MANOVA with all relevant baseline measures as dependent variables and gender as independent variable revealed significant differences between boys and girls ($V = .10$, $F(5, 1194) = 25.36$, $p < .001$, $h_p^2 = .10$). Separate independent ANOVA-tests showed that girls scored higher on time spent on FB at Time 1 ($F(1, 1588) = 49.92$, $p < .001$), private FB interactions at Time 1 ($F(1, 1547) = 43.09$, $p < .001$), online co-rumination at Time 1 ($F(1, 1352) = 83.54$, $p < .001$), and depressive symptoms at Time 1 ($F(1, 1533) = 51.81$, $p < .001$). No gender differences were found regarding perceived online social support at Time 1. Table 1 also presents the zero-order correlations with regard to all relevant variables in the model, separately for boys and girls.

[Table 1 about here]

Hypothesized Model

The hypothesized model showed a good fit to the data and yielded a chi-square value of 4778.17 with 968 degrees of freedom, $p < .001$; RMSEA = .05; CFI = .93; $\chi^2/df = 4.94$. First, regarding the correlations, results showed that depressive symptoms at Time 1 were correlated with private FB interactions at Time 1 ($\beta = .10$; $p < .001$), marginally correlated with online co-rumination at Time 1 ($\beta = .03$; $p < .10$), and negatively correlated with perceived online social support at Time 1 ($\beta = -.19$; $p < .001$).

Second, regarding the relationships between perceived online social support and online co-rumination, results showed that perceived online social support at Time 1 positively predicted online co-rumination at Time 2, $\beta = .13$, $B = .06$, $SE = .01$, $p < .001$; however,

online co-rumination at Time 1 was unrelated to perceived online social support at Time 2 ($p > .05$).

Third, regarding the hypothesized pathways, no significant relationship between private FB interactions at Time 1 and adolescents' depressive symptoms at Time 2 was found ($p > .05$). Private FB interactions at Time 1 positively predicted adolescents' online co-rumination at Time 1, $\beta = .18$, $B = .16$, $SE = .04$, $p < .001$, but not at Time 2 ($p > .05$). Online co-rumination at Time 2 positively predicted adolescents' depressive symptoms at Time 2, $\beta = .09$, $B = .08$, $SE = .03$, $p < .01$, but online co-rumination at Time 1 was unrelated to adolescents' depressive symptoms at Time 2 ($p > .05$). Private FB interactions at Time 1 positively predicted adolescents' perceptions of online social support at Time 1, $\beta = .23$, $B = .34$, $SE = .04$, $p < .001$, and Time 2, $\beta = .10$, $B = .13$, $SE = .04$, $p < .001$. Perceptions of online social support at Time 1 ($\beta = -.06$, $B = -.02$, $SE = .01$, $p < .05$) and Time 2 ($\beta = -.08$, $B = -.04$, $SE = .01$, $p < .01$) both negatively predicted adolescents' depressive symptoms at Time 2. All predictors in the model explained 36% of the variance in adolescents' depressive symptoms ($R^2 = .36$) (see Figure 1).

[Figure 1 over here]

Testing indirect effects. Through bootstrapping method and user defined estimands, indirect effects could be calculated. Results revealed four significant indirect effects of private FB interactions at Time 1 on girls' depressive symptoms at Time 2: first, through perceived online social support at Time 2 ($-.01 = .09 * -.14$; $CI = [-.017; -.002]$; $p < .01$), second, through perceived online social support at Time 1 and perceived online social support at Time 2 ($-.01 = .25 * .44 * -.14$; $CI = [-.017; -.004]$; $p = .001$), third, through perceived online social support at Time 1 and online co-rumination at Time 2 ($.002 = .21 * .14 * .09$; $CI = [.000; .005]$; $p < .01$), and fourth, through online co-rumination at Time 1 and online co-rumination at Time 2 ($.003 = .17 * .35 * .09$; $CI = [.001; .007]$; $p = .01$).

Gender Differences

To test moderation by gender, we conducted a multiple group comparison test. The moderated model showed a good fit to the data: $\chi^2(1862) = 6562.98, p < .001$; RMSEA = .04; CFI = .91; $\chi^2/df = 3.53$. When comparing the unconstrained model with the constrained model, results suggested that our hypothesized model significantly differed between boys and girls, $\Delta \chi^2(24) = 64.06, p < .001$.

Follow-up path-by-path analyses revealed that the relationship between perceived online social support at Time 1 and adolescents' depressive symptoms at Time 2 differed between boys and girls, [$\Delta \chi^2(1) = 13.43, p < .001$], with perceived online social support at Time 1 negatively predicting girls' depressive symptoms at Time 2, $\beta = -.14, B = -.06, SE = .02, p < .001$, but not boys' depressive symptoms at Time 2, $p > .05$. The model for boys is presented in Figure 2 and the model for girls is presented in Figure 3.

[Figure 2 over here]

[Figure 3 over here]

Testing indirect effects for girls. Using bootstrapping method and user-defined estimands indirect effects could be calculated. Different from boys, results revealed a significant indirect effect of private FB interactions at Time 1 on girls' depressive symptoms at Time 2, through perceived online social support at Time 1 ($-.02 = .21 * -.10$; CI = $[-.036; -.005]$; $p < .01$).

Additional Analyses

In addition, we compared the means of private FB interactions at Time 1 and Time 2 in (1) the group that scored low on the CES-D at Time 1, but high at Time 2 and in (2) the group that scored high on the CES-D at Time 1, but low at Time 2. A paired-samples t-test revealed that among participants who scored low on the CES-D at Time 1, but high at Time 2 ($N = 142$), the mean of private FB interactions at Time 1 ($M = 5.02; SD = 1.68$) was not statistically

different from the mean of private FB interactions at Time 2 ($M = 5.15$; $SD = 1.55$), $t(141) = -1.07$; $p > .05$. However, participants who scored high on the CES-D at Time 1, but low at Time 2 ($N = 120$), reported a higher level of private FB interactions at Time 2 ($M = 5.39$; $SD = 1.58$) than at Time 1 ($M = 5.14$; $SD = 1.46$). The paired-samples t-test revealed this to be a statistically significant difference, $t(119) = -2.06$; $p < .05$.

Furthermore, we tested a model which examined the reverse relationships between depressive symptoms at Time 1, online co-rumination at Time 1 and Time 2, perceived online social support at Time 1 and Time 2, and private FB interactions at Time 2. The model showed a good fit to the data and yielded a chi-square value of 4737.52 with 841 degrees of freedom, $p < .001$; RMSEA = .05; CFI = .94; $\chi^2/df = 5.63$. First, results showed that perceived online social support at Time 1 positively predicted online co-rumination at Time 2, $\beta = .15$, $B = .06$, $SE = .01$, $p < .001$; however, online co-rumination at Time 1 was unrelated to perceived online social support at Time 2 ($p > .05$). Second, depressive symptoms at Time 1 positively predicted adolescents' private FB interactions at Time 2, $\beta = .08$, $B = .06$, $SE = .01$, $p < .001$. Third, depressive symptoms at Time 1 positively predicted adolescents' online co-rumination at Time 1, $\beta = .05$, $B = .07$, $SE = .04$, $p = .05$, but not at Time 2 ($p > .05$). Online co-rumination at Time 2 positively predicted adolescents' private FB interactions at Time 2, $\beta = .10$, $B = .14$, $SE = .03$, $p < .001$, whereas online co-rumination at Time 1 negatively predicted adolescents' private FB interactions at Time 2, $\beta = -.07$, $B = -.07$, $SE = .02$, $p < .01$. Fourth, depressive symptoms at Time 1 negatively predicted adolescents' perceptions of online social support at Time 1, $\beta = -.20$, $B = -.46$, $SE = .06$, $p < .001$, but not at Time 2 ($p > .05$). Perceptions of online social support at Time 2 positively predicted adolescents' private FB interactions at Time 2 ($\beta = .12$, $B = .08$; $SE = .02$, $p < .001$), but perceptions of online social support at Time 1 were unrelated to private FB

interactions at Time 2 ($p > .05$). All predictors in the model explained 41% of the variance in adolescents' private FB interactions ($R^2 = .41$) (see Figure 4).

[Figure 4 over here]

Discussion

The aim of this study was to investigate the role of two aspects of online peer interactions –perceived online social support and online co-rumination– in the short-term longitudinal relationship between private FB interactions and adolescents' depressive symptoms. Special attention was given to the role of gender in these indirect relationships. Results revealed that private FB interactions can be helpful for girls, if private FB interactions predict increases in girls' perceptions of online social support.

Private Facebook Interactions and Adolescents' Depressive Symptoms

First, results revealed that depressive symptoms are predictive of relative increases in private FB interactions, rather than the other way round. This finding can be explained by the Mood Management Theory (Zillman, 1988). According to this theory, people in negative moods seek media that are capable to improve their mood, while individuals in positive moods seek media that are capable to maintain their mood. Various empirical studies support this theory (Dillman Carpentier et al., 2008; Johnson & Knobloch-Westerwick, 2014). Building on this theory, it is therefore not surprising that depressive adolescents are especially attracted to social media such as SNSs, for interacting with others, as private Facebook interactions may distract these adolescents from their depressive feelings and subsequently may improve their mood.

This finding is also in line with prior studies revealing a positive relationship between depressive feelings and FB addiction (e.g., Blachnio, Przepiorka, & Pantic, 2015; Koc & Gulyagci, 2013) and status updating (Scherr & Brunet, 2017). More specifically, a recent study by Sherr and Brunet (2017) found that increasing depressive tendencies were related to

an increased frequency of posting status updates among young FB users. These authors argue that depressed FB users may especially use FB for status updating as this type of FB use allows users to build up a network that they can count on during an episode of depression, or in other words, when in need of support. Furthermore, other studies have shown that individuals with health problems actively seek social support through SNSs (e.g., Oh et al., 2013), as online social support seeking offers distressed people various benefits, including the possibility to easily form and maintain in-depth relationships with similar others.

Perceived Online Social Support

In line with the first hypothesis, results revealed that private FB interactions were related to boys' and girls' perceptions of online social support but, more importantly, were also predictive of relative increases in boys' and girls' perceptions of online social support over time (i.e., six months later). In addition, although perceptions of online social support were associated with both boys' and girls' depressive symptoms, perceptions of online social support were only predictive of relative decreases in *girls'* depressive symptoms over time.

On the one hand, these findings confirm our expectations that specific affordances related to private FB interactions, such as quick distribution of content (Ellison & Vitak, 2015) and connection with other users (Treem & Leonardi, 2012) facilitate adolescent users' perceptions of online social support. In addition, these results were in line with previous cross-sectional studies showing a positive association between FB use and increased perceptions of offline (e.g., Oh et al., 2014) and online (e.g., Frison & Eggermont, 2015a) social support. On the other hand, these results are also in line with the main effects model (Cohen & Wills, 1985) and previous cross-sectional studies (e.g., Wright, 2012). However, these findings extend prior studies by showing that private FB interactions were not only cross-sectionally but also longitudinally related to perceived online social support.

Moreover, this study is the first to examine the short-term longitudinal association between

perceptions of online social support and adolescents' well-being, hereby confirming that perceived online social support has beneficial outcomes similar to offline social support.

Gender differences. In line with the third hypothesis, findings confirm that the indirect relationship between private FB interactions, perceived online social support, and adolescents' depressive symptoms is stronger among girls, as perceptions of online social support were predictive of relative decreases over time in girls' depressive symptoms, but not in boys' depressive symptoms. Thus, although increased perceptions of online social support were negatively related to both boys' and girls' development of depressive symptoms, only among girls, these increased perceptions of online social support were beneficial in the long run (i.e., six months later).

Based on these findings, we can conclude that private FB interactions can be helpful for girls, but not for boys. Rose and Rudolph (2006) argue that the significant differences in boys' and girls' peer relationships may explain these differential outcomes. For instance, it may be that girls receive greater benefits of perceiving support from their friends, as girls' social interactions tend to involve more intimacy (e.g., McNelles & Connolly, 1999) and empathy (e.g., van Tilburg, Unterberg, & Vingerhoets, 2002), than boys' social interactions. Future research is needed to test this assumption and to explore more in-depth why increased perceptions of online social support are helpful for girls, but not for boys.

Reverse relationship. Additional analyses revealed that depressive symptoms were negatively related to perceptions of online social support but were not predictive of relative decreases in perceptions of online social support over time. Perceptions of online social support, in turn, were positively associated with private FB interactions, but were not predictive of relative increases in private FB interactions over time. These findings hereby further confirm our expectations that private FB interactions are indirectly related to relative

decreases in adolescents' depressive symptoms, through perceived online social support, rather than the other way round.

Online Co-Rumination

Results further showed that private FB interactions were related to both boys' and girls' online co-rumination; however, private FB interactions were not predictive of relative increases in adolescents' online co-rumination over time. In addition, although online co-rumination was associated with both boys' and girls' depressive symptoms, online co-rumination was not predictive of relative increases in adolescents' depressive symptoms over time. No longitudinal support was thus found for the hypothesized indirect relationship between private FB interactions, online co-rumination, and adolescents' depressive symptoms. Hypothesis 2 could therefore not be confirmed.

First, these results are in line with the findings of Davila et al. (2012), who found preliminary support for a correlational relationship between FB use and co-rumination. Davila et al. (2012), however, focused on time spent on FB, whereas our study focused on a specific type of FB use, i.e., interactions in a private FB setting. Our findings thus extend the literature by revealing that interacting with peers on FB in a private setting is related to excessive and repeated discussion of problems on FB. Our findings hereby confirm our idea that private FB interactions may not exclusively stimulate discussions about positive events, but can equally stimulate excessive talks about negative events.

Second, although our results suggest that interacting in a private FB setting may stimulate co-rumination on FB at the same moment, it does not stimulate co-rumination on FB in the long run (i.e., six months later). Similarly, although our results suggest that adolescents may feel more depressed at the moment when they co-ruminate on FB, our results show that these depressed feelings disappear after a certain amount of time. Our findings thus imply that the risks related to private FB interactions (i.e., online co-rumination)

and online co-rumination (i.e., depressive symptoms) are more short-lived than expected. In other words, the impact of private FB interactions and online co-rumination may probably be more fleeting and ephemeral compared to interactions in a face-to-face context or compared to offline co-rumination. More research is therefore needed to examine why this is the case.

Gender differences. Findings revealed that the indirect relationship between private FB interactions, online co-rumination, and adolescents' depressive symptoms was not stronger among girls. Both in boys and girls, private FB interactions were related to online co-rumination and online co-rumination was related to the development of depressive symptoms. Hypothesis 3 could thus not be confirmed.

As our study was the first to investigate the moderating role of adolescents' gender within the indirect association between private FB interactions, online co-rumination, and adolescents' depressive symptoms, we relied on insights from the literature about offline co-rumination (Rose et al., 2007). Contrary to the offline literature, our results revealed that online co-rumination has similar, rather than different implications for boys and girls. More research is thus needed to examine how offline co-rumination differs from online co-rumination in order to better understand the differential relationships in boys vs. girls.

Reverse relationship. Additional analyses revealed that depressive symptoms were positively related to online co-rumination but were not predictive of relative increases in co-rumination over time. Online co-rumination, in turn, was positively associated with private FB interactions, but predictive of relative *decreases* in private FB interactions over time. These results reveal that online co-rumination is predictive of decreases in private FB interactions over time, rather than private FB interactions being related to increases in online co-rumination over time. A plausible explanation for this somewhat unexpected finding is that adolescents might apply strategies that help to avoid further online co-rumination, given the explicit focus on negative feelings that is typical for co-rumination. One potential

strategy is that adolescents will engage in less interactions in a private FB setting, as adolescents may link such interactions to potential co-ruminative conversations. This thus might explain why co-rumination is predictive of decreases, rather than increases, in private FB interactions over time.

Implications

Our findings have important implications. First, this study shows that FB functions as a new platform for adaptive peer interactions (i.e., perceiving social support), but also as a platform for maladaptive peer interactions (i.e., co-ruminating) in the context of depression. This implies that neither perceiving social support, nor co-ruminating requires face-to-face contact. Thus, due to the widespread use of SNSs among adolescents, the face-to-face component is no longer a necessary condition for these aspects of adolescents' peer interactions. As a result, aspects related to these peer interactions (i.e., social support; co-rumination) have expanded to an online world. These findings hereby imply that contemporary youth use new platforms to perceive social support, but also to discuss problems with others, compared to one decade ago. Scholars should take notice of this presence of perceived social support and co-rumination in a SNS context. We therefore recommend that future studies should pay sufficient attention to the different aspects of online peer interactions when examining their associations with adolescents' well-being.

Second, this study also provides additional support for the claim that interacting on FB does not lead directly to relative increases or decreases in adolescents' depressive symptoms. Based on our results, it is more correct to assume that private FB interactions are, as expected, indirectly related to adolescents' development of depressive symptoms. These results highlight the importance of exploring indirect associations over and above direct relationships. Especially in the context of peer interactions, outcomes may differ, due to the positive and negative aspects related to peer interactions. Given that today's peer interactions

have expanded to an online context, future studies should pay specific attention to the examination of the outcomes of such aspects of online peer interactions.

Third, results revealed that perceived online social support predicts relative increases in online co-rumination over time. This finding supports our notion that those who perceive social support from their FB friends may co-ruminate more with them, as one's belief that he or she is appreciated and cared about, may increase the likelihood that he or she will feel more relaxed talking about problems repeatedly and in detail. In addition, this finding is also in line with previous correlational findings in an offline context (Boren, 2013). For instance, Boren (2013) found that social support positively predicted co-rumination. Due to this finding, the question arises whether perceived online social support can be categorized as exclusively helpful, as it also leads to online co-rumination in the long run. Although our findings showed that online co-rumination was not predictive of depressive symptoms in the long run, this does not necessary imply that online co-rumination is not harmful. It is still possible that certain groups of adolescents are more vulnerable for the hypothesized detrimental outcomes of online co-rumination. Thus, although we found that perceived online social support is helpful for girls, future research is needed to explore whether this positive impact in the long run still holds when investigating these relationships between online co-rumination and depressive symptoms, for instance among adolescents who feel closely related to their friends vs. adolescents who feel not related to their friends.

Taken together, by examining indirect pathways, the present study offers scholars and practitioners a more nuanced insight into how private FB interactions relate to a decrease in depressive symptoms in adolescence. These insights are highly relevant and are an important first step towards practical recommendations regarding adolescents' FB use. However, in order to formulate a set of scientifically based practical recommendations, more research is still needed. For instance, future research should examine day-to-day associations, as private

FB interactions may still be harmful in the very short term, for instance, on a day-to-day basis. Given that our findings imply that the risks related to private FB interactions and online co-rumination are more short-lived than expected, it could be that private FB interactions may stimulate online co-rumination on a *given day*, which in turn may lead to more depressive symptoms that *same day*. In addition, future research should set up intervention studies that develop and evaluate strategies aimed at creating awareness around the opportunities and potential challenges related to private FB use. Nonetheless, we believe that this study contributes to theory formation about how the relationship between SNS use and adolescents' well-being works and offers guidance for future intervention and prevention programs.

Limitations

The present study has a couple of limitations which must be considered when interpreting our findings. First, all data used in the present study were gathered through self-report measures. Future studies should rely on other data collection reports, such as observer reports, in order to limit the common method variance. Related to this limitation is that some scholars question the reliability of the use of self-reports to measure time spent on SNSs (e.g., Junco, 2013). Although self-report questionnaires are the most widely used tools to assess people's FB use (e.g., time spent on FB) (e.g., Banjanin, Banjanin, Dimitrijevic, & Pantic, 2015), we acknowledge that this is also a limitation of the present study. In order to increase reliability of such measures of FB use, future studies could benefit from combining self-report measures with more objective methods. For instance, future studies could gather objective data through monitoring software (e.g., Junco, 2013) or content analyses of participants' SNS profiles (e.g., Settanni & Marengo, 2015). Such observational research will allow more in-depth insight into specific day-to-day behaviors of specific groups of social media users (e.g., depressed vs. non-depressed individuals). Third, although we

reported a substantial drop-out of participants, our relationships would likely be even stronger without drop-out, because participants who dropped out felt more depressed. Future studies should therefore try to minimize attrition, to provide a more correct understanding of the strength of our relationships. Fourth, this study was limited by the fact that perceived online social support and online co-rumination were offline measures adapted to a FB context. Although these measures were validated in an offline context, they were not validated in a FB context. For instance, one limitation of the measure for online co-rumination is that participants were instructed to think about their closest, same-sex friend. However, it could be that one's closest same-sex friend does not use FB frequently (whereas other friends use FB very frequently), which can result in an underestimation of online co-rumination. Lastly, this study reported small to moderate standardized regression coefficients and effect sizes. This low magnitude of effects, however, is not only typical for the media-effects literature, but is also found in various other disciplines (Valkenburg & Peter, 2013). As suggested by Valkenburg and Peter (2013), contemporary media-effects theories argue that media effects are conditional, i.e., they are contingent on various dispositional, social-contextual and developmental factors. As a result, these authors claim that it is logically impossible to expect large media effects in the general population. In addition, although many media-effect sizes may be rather small, this does not mean that the findings are not important. Especially given the important and growing role of social media in the lives of contemporary adolescents, we believe that the findings of the present study offer important insights for the media-effects literature.

Conclusion

Despite these limitations, the present study provides important insight into the indirect relationships between a specific type of Facebook use (i.e., private Facebook interactions) and adolescents' depressive symptoms.

Overall, we can conclude (1) that adolescents with depressive symptoms are especially attracted to a private Facebook context to interact with their peers, and (2) that adolescent girls can experience benefits from interacting with peers in a private Facebook context when they perceive social support from these interactions.

Thus, interacting on Facebook can be beneficial for adolescent girls' mental health. However, this beneficial impact only occurs when private Facebook interactions stimulate adolescent girls' perceptions of online support, not when these interactions stimulate increased problem talk. Although this finding is complex, we believe that it highly contributes to the ongoing debate about whether social media are "helpful" and/or "harmful" to adolescents' mental health.

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Table 1

Descriptive Statistics and Zero-Order Correlations for Boys and Girls.

	Min	Max	M (SD)	Boys M (SD)	Girls M (SD)	1.	2.	3.	4.	5.	6.	7.	8.
1. Private FB interactions (T1)**	1	7	5.03 (1.64)	4.77 (1.73)	5.31 (1.48)	1	.31**	.15**	.31**	.21**	.06	.11*	.41**
2. Online co-rumination (T1)**	1	5	2.83 (.96)	2.60 (.97)	3.06 (.91)	.23**	1	.38**	.31**	.20**	.08*	.09	.26**
3. Online co-rumination (T2)**	1	5	2.83 (.92)	2.70 (.88)	2.99 (.90)	.18**	.46**	1	.23**	.36**	.05	.10*	.10*
4. Perceived online social support (T1)	1	7	4.39 (1.72)	4.33 (1.77)	4.45 (1.66)	.18**	.32**	.27**	1	.49**	-.17**	-.03	.22**
5. Perceived online social support (T2)	1	7	4.61 (1.69)	4.68 (1.68)	4.80 (1.56)	.18**	.15**	.36**	.44**	1	-.07	-.12**	.08
6. Depressive symptoms (T1)**	1	4	1.97 (.62)	1.85 (.59)	2.09 (.73)	.14**	.06	.03	-.17**	-.13**	1	.43**	.11**
7. Depressive symptoms (T2)**	1	4	1.93 (.65)	1.78 (.54)	2.08 (.70)	.10*	.10*	.06	-.22**	-.16**	.55**	1	ns
8. Daily time spent on FB (T1)**	1	11	5.01 (2.89)	4.53 (2.76)	5.94 (2.94)	.43**	.23**	.15**	.09*	.07	.16**	.08	1

Note. FB = Facebook; T1 = Time 1; T2 = Time 2; $N_{T1} = 1,621$; * $p < .05$; ** $p < .01$; Correlation coefficients above the diagonal are from boys; below the diagonal are from girls.

Figure 1. Model examining the relationships between private FB interactions at Time 1, online co-rumination at Time 1/Time 2, perceived online social support at Time 1/Time 2, and adolescents' depressive symptoms at Time 2.

Note: Values reflect standardized coefficients. Ovals represent latent constructs. For clarity of presentation, covariances, control variables, observed indicators, and error terms are not shown.

FB = Facebook

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

Figure 2. Model examining the relationships between private FB interactions at Time 1, online co-rumination at Time 1/Time 2, perceived online social support at Time 1/Time 2, and boys' depressive symptoms at Time 2.

Note: Values reflect standardized coefficients. Ovals represent latent constructs. For clarity of presentation, covariances, control variables, observed indicators, and error terms are not shown.

FB = Facebook

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

Figure 3. Model examining the relationships between private FB interactions at Time 1, online co-rumination at Time 1/Time 2, perceived online social support at Time 1/Time 2, and *girls'* depressive symptoms at Time 2.

Note: Values reflect standardized coefficients. Ovals represent latent constructs. For clarity of presentation, covariances, control variables, observed indicators, and error terms are not shown.

FB = Facebook

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

Figure 4. Model examining the relationships between depressive symptoms at Time 1, online co-rumination at Time 1/Time 2, perceived online social support at Time 1/Time 2, and adolescents' private FB interactions at Time 2.

Note: Values reflect standardized coefficients. Ovals represent latent constructs. For clarity of presentation, covariances, control variables, observed indicators, and error terms are not shown.

FB = Facebook

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