Article

Who Benefits From Chatting, and Why? The Roles of Extraversion and Supportiveness in Online Chatting and Emotional Adjustment

Personality and Social Psychology Bulletin
37(9) 1202–1215

DOI: 10.1177/0146167211409053
http://pspb.sagepub.com

Maarten H. W. Van Zalk[1], Susan J. T. Branje[2], Jaap Denissen[3], Marcel A. G. Van Aken[2], and Wim H. J. Meeus[2]

Abstract

The current study aimed to provide more insight into the role of online chatting in young adults' emotional adjustment. A model was tested that takes into account (a) extraversion of individuals who communicate online, (b) the kind of peers these individuals communicate with online (i.e., online-exclusive peers vs. friends), and (c) the extent to which effects of online chatting on emotional adjustment are mediated by individuals' ability to provide support to others. Young adults (age *M* = 18.9) filled out questionnaires about themselves and their fellow students at three measurements with a 4-month interval. Results showed that only for less extraverted individuals, chatting with peers found exclusively online directly predicted higher self-esteem and indirectly predicted less depressive symptoms through increases in supportiveness. Thus, results supported a model of social compensation where effects of online chatting with online-exclusive peers improved young adults' emotional adjustment.

Keywords

Online chatting, extraversion, social compensation, depression, self-esteem

Received August 17, 2010; revision accepted March 7, 2011

In recent years, adolescents and young adults have increasingly communicated with their friends online (Subrahmanyam, Smahel, & Greenfield, 2006; Valkenburg & Peter, 2007b; Wolak, Mitchell, & Finkelhor, 2003). Furthermore, less extraverted young adults report acquainting others more frequently through chatting than through offline communication (Wolak et al., 2003). Nevertheless, very little is known about mechanisms underlying effects of chatting on young adults' emotional adjustment. Moreover, personality differences in the extent to which chatting affects emotional adjustment remain relatively unexplored. The purpose of the current study is to provide more insight into the role of extraversion as moderated in associations between chatting and young adults' emotional adjustment. More particularly, the current study aims to enhance knowledge regarding mechanisms that underlie these associations.

Chatting, Self-Esteem, and Depressive Symptoms

Young adulthood is characterized as a period of much change in most Westernized countries, such as moving out of the parental home, going to college, and starting to work (Arnett, 2004; Asendorpf & Wilpers, 1998). These transitions often make individuals move away from their old friendship networks, creating a need to establish new friendships and find new ways to maintain old relationships. Young adults have been found to use the Internet to find new friends and maintain old friendships (Morgan & Cotten, 2003; Wellman, Quan-Haase, Witte, & Hampton, 2001). We distinguish between chatting with *friends* and chatting with *online-exclusive peers*. Chatting with friends refers to direct, dyadic-based online communication with persons with whom the individual already has a friendship relation. Online-exclusive peers are persons with whom the individual communicates exclusively online. Ever since the increased popularity of

[1]Örebro University, Örebro, Sweden
[2]Utrecht University, Utrecht, Netherlands
[3]Humboldt University, Berlin, Germany

Corresponding Author:
Maarten Herman Walter Van Zalk, Örebro University, Center for Developmental Research, Örebro Sweden
Email:Maarten.vanzalk@oru.se

chatting with friends and online-exclusive peers, however, concerns have been raised about the possible consequences of this chatting on adolescent emotional adjustment. Effects of chatting on two indicators of emotional adjustment, namely self-esteem (Yang & Tung, 2006) and depression (Morgan & Cotten, 2003), have been previously stressed and therefore are discussed here.

Two contrasting perspectives are relevant regarding the role of Internet use in adolescent emotional adjustment. The *stimulation perspective* suggests that chatting with friends *and* chatting with online-exclusive peers have beneficial effects on adolescents' emotional adjustment. A series of experimental studies (Antheunis, Valkenburg, & Peter, 2009; Schouten, Valkenburg, & Peter, 2009) and a longitudinal study (Valkenburg & Peter, 2009) have indicated that chatting online stimulates direct communication concerning abilities to provide support. Chatting has been shown to provide opportunities for direct feedback on how to respond to others' social and emotional needs (Valkenburg & Peter, 2009). This online feedback may improve young adults' ability to provide support, or *supportiveness*, more than in offline communication (Galin, Gross, & Gosalker, 2007; Gross, 2009). For example, one experimental study showed that young adults tended to take peers' needs more into account after receiving online feedback than after receiving offline feedback (Galin et al., 2007).

One experimental study has shown that young adults who chatted with online-exclusive peers increased more in self-esteem than when they communicated offline with peers because they perceived themselves to increase in supportiveness (Gross, 2009). This indicates that chatting with online-exclusive peers may enhance direct feedback by peers on young adults' specific supportiveness, which can subsequently be safely explored and tested online. This increase in supportiveness boosts self-esteem, as it makes individuals more self-asserted about their abilities and attractiveness as social partners (Kimber, Sandell, & Bremberg, 2008). At the same time, particularly the ability to provide support increases stability and quality of relationships with peers, which, in turn, may decrease depressive symptoms over time (Hale, 2001). In sum, the stimulation perspective holds that chatting with online-exclusive peers increases supportiveness. Improved supportiveness, in turn, is suggested to lead to more self-esteem and less depressive symptoms (see Figure 1).

In contrast, the *displacement perspective* states that chatting with online-exclusive peers is more superficial because it lacks depth (Kraut, Mukhopadhyay, Szczypula, Kiesler, & Scherlis, 1999; Yang & Tung, 2006) and nonverbal cues used in offline interaction (Weiser, 2001). Moreover, chatting with online-exclusive peers may displace time spent with friends in offline interactions, as less time is spent on maintenance of offline relationships (Van den Eijnden, Meerkerk, Vermulst, Spijkerman, & Engels, 2008). This could be particularly detrimental to young adults, who need time to develop and adjust their supportiveness to adapt to novel social situations. This lack of developing supportiveness could then lead to a risk for social isolation and lower relationship quality (Kraut et al., 1999; Valkenburg & Peter, 2007b). Both social isolation (e.g., Laursen, Bukowski, Aunola, & Nurmi, 2007) and low relationship quality (e.g., Selfhout, Branje, & Meeus, 2009) are potential risk factors for developing depressive symptoms. In addition, lower levels of supportiveness may lead to less general self-esteem (Kimber et al., 2008). In sum, the displacement perspective holds that chatting with online-exclusive peers leads to low supportiveness, which, in turn, is suggested to have detrimental effects on both self-esteem and depressive symptoms (see Figure 1).

Prior Empirical Findings Regarding the Displacement and Stimulation Perspectives

Studies that did not differentiate between chatting with friends versus chatting with online-exclusive peers have yielded mixed support for the displacement and stimulation perspective. In surveys among youths in middle adolescence, chatting was cross-sectionally associated with low general well-being (Valkenburg & Peter, 2007a) and predicted more depressive symptoms over a 1-year period (Van den Eijnden et al., 2008). These findings support the displacement perspective. After adolescence, however, chatting was cross-sectionally associated with less depression among undergraduates (Morgan & Cotten, 2003). These latter results are more in line with the stimulation perspective.

Although the displacement perspective emphasizes effects of chatting with online-exclusive peers only, the stimulation perspective stresses that both chatting with friends and chatting with online-exclusive peers are important for individuals' emotional adjustment. Only one study compared the relative importance of chatting with online-exclusive peers to chatting with friends: Chatting with online-exclusive peers, but not chatting with friends, was cross-sectionally associated with less overall well-being, supporting the displacement perspective (Valkenburg & Peter, 2007a).

Finally, studies have not yet examined whether supportiveness is a mediator of effects of chatting on emotional adjustment. The displacement perspective assumes that chatting with online-exclusive peers displaces opportunities to develop and improve supportiveness in offline situations, thereby leading to less supportiveness. Lower supportiveness, in turn, is suggested to lead to less self-esteem and more depressive symptoms. In contrast, the stimulation perspective suggests that chatting with friends and online-exclusive peers improves supportiveness because online communication presents individuals with a safe and controllable way to receive feedback on their supportiveness. The stimulation perspective holds that this "online training" in supportiveness leads to improvements in supportiveness, both online and offline. These improvements in supportiveness, in turn, are suggested to lead to higher self-esteem and

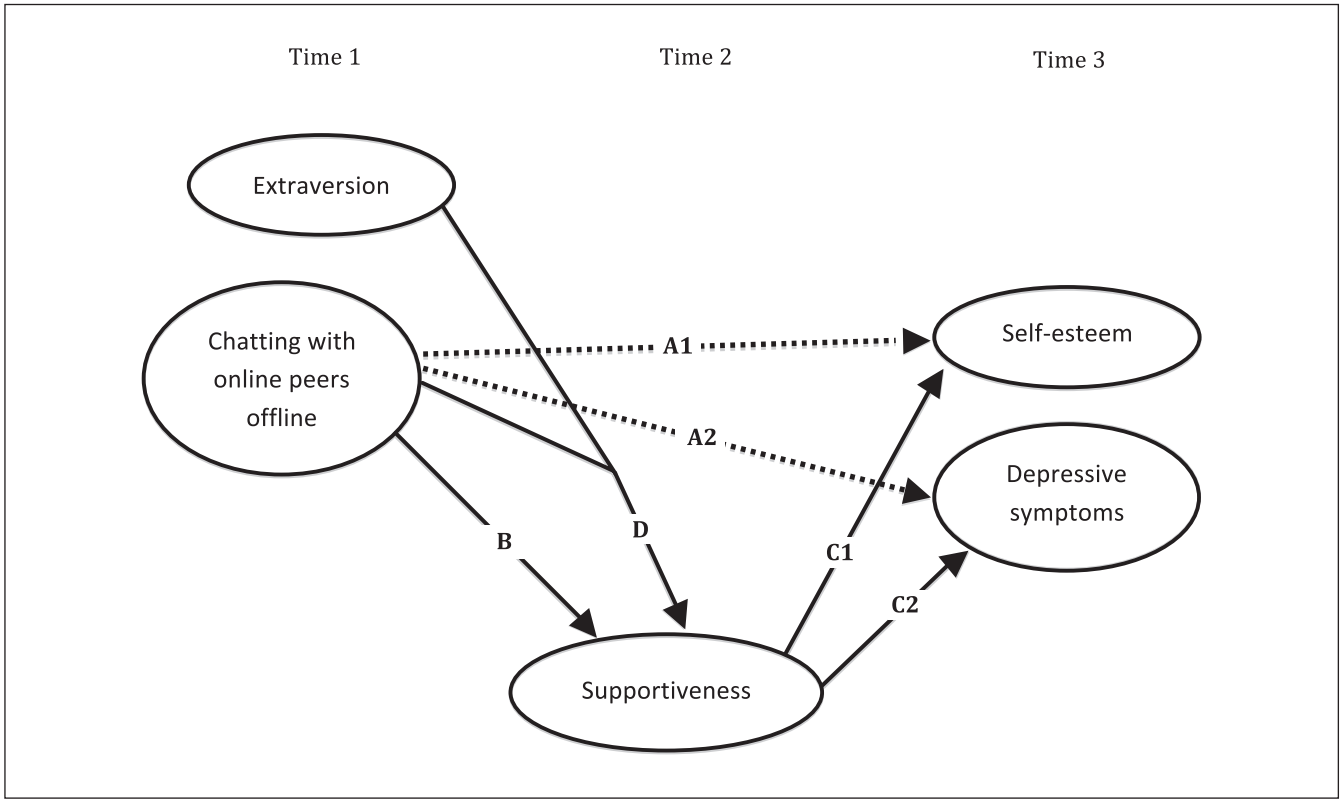

Figure 1. The displacement perspective versus the stimulation perspective

Conceptual figure of displacement and stimulation perspective. The displacement perspective suggests that more time spent chatting with online-exclusive peers may lead to less self-esteem (Path A1) and more depressive symptoms (Path A2). The displacement perspective furthermore holds that direct effects of chatting with online-exclusive peers at Time 1 on self-esteem and depressive symptoms at Time 3 disappear after including deteriorating effects of chatting with online-exclusive peers on supportiveness at Time 2 (Path B), which, in turn, decreases self-esteem (Path C1) and increases depressive symptoms (Path C2). In contrast, the stimulation perspective suggests that more time spent chatting with online-exclusive peers may lead to more self-esteem (Path A1) and less depressive symptoms (Path A2). The stimulation perspective furthermore holds that direct effects of chatting with online-exclusive peers at Time 1 on self-esteem and depressive symptoms at Time 3 disappear after including beneficial effects of chatting with online-exclusive peers on supportiveness (Path B), which in turn leads to more self-esteem (Path C1) and less depressive symptoms (Path C2). The rich-get-richer hypothesis holds that chatting predicts more self-esteem and less depressive symptoms more strongly for individuals with *high* extraversion by improving supportiveness more strongly for these individuals (Path D). In contrast, the social compensation hypothesis holds that chatting predicts more self-esteem and less depressive symptoms more strongly for individuals with *low* extraversion by improving supportiveness more strongly for these individuals (also Path D).

lower depressive symptoms. Therefore, research is needed that uses three measurements to test whether chatting at Time 1 predicts supportiveness at Time 2, which, in turn, predicts emotional adjustment at Time 3. Alternatively, chatting with online-exclusive peers at Time 1 may directly boost self-esteem at Time 2 by increasing individuals sense of connectedness with others (Valkenburg & Peter, 2009). This increase in self-esteem at Time 2 may, in turn, enhance supportiveness at Time 3.

Rich-Get-Richer and Social Compensation Hypotheses

Personality-environment models of adjustment (Cattell, 1980; South & Krueger, 2008) stress the need to consider interactions between personality traits and environmental influences to understand the development of individuals' adjustment. Empirical studies indicate moderating effects of extraversion on associations between chatting and emotional adjustment (Amichai-Hamburger, Wainapel, & Fox, 2002; Peter, Valkenburg, & Schouten, 2005). Two hypotheses are relevant in this respect. The *rich-get-richer hypothesis* (Kraut et al., 2002; Peter et al., 2005) suggests that chatting has beneficial effects on emotional adjustment particularly for highly extraverted individuals because it improves supportiveness more than for these individuals (see Figure 1). Extraversion is thought to reflect the basic motivation to obtain rewards through social situations, making extraverted individuals more likely to experience positive affect in social situations (Denissen & Penke, 2008; Elphick, Halverson, & Marszal-Wisniewska, 1998; Fleeson, Malanos, & Achille, 2002; Freedman & Doob, 1968). Because of this increased positive affect during social interactions, extraverted individuals may be more motivated to communicate online, which allows them to further train and enhance their supportiveness. This increase in supportiveness, in turn, may

enhance emotional adjustment. Thus, chatting is suggested to be more beneficial for extraverted individuals than for less extraverted individuals.

In contrast, the *social compensation hypothesis* suggests that less extraverted individuals improve more in their supportiveness by chatting than more extraverted individuals because constraints that make the former interact more poorly in offline encounters with their friends matter less in an online environment (Campbell, Cumming, & Hughes, 2006; Walther, 1996). That is, individuals with low extraversion may find the online environment a safe, controllable place to explore and improve their offline and online supportiveness (Wolak et al., 2003), and interact with peers (Peter et al., 2005), which may enhance their feelings of self-worth and emotional adjustment. Thus, the social compensation perspective holds that chatting improves emotional adjustment particularly for individuals with low extraversion.

Empirical studies provide mixed support for the rich-get-richer hypothesis and the social compensation hypothesis. A cross-sectional study showed that particularly introverted individuals reported communicating online to compensate for their lack of supportiveness and reported gaining more online friends by chatting than more extraverted individuals (Peter et al., 2005). This supports the social compensation hypothesis. In contrast, although general Internet use predicted more loneliness over a period of 18 months for introverted individuals, it predicted less loneliness for more extraverted individuals (Kraut et al., 2002). Finally, one study did not find any support for a moderating role of extraversion in effects of chatting on depressive symptoms over a 1-year period (Van den Eijnden et al., 2008). In sum, the empirical results provide mixed support for the social compensation hypothesis and the rich-get-richer hypothesis.

Overcoming Limitations of Prior Research

The current study aims to overcome three key limitations in prior research on effects of Internet use on emotional adjustment. First, to our knowledge, previous empirical investigations on how Internet use may affect supportiveness and emotional adjustment have been based entirely on self-reports. This introduces the problem of shared-observer variance, which can lead to overestimations of associations between constructs (Kenny, Kashy, & Cook, 2006). Moreover, the ability to provide support to others may be perceived more accurately by peers than by individuals themselves, particularly because more introverted individuals tend to underestimate their own supportiveness to others (Swickert, 2009). This means that prior studies (e.g., Valkenburg & Peter, 2009) may overestimate to what extent chatting is associated with supportiveness, as both constructs were reported on by the same individual. To address this issue, we use self-reports on chatting and emotional adjustment and peer reports on supportiveness.

To our knowledge, this is the first study to use a multi-informant approach to examining effects of online communication on supportiveness. A second key issue is that meditational analyses examining underlying mechanisms of effects of chatting on emotional adjustment have been cross-sectional. To gain insight into the direction of causality, cross-lagged modeling with three waves of data measurement is used in the current study to examine whether effects of the independent variable (i.e., self-rated chatting at Time 1) on the dependent variable (i.e., self-rated emotional adjustment at Time 3) are mediated by a third factor (i.e., peer-rated supportiveness at Time 2). By measuring all constructs at all three times of measurement, alternative temporal patterns (e.g., chatting at Time 1 predicts emotional adjustment at Time 2, which, in turn, predicts increased supportiveness) can be tested as well. A third issue is that prior empirical studies have either examined (a) how effects of chatting on emotional adjustment differed for different populations (e.g., moderation by extraversion) or (b) what processes underlie effects of chatting on emotional adjustment (e.g., mediation by supportiveness). The current study is the first to integrate the idea that supportiveness mediates effects of chatting on emotional adjustment with the notion that extraversion moderates this mediation effect (see Figure 1). Testing this model has important theoretical implications for understanding functions of chatting and supportiveness for individuals with different levels of extraversion. For example, although supportiveness may mediate chatting effects on emotional adjustment for individuals with low extraversion, this may not be the case for individuals with higher levels of extraversion. In sum, by integrating the role of extraversion as a moderator in effects of chatting on emotional adjustment on one hand with the mediating role of supportiveness in these effects on the other hand, the current study aims to advance current knowledge on how and under what conditions young adults' chatting may affect emotional adjustment.

Method

Participants and Procedure

Participants included 197 psychology freshmen (M = 18.9 years, SD = 1.6) attending university in Utrecht, which is a medium-sized city in the Netherlands. At the first measurement, 205 participants filled out questionnaires about themselves at three measurements with a 4-month interval. All participants were randomly divided into groups for educational purposes, ranging from 19 to 24 individuals.

During the second week of their first semester at the university, participants completed online questionnaires by accessing a website using a personal password. Participants filled out questionnaires that appeared in randomized order to avoid response sets. Confidentiality of all answers was explicitly guaranteed. The instruments used in the current study were part of a larger battery of assessments that took

approximately 40 minutes to complete. For the follow-ups, participants were contacted through email and mobile phones to remind them to complete the online questionnaire. An identical procedure was followed for each of the three measurements. Participants received 20 (around $30), two hours of course credit, and a personality feedback profile after successful completion of the study.

Participants met in groups for mandatory university lessons throughout the year, ranging between 4 and 8 hours a week. All measurements took place during weeks in which students attended university lessons, and these mandatory meetings did not significantly change in frequency throughout the study period. A measure of how much each participant communicated with his or her group members across the 4 months (ranging from 0 = *never* to 6 = *very often*; $M = 2.99$, $SD = 1.83$) indicated that participants communicated regularly with one another within groups. The first measurement took place after participants had interacted for 2 weeks (the average time communicated at that point was $M = 2.12$, $SD = 0.92$). This indicated that after 2 weeks, group members had already interacted with each other.

Of the 205 individuals who took part at the first measurement, 197 individuals (96%) took part at the last measurement. The 197 individuals who participated at the last measurement did not significantly ($p > .05$) differ from the individuals who did not participate at the last measurement ($n = 8$) in age, gender, chatting with online-exclusive peers, chatting with friends, depression, self-esteem, supportiveness, or extraversion. The majority of participants were female ($n = 153$, 78%) and of Dutch origin ($n = 181$, 92%).

Measurements

All measures were completed at each of three measurements over a 4-month interval.

Internet use. Chatting with online-exclusive peers and friends was measured at all three measurements by asking respondents to indicate the average number of hours they spent chatting with online-exclusive peers each week. Participants were instructed that whereas friends were "friends they regularly meet in the offline context," online-exclusive peers were "people they had never met in the offline context." Chatting with friends as well as chatting with peers were measured by assessing the average number of hours they spent chatting each week. Respondents answered these questions on a 7-point scale: 1 = *never*, 2 = *0 to 2 hours*, 3 = *2 to 6 hours*, 4 = *6 to 15 hours*, 5 = *15 to 25 hours*, 6 = *25 to 40 hours*, and 7 = *more than 40 hours*. The chatting with online-exclusive peers and chatting with friends scales showed acceptable reliability (Cronbach's αs of .81 at Time 1, .87 at Time 2, and .92 at Time 3). Prior cross-sectional studies have shown that these specific scales have excellent congruent, discriminative, and predictive validity (Peter, Valkenburg, & Schouten, 2005; Selfhout, Branje, Delsing, Ter Bogt, & Meeus, 2009).

Depression. Depression was measured using the Dutch short version of the Beck Depression Inventory (BDI; Beck et al., 1961). This questionnaire consisted of 21 items pertaining to depressive feelings, such as "I am so sad or unhappy that I can't stand it." Respondents rated to what extent these statements applied to themselves on a 5-point Likert-type scale (1 = *never* to 5 = *always*). Studies have demonstrated that the original BDI has good psychometric properties for screening depressive disorders (Barrera & Garrison-Jones, 1988) and that this specific version of the BDI has good construct validity and predictive validity (Schotte, 1997). Cronbach's alphas of the BDI in the current sample were .91 at Time 1, .90 at Time 2, and .92 at Time 3.

Self-esteem. Self-esteem was measured with the Dutch version of the 10-item Rosenberg Self-Esteem Scale (RSE; Rosenberg, 1965). The RSE has excellent construct validity (Robins, Hendin, & Trzesniewski, 2001) and predictive validity (Franck, De Raedt, Barbez, Rosseel, 2008). The Dutch version of the RSE has good psychometric properties in Dutch populations as well (Verkuyten, 1995). Cronbach's alphas were .86 at Time 1, .88 at Time 2, and .91 at Time 3.

Supportiveness to others. Supportiveness was measured by letting all work-group members rate all group members on two items, namely, the extent to which an individual is able to provide emotional support (1 = *very little* to 7 = *very much*) and the extent to which an individual is able to provide social support (1 = *very little* to 7 = *very much*). We used composite peer ratings, measured by calculating the mean of all peer ratings and then calculating the mean of these peer ratings across the two items. Cronbach's alphas were high (.96 for Time 1, .97 for Time 2, and .95 for Time 3). In addition, to provide support for the internal validity of these two indicators, we used these two indicators to specify a longitudinal confirmatory factor analysis model where emotional support and social support were used to estimate one latent factor (i.e., supportiveness) for each measurement. We added time-invariance constraints by constraining each specific indicator to be equal to the same indicator at the next measurement as proposed by Kline (1998). Finally, we estimated relative stability paths of supportiveness from Time 1 to Time 2 and from Time 2 to Time 3. The model showed an excellent fit ($\chi^2 < 2.13$, $df = 9$, $p > .01$; comparative fit index [CFI] = .99, root mean square error of approximation [RMSEA] = .01) and factor loadings were high (> .87, $p < .001$). The relative stability paths also indicated high relative stability for each 4-month period ($\beta < .81$, $p > .01$ from Time 1 to Time 2, and $\beta < .83$, $p > .01$ from Time 2 to Time 3). To further validate that our measure of supportiveness was not merely an indicator of general likeability by others, we compared supportiveness to composite peer ratings of likeability, measured by calculating the mean of all group members' ratings on the extent to which an individual was liked by them (1 = *very little* to 7 = *very much*). Correlations within each measurement showed only moderate overlap between likeability and social provision ability (see Table 1),

suggesting that the two measures represent related yet distinct constructs.

Extraversion. Participants completed the 8-item extraversion scale of the 44-item Dutch translation of the Big Five Inventory (BFI; Denissen, Geenen, Selfhout, & Van Aken, 2008; John & Srivastava, 1999) at each of the three measurements. Participants indicated their agreement regarding each statement on a 1 (*totally disagree*) to 5 (*totally agree*) Likert-type scale. A sample item is "is talkative." The Cronbach's alphas were .83, .89, .86 at Time 1, Time 2, and Time 3, respectively (see the study of Denissen, Geenen, et al., 2008, for descriptives as well as correlations with other scales of the BFI in the current sample).

Strategy of Analyses

We examined a longitudinal cross-lagged model (Muthén, 2001) to study the extent to which the longitudinal effects of chatting with friends and chatting with online-exclusive peers on depression and self-esteem were mediated by supportiveness. In this model, all variables on each of the three measurements were entered simultaneously as continuous variables into the same model. We estimated the bidirectional cross-lagged paths from Time 1 to Time 2 and from Time 2 to Time 3 between (a) chatting with friends and supportiveness, (b) chatting with friends and depression, (c) chatting with friends and self-esteem, (d) chatting with online-exclusive peers and supportiveness, (e) chatting with online-exclusive peers and depression, (f) chatting with online-exclusive peers and self-esteem, (g) supportiveness and depressive symptoms, (h) supportiveness and self-esteem, and (i) depression and self-esteem. By controlling these effects for within-measurement correlations among all variables at Time 1, Time 2, and Time 3 as well all relative stability paths, cross-lagged effects can be interpreted as predicting relative changes in the outcome variable (Kline, 1998).

To examine the moderating role of extraversion in associations between chatting and emotional adjustment, we included (a) the interaction effects between the extraversion and chatting with friends and (b) the interaction effects between extraversion and chatting with online-exclusive peers when predicting emotional adjustment. We controlled these interactions for main effects of extraversion; we estimated to what extent extraversion predicted changes at the next measurement in chatting with friends, chatting with online-exclusive peers, depression, self-esteem, and support provision. If an interaction was significant, we subsequently explored differences in associations between chatting and emotional adjustment by splitting the sample into three equal groups: individuals with low, medium, and high scores on extraversion. Next, we examined differences in associations of chatting with emotional adjustment among these three groups in the cross-lagged model according to critical ratios of difference (Kline, 1998).

To test mediation of supportiveness in effects of chatting on depression and self-esteem, we tested the four conditions in a mediation model (Baron & Kenny, 1986; see the results section for details). In addition, we tested the alternative temporal patterns by examining whether effects of supportiveness at Time 1 on emotional adjustment at Time 3 were mediated by chatting at Time 2. We also examined whether effects of chatting at Time 1 on supportiveness at Time 3 were mediated by emotional adjustment at Time 2.

Finally, to explore the moderating role of extraversion in the mediation effects of supportiveness on associations between chatting and emotional adjustment, we examined a model of *conditional indirect effects* (also referred to as moderated mediation; see Preacher, Rucker, & Hayes, 2007). We performed a series of bootstrap analyses to examine the indirect effects of (a) chatting on emotional adjustment via supportiveness for individuals with low, medium, and high scores of extraversion and (b) supportiveness on emotional adjustment via chatting for individuals with low, medium, and high scores of extraversion.

Results

Descriptives

Table 2 shows means and standard deviations of all variables in the current study. To test whether there are differences in mean levels and changes in chatting with online-exclusive peers, chatting with friends, depression, self-esteem, and supportiveness, a repeated-measurement analysis was used in which the time factor represented the changes across the three measurements. In addition, we examined effects of time, extraversion, and time × extraversion.

Findings showed mean-level differences in extraversion for all five variables of Internet use, $F(24, 173) = 3.23–3.61$, $p < .01$. Findings showed that there were no significant ($p > .10$) mean-level changes in any of the five variables across the 8 months, and these changes did not significantly ($p > .10$) differ for individuals with low, medium, or high extraversion.

Associations Among Chatting, Depression, and Self-Esteem

We examined a cross-lagged model including the associations between chatting with online-exclusive peers and chatting with friends on one hand and depression and self-esteem on the other hand across the three measurements. The fit of the total model was adequate: $\chi^2 = 80.21$, $df = 22$, $p < .01$; CFI = .99, RMSEA = .03. Table 3 presents the longitudinal associations among all variables of interest: Within-measurement correlations and relative stability paths were controlled for but were omitted from the table for reasons of clarity. Relative stability paths of two types of Internet use ranged from .43 to .56 ($p < .01$), suggesting that chatting showed moderate relative stability across 4 months. Relative

Table 1. Ranges of Within-Measurement Correlations for the Sample as a Whole

	Extraversion	Chat friends	Chat online-exclusive peers	Likeability	Supportiveness	Depression
Extraversion	—					
Chat friends	.25*** to .27***	—				
Chat online-exclusive peers	–.17** to .21***	.25*** to .29***	—			
Likeability	.35*** to .39***	.03 to .05	.02 to .03	—		
Supportiveness	.32*** to .35**	.03 to .04	.03 to .05	.55*** to .57***	—	
Depression	–.27*** to –.28***	.03 to .04	.01 to .02	–.17*** to –.22***	–.35*** to –.41***	—
Self-esteem	.00 to .04	.02 to .03	.00 to .01	.10** to .18***	.28*** to .31***	–.42*** to –.45***

Range refers to the range of within-measurement correlations across the three measurements.
**$p < .01$. ***$p < .001$

Table 2. Descriptive Statistics of Internet Use and Emotional Adjustment

	Time 1		Time 2		Time 3	
Dimension	*M*	*SD*	*M*	*SD*	*M*	*SD*
Chatting with online-exclusive peers	0.72	0.63	0.73	0.50	0.82	0.44
Chatting with friends	1.69	0.84	1.72	0.23	1.69	0.24
Depression	1.44	0.79	1.41	0.31	1.39	0.30
Self-esteem	3.52	0.63	3.55	0.47	3.56	0.48
Supportiveness	3.92	0.60	4.08	0.42	4.09	0.42
Extraversion	3.49	0.62	3.50	0.43	3.53	0.42

stability paths of depression and self-esteem ranged between .58 and .64 ($p < .01$), respectively, suggesting that depression and self-esteem showed moderate to high relative stability across 4 months.

For the sample as a whole, chatting with online-exclusive peers and chatting with friends were not significantly associated with depression and self-esteem between measurements ($\beta < .04$, $p > .05$). Thus, findings provided no support for overall stimulation or displacement effects of chatting on emotional adjustment. Furthermore, depression and self-esteem did not predict chatting over time. In addition, this means that supportiveness did not mediate effects of chatting on emotional adjustment for the sample as a whole.

Moderation of Extraversion in Effects of Chatting on Emotional Adjustment

To examine whether extraversion moderates effects of chatting on emotional adjustment, we examined interactions between extraversion and chatting when predicting subsequent emotional adjustment. All variables were entered as continuous variables. As can be seen in Table 3, extraversion significantly interacted with chatting with online-exclusive peers when predicting subsequent depression ($\beta = –.25$, $p < .01$ from Time 1 to Time 2, and $\beta = –.30$, $p < .01$ from Time 2 to Time 3, respectively) and self-esteem ($\beta = .22$, $p < .01$ from Time 1 to Time 2, and $\beta = .23$, $p < .01$ from Time 2 to Time 3, respectively). Post hoc analyses were performed splitting the sample into individuals with low ($n = 66$), medium ($n = 66$), and high ($n = 65$) scores on extraversion. Next, we performed multiple-group analyses to examine differences among these three groups in associations between chatting with online-exclusive peers and emotional adjustment (Kline, 1998).

Because critical ratios of difference demonstrated that no significant differences existed between medium and highly extraverted individuals in any of the associations of interest, we report on only differences between individuals with low extraversion and individuals with medium to high extraversion. Two significant differences ($p < .001$) were found. First, for individuals with low extraversion only, the cross-lagged path from chatting with online-exclusive peers to subsequent depression was negative and significant ($\beta = –.23$, $p < .05$ from Time 1 to Time 2, and $\beta = –.20$, $p < .05$ from Time 2 to Time 3, respectively). Second, only for this group, the cross-lagged path from chatting with online-exclusive peers to subsequent self-esteem was positive and significant ($\beta = .12$, $p < .05$ from Time 1 to Time 2, and $\beta = .11$, $p < .05$ from Time 2 to Time 3, respectively).

Thus, no support was found for the rich-get-richer hypothesis: For individuals with low extraversion, chatting with online-exclusive peers specifically predicted *less* depression and *more*

Table 3. Longitudinal Associations Among Chatting, Depression, Self-Esteem, and Supportiveness Moderated by Extraversion

		95% CI			95% CI	
	Time 1 → Time 2	Lower	Upper	Time 2 → Time 3	Lower	Upper
Relative stability paths						
Chat online-exclusive peers	.51***	.34***	.61***	.55***	.45***	.65***
Chat friends	.43***	.36***	.60***	.47***	.38***	.62***
Depression	.63***	.43***	.81***	.60***	.41***	.82***
Self-esteem	.53***	.45***	.64***	.63***	.53***	.72***
Supportiveness	.81***	.72***	.90***	.83***	.75***	.92***
Cross-lagged paths						
Chat online-exclusive peers →						
Self-esteem	.00	−.03	.04	−.01	−.03	.02
Depression	.06	.02	.08	.03	.03	.09
Supportiveness	.00	−.04	.02	.03	−.04	.02
Chat friends →						
Self-esteem	.03	.02	.03	.03	.02	.03
Depression	.02	.02	.02	.02	.02	.02
Supportiveness	.01	−.03	.04	.02	−.03	.04
Self-esteem →						
Chat online-exclusive peers	.01	.00	.02	.02	.00	.02
Chat friends	.00	−.02	.02	.03	−.02	.02
Supportiveness	.02	−.04	.06	.02	−.04	.06
Depression →						
Chat online-exclusive peers	−.02	−.03	.04	−.00	−.03	.04
Chat friends	.01	.00	.02	−.01	.00	.02
Supportiveness	−.11*	−.17*	−.02	−.10*	−.15*	−.08
Supportiveness →						
Chat friends	.02	−.04	.04	−.02	−.03	.04
Chat online-exclusive peers	.01	.00	.04	.01	.00	.04
Self-esteem	.05	.02	.09*	.09**	.06	.11*
Depression	−.24**	−.19**	−.27**	−.20**	−.18**	−.29**
Extraversion →						
Self-esteem	.02	.00	.05	.03	.00	.05
Chat online-exclusive peers	.01	.00	.03	.00	.01	.02
Chat friends	.03	.00	.07	.04	.00	.07
Extraversion →						
Depression	.00	−.03	.04	.01	−.03	.04
Supportiveness	.00	−.03	.05	.02	−.03	.04
Chat online-exclusive peers × extraversion →						
Depression[a]	.01	−.02	.02	.03	−.02	.02
Self-esteem	.27***	.23***	.33***	.24***	.22***	.31***
Supportiveness	.31***	.23***	.38***	.37***	.26***	.35***
Chat friends × extraversion →						
Depression	.05	.02	.07	.01	.00	.02
Self-esteem	.05	.00	.08	.00	−.03	.02
Supportiveness	.03	−.02	.06	.04	.00	.06

95% CI = confidence interval with an alpha of 5%. All paths controlled for within-measurement correlations among all variables in the model. Significance of standardized effects was determined by performing bootstrapped confidence intervals (t = 5,000).

a. Before including the interaction effects of chatting with online-exclusive peers × extraversion on supportiveness and the effects of supportiveness on subsequent depression, interaction effects of chatting with online-exclusive peers × extraversion on depression were significant ($\beta = -.33$, $p < .01$ from Time 1 to Time 2 and $\beta = -.28$, $p < .01$ from Time 2 to Time 3).

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

Table 4. Bootstrapping Results for Conditional Indirect Effects

Indirect effect	Condition	*B*	*SE*	*p*
Chatting with online-exclusive peers T1 → supportiveness T2 → depression T3	Low extraversion	–.23	.06	.01
	Medium extraversion	.05	.35	.88
	High extraversion	.03	.22	.76
Chatting with online-exclusive peers T1 → supportiveness T2 → self-esteem T3	Low extraversion	.03	.10	.66
	Medium extraversion	.04	.21	.82
	High extraversion	.01	.12	.84
Supportiveness T1→ chatting with online-exclusive peers T2 → self-esteem T3	Low extraversion	.00	.03	.99
	Medium extraversion	.04	.06	.92
	High extraversion	.05	.21	.99
Supportiveness T1 → chatting with online-exclusive peers T2 → self-esteem T3	Low extraversion	.00	.09	.98
	Medium extraversion	.09	.23	.64
	High extraversion	.02	.00	.92
Chatting with online-exclusive peers T1 → depressive symptoms T2 → supportiveness T3	Low extraversion	.01	.00	.96
	Medium extraversion	.03	.02	.95
	High extraversion	.01	.00	.95
Chatting with online-exclusive peers T1 → self-esteem T2 → supportiveness T3	Low extraversion	.00	.01	.98
	Medium extraversion	.01	.03	.97
	High extraversion	.04	.05	.98

T1 = Time 1; T2 = Time 2; T3 = Time 3. For all confidence intervals, 5,000 bootstrap samples were calculated.

self-esteem over time. Thus, the social compensation hypothesis was partially supported; chatting with online-exclusive peers was associated with emotional adjustment for individuals with low extraversion.

Testing Moderated Mediation: The Moderating Role of Extraversion in Mediation of Supportiveness in Effects of Chatting on Emotional Adjustment

To examine the moderating role of extraversion in mediation effects of supportiveness, we examined bootstrapped conditional indirect effects with macros developed by Preacher et al. (2007). Table 4 shows the results for the mean effects after 5,000 bootstrapped samples. Because none of the indirect effects of chatting with friends on subsequent supportiveness and emotional adjustment were found, these are not displayed in the table. Only one conditional indirect effect of chatting with online-exclusive peers was significant. For adolescents with low extraversion, chatting with online-exclusive peers at Time 1 significantly predicted less depressive symptoms at Time 3 via supportiveness at Time 2. Confidence intervals showed that this indirect effect was significantly ($p < .01$) larger for adolescents with low extraversion than for either adolescents with medium extraversion or adolescents with medium to high extraversion. Thus, findings indicate that only for adolescents with low extraversion, chatting with online-exclusive peers may have beneficial effects on depressive symptoms because it increases supportiveness. No support was found for a mediating role of supportiveness regarding effects of chatting with online-exclusive peers on self-esteem.

In addition, we examined the four conditions of mediation only for this group regarding effects of chatting with online-exclusive peers on depressive symptoms. Mediation would be supported if (a) chatting at Time 1 predicted changes in emotional adjustment at Time 3, (b) chatting at Time 1 predicted changes in supportiveness at Time 2, (c) changes in supportiveness at Time 2 predicted changes in emotional adjustment at Time 3, and (d) effects of chatting at Time 1 on emotional adjustment at Time 3 significantly reduced in size after including effects of supportiveness at Time 2 on emotional adjustment at Time 3. Figure 2 shows all significant cross-lagged paths for individuals with low extraversion.

To test the first condition of mediation, we examined the same model as previously discussed, with the omission of the extraversion and supportiveness variables. The fit of the total model was adequate: $\chi^2 = 42.09$, $df = 23$, $p < .01$; CFI = .99, RMSEA = .01. Only for individuals with low extraversion was the cross-lagged path from chatting with online-exclusive peers at Time 1 to depression at Time 3 negative and significant ($\beta = -.25$, $p < .01$). Thus, the first condition of mediation was supported.

To test the second condition of mediation, we also included supportiveness at all measurements and all within-wave and cross-lagged associations between supportiveness and all other variables in the model. The fit of the total model was adequate: $\chi^2 = 21.02$, $df = 26$, $p < .05$; CFI = 1.00, RMSEA = .01. Findings showed that chatting with online-exclusive peers at Time 1 predicted changes in supportiveness at Time 2 ($\beta = .35$,

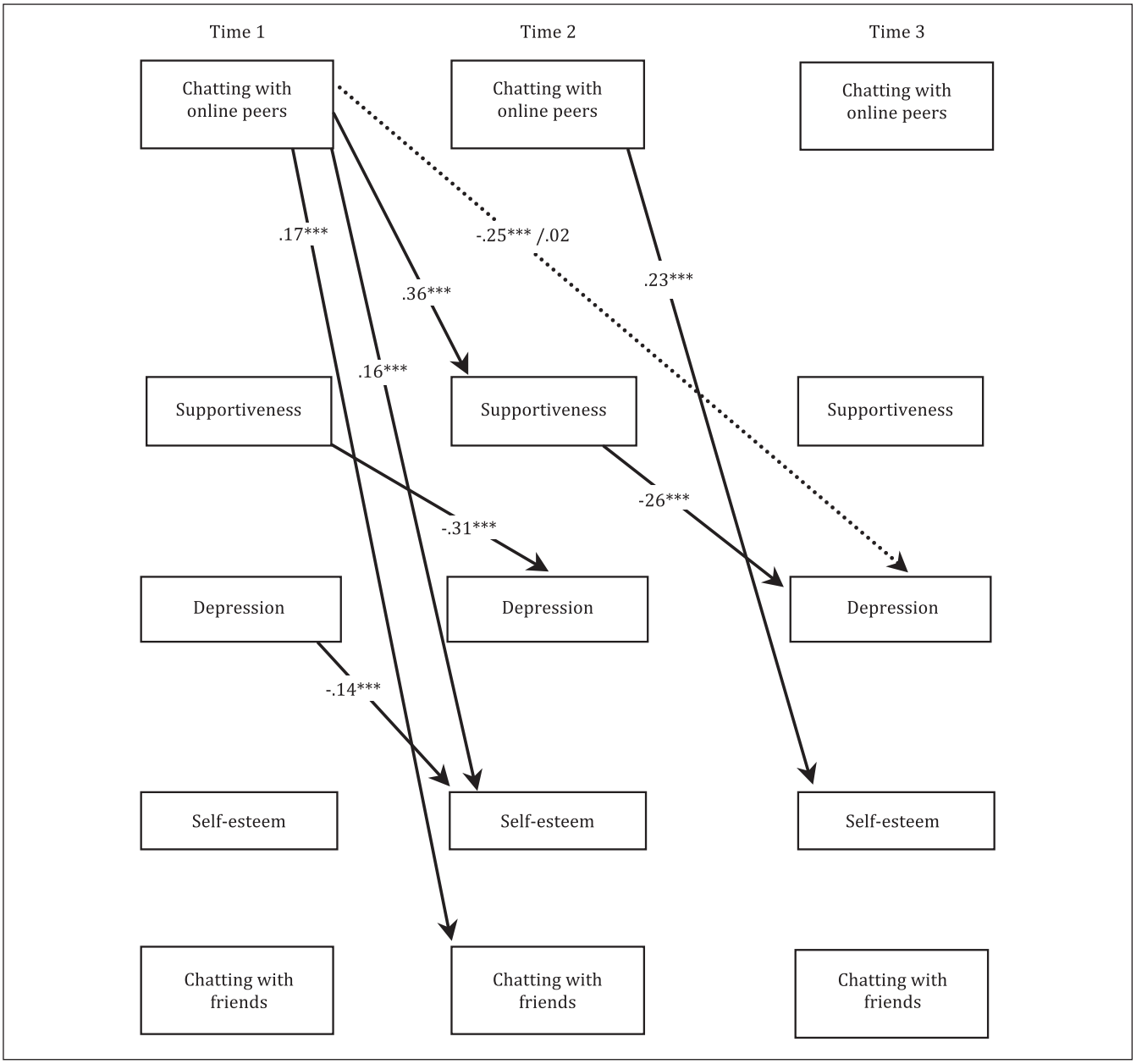

Figure 2. Longitudinal associations among depression, chatting with online-exclusive peers, chatting with friends, and supportiveness for individuals scoring low on extraversion

Only significant cross-lagged paths are shown. All within-measurement correlations among all variables and relative stability paths were estimated in the model but were omitted from this figure for reasons of clarity. The dotted line demonstrates the significant change in regression weights in the direct effect of chatting with online-exclusive peers at Time 1 on depression Time 3, after estimating the effect of chatting with online-exclusive peers on supportiveness.

***$p < .001$.

$p < .01$), thereby supporting the second condition of mediation. To test the third condition of mediation, we examined whether supportiveness at Time 2 predicted changes in depression at Time 3. Findings showed that supportiveness at Time 2 significantly predicted changes in depression ($\beta = -.20$, $p < .01$). Finally, we examined the fourth condition by testing whether the effect of chatting with online-exclusive peers at Time 1 on depression at Time 3 was reduced significantly after including effects of supportiveness at Time 2 on depression at Time 3. Critical ratios of differences revealed that the effect became significantly ($p < .01$) less strong (from $\beta = -.25$, $p < .01$ to $\beta = -.02$, $p > .10$). Thus, al four conditions of mediation were supported. Taken together, findings demonstrate that only for adolescents with low extraversion were direct effects of chatting with online-exclusive peers on depression mediated by supportiveness.

Alternative Mechanisms

One alternative causal ordering through which chatting, supportiveness, and emotional adjustment are associated is that chatting with online-exclusive peers mediated effects of supportiveness on emotional adjustment. Table 3 demonstrates that supportiveness did not predict changes in chatting. Furthermore, the conditional indirect effects in Table 3 showed no support for differences in the way supportiveness at Time 1 indirectly predicted emotional adjustment at Time 3 via chatting with online-exclusive peers at Time 2. Additional bootstrap sampling ($k = 5{,}000$) on conditional indirect effects of supportiveness at Time 1 on emotional adjustment at Time 3 via chatting with friends at Time 2 also did not show any significant ($p < .10$) effects. In sum, results provided no support for mediation effects of chatting with online-exclusive peers on the link between supportiveness and emotional adjustment.

Another alternative causal mechanism would be that chatting with online-exclusive peers affects supportiveness, which is mediated by emotional adjustment. Again, findings did not support this alternative mechanism. Although chatting with online-exclusive peers predicted supportiveness (as demonstrated in Table 3), another set of bootstrap ($k = 5{,}000$) sampling on conditional indirect effects of chatting at Time 1 on supportiveness at Time 3 via emotional adjustment at Time 2 also did not show any significant ($p < .05$) effects.[1] To summarize, no support was found for emotional adjustment as core mediator for effects on supportiveness.

Finally, to examine whether peer-rated supportiveness was an indicator of likeability by peers, we examined whether peer-rated likeability mediated the effects of chatting with online-exclusive peers on emotional adjustment. Results did not support this alternative mechanism. Chatting with online-exclusive peers and friends did not predict peer-rated likeability ($\beta = .00$, $p > .10$, and $\beta = .03$, $p > .10$, respectively). Peer-rated likeability was not longitudinally predictive of peer-rated supportiveness ($\beta = .02$, $p > .10$), depressive symptoms ($\beta = .04$, $p > .10$), and self-esteem ($\beta = .01$, $p > .10$) while controlling for relative stability paths and within-wave correlations. Thus, these results suggest that the likeability and supportiveness measures pertain to different constructs.

Discussion

The current study aimed to gain more insight into the role of chatting in self-esteem and depressive symptoms among young adults. As in previous studies (e.g., Gross, 2004; Valkenburg & Peter, 2009), findings indicated that chatting does not affect emotional adjustment for the sample as a whole. In contrast, other studies using samples of Internet users during the second half of the 1990s found that general Internet use predicted worse emotional adjustment (e.g., Kraut et al., 2002; Mesch, 2001). Perhaps during these earlier stages of Internet use, it was hard to develop and maintain social relationships online. For example, although in Mesch's (2001) study only 11% of the total sample was online, all participants in the current study reported chatting every week. The supported model in the current study demonstrated that as chatting becomes more normative, researchers need to take into account (a) extraversion of individuals who communicate online, (b) the kinds of targets these individuals communicate with online (i.e., online-exclusive peers vs. friends), and (c) peer-rated supportiveness as a mechanism underlying effects of chatting on self-esteem and depressive symptoms. Thus, results stress that to advance current knowledge regarding effects of Internet use on individuals' subsequent emotional adjustment, these three factors need to be taken into consideration.

Results provided partial support for the social compensation perspective: Chatting with online-exclusive peers may indirectly reduce depressive symptoms by improving supportiveness for less extraverted individuals. Why would chatting with online-exclusive peers improve supportiveness for these individuals? One explanation may be provided by prior findings indicating that during online communication, individuals tend to receive and provide more direct feedback on their social supportiveness (Antheunis et al., 2009; Schouten et al., 2009). This direct feedback seems to contain useful information for young adults' supportiveness skills, such as taking others' values and views into account (Galin et al., 2007). This direct online feedback is accompanied with perceptions of reduced social threat, particularly for introverted young adults (Gross, 2009). In addition, particularly less extraverted individuals feel more confident to explore and test out their supportiveness online (Amichai-Hamburger et al., 2002; Peter et al., 2005). During the transition period to adulthood, these individuals may feel the need to be able to control novel social situations. Chatting with online-exclusive peers may offer a relatively safe way of testing out, adjusting, and reflecting on their supportiveness. This online "training" of supportiveness may provide them with the necessary skills to increase contacts with others, online and perhaps also offline, thereby reducing social isolation and perhaps even forming supportive peer relationships. This reduced social isolation and these supportive peer relationships may reduce depressive feelings and thoughts. In sum, findings indicate that chatting with online-exclusive peers may improve supportiveness for less extraverted individuals, and this, in turn, may lead to less depressive symptoms.

Findings indicated that chatting with online-exclusive peers may improve self-esteem for individuals with low extraversion. Supportiveness was not found to mediate effects of chatting with online-exclusive peers on self-esteem. Perhaps chatting fosters self-esteem by enhancing a feeling of social connectedness to others (LaRose, Mastro, & Eastin, 2001) and increases the feeling one has many friends to interact with (Denissen, Penke, Schmitt, & Van Aken, 2008), which is more important for less extraverted individuals than for more extraverted individuals. This, in turn, may improve

feelings of self-esteem for less extraverted individuals. Therefore, less extraverted individuals in particular may increase in feelings of self-esteem through chatting with online-exclusive peers.

Based on the stimulation perspective, both communication with friends and communication with peers online were initially expected to stimulate the development of supportiveness. Perhaps talking to people one does not meet offline is accompanied with feelings of reduced social threat, as online chatting with friends may create old interaction patterns that are also used offline. That is, chatting with online-exclusive peers may provide less extraverted individuals with a sense of safety that may be difficult to achieve in more uncertain offline contexts. This sense of safety may allow less extraverted individuals to explore and test out their supportiveness. Furthermore, direct feedback from online-exclusive peers may not induce feelings of anxiety as much as offline communication for less extraverted individuals (Gross, 2009), thereby leading them to use this feedback to adjust their supportiveness. Thus, chatting with online-exclusive peers, and not chatting with friends, may offer new opportunities to explore support provision abilities.

Findings offer no support for the displacement perspective (Valkenburg & Peter, 2007b). That is, no support was found for claims that chatting has detrimental effects on adolescents' emotional adjustment. Nevertheless, it must be stressed that the current results may hold only for this specific age group of less extraverted young adults: Their need to develop relationships may be met by the possibilities of talking to peers online. For younger adolescents, perhaps, displacement effects may occur when individuals are spending time on Internet activities that increase the risk of Internet addiction (Selfhout, Branje, Delsing, et al., 2009; Van den Eijnden et al., 2008). Furthermore, online chatting may not lead to Internet addiction as much as other more addictive aspects of Internet use, such as gaming (Yang & Tung, 2006). Thus, current stimulation effects of chatting may specifically hold for young adults and for online chatting, and future studies should examine developmental differences in the role of different types of Internet use for emotional adjustment across adolescence.

Findings of the current study and of prior studies (Amichai-Hamburger et al., 2002; Peter et al., 2005) indicate that less extraverted individuals tend to use the Internet more to communicate with online-exclusive peers, although not with friends, than individuals with higher extraversion. This finding may seem counterintuitive at first, as extraverts tend to be more socially active in offline settings than introverts (Asendorpf & Wilpers, 1998; Denissen & Penke, 2008; Selfhout et al., 2010). The need for introverts to compensate for their lack of supportiveness may form a particularly strong motive for introverts to communicate online: They may feel chatting provides them with a safe, controllable tool to explore relationships (Amichai-Hamburger et al., 2002). In contrast, more extraverted individuals may feel confident enough interacting offline and may use offline situations to train their supportiveness. In sum, findings do not support the rich-get-richer hypothesis: Chatting does not have an impact on more extraverted individuals' emotional adjustment.

One limitation of the current study is that participants were primarily female. Therefore, it was not possible to fully explore all gender differences in our analyses. For example, chatting may reduce social isolation for shy adolescent boys, as shyness in boys specifically may form a risk factor for becoming socially isolated (Valkenburg & Peter, 2009). Therefore, future studies should include more males to test gender differences in the way chatting may influence supportiveness and emotional adjustment. Another limitation of the current study is that all participants were highly educated. Although recent studies have demonstrated that associations between chatting and general well-being are similar for middle adolescents with lower and higher educational backgrounds (Valkenburg & Peter, 2007a, 2007c), future studies should examine whether this is also the case for young adults. Another limitation is that specific types of online communication with online-exclusive peers that may have been beneficial for more introverted individuals were not examined. More dyadic, private online conversations may be more attractive and seem less threatening for introverted individuals than open, public forums and chat rooms (Valkenburg & Peter, 2009). Future studies should examine the specific interactions that take place online across different contexts to be able to specify which online contexts are more important for potential "training" of introverted individuals' supportiveness. A final limitation is that the current study examined only the frequency of communication online and not the quality of online communication. Recent studies suggest that explanations for why chatting may have beneficial effects lie in the quality and self-disclosure of chatting and the trade-off that exists in these characteristics between chatting and offline communication (Valkenburg & Peter, 2009). Moreover, although the current study suggests that supportiveness may increase because of chatting with online-exclusive peers, more process-oriented indicators of online communication that may explain this increase, such as direct feedback on support provision, were not examined. Therefore, future studies should compare how online and offline communication differ in how these characteristics are related to emotional adjustment.

Despite these limitations, several strengths of the current study should be mentioned. The current study is the first study to use peer reports on supportiveness in combination with self-reports on chatting and emotional adjustment, thereby reducing risks of inflation of associations because of shared-observer variance. In addition, by examining cross-lagged models with three measurements of all constructs, more insight was provided into the direction of causality in associations among chatting, supportiveness, and emotional adjustment. Finally, by integrating both moderation effects of extraversion and the mediating role of supportiveness in links between chatting and emotional

competence, the current study was able to simultaneously study how and under what conditions chatting may affect emotional adjustment.

To conclude, the current findings stress the need for future studies to simultaneously study personality traits as well as the identity of the chatting partner when trying to understand how chatting may affect emotional adjustment. Overall, chatting with online-exclusive peers was suggested to improve supportiveness and boost emotional adjustment for less extraverted individuals, thereby stressing positive functions of chatting for these individuals.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: This research was partly supported by funding of the Research Centre Adolescent Development, Department of Developmental Psychology, Linschoten Institute, and Langeveld Institute at the Utrecht University.

Note

1. To examine gender differences in the discussed associations, we tested whether the interaction between gender and chatting with online-exclusive peers and the interaction between gender and chatting with friends significantly predicted subsequent depression and/or subsequent self-esteem. In addition, we included three-way interactions of chatting with online-exclusive peers or offline friends × gender × extraversion when predicting depression and self-esteem to explore whether there were gender differences in the way extraversion moderated longitudinal associations between chatting and emotional adjustment. Findings showed that none of the interactions were significant ($\beta < .05$, $p > .05$). Finally, we included the same interactions to predict supportiveness over time to explore whether the found moderated mediation was different for males and females. Findings showed that none of these additional interactions were significant ($\beta < .02$, $p > .05$).

References

Amichai-Hamburger, Y., Wainapel, G., & Fox, S. (2002). "On the Internet no one knows I'm an introvert": Extroversion, neuroticism, and Internet interaction. *CyberPsychology and Behavior, 5*, 125-128.

Antheunis, M. L., Valkenburg, P. M., & Peter, J. (2009). Getting acquainted through social network sites: Testing a model of online uncertainty reduction and social attraction. *Computers in Human Behavior, 26*, 100-109.

Arnett, J. (2004). *Emerging adulthood: The winding road from the late teens through the twenties.* New York, NY: Oxford University Press.

Asendorpf, J. B., & Wilpers, S. (1998). Personality effects on social relationships. *Journal of Personality and Social Psychology, 74*, 1531-1544.

Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic and statistical considerations. *Journal of Personality and Social Psychology, 51*, 1173-1182.

Barrera, M., & Garrison-Jones, C. V. (1988). Properties of the Beck Depression Inventory as a screening instrument for adolescent depression. Journal of Abnormal Child Psychology: *An official publication of the International Society for Research in Child and Adolescent Psychopathology, 16*, 263-273.

Campbell, A. J., Cumming, S. R., & Hughes, I. (2006). Internet use by the socially fearful: Addiction or therapy? *CyberPsychology and Behavior, 9*, 69-81.

Cattell, R. B. (1980). Two basic models for personality-environment interaction and the need for their substantive investigation. *Multivariate Behavioral Research, 15*, 243-247.

Denissen, J. J. A., Geenen, R., Selfhout, M., & Van Aken, M. A. G. (2008). Single-item big five ratings in a social network design. *European Journal of Personality, 22*, 37-54.

Denissen, J. J. A., & Penke, L. (2008). Individual reaction norms underlying the five factor model of personality: First steps towards a theory-based conceptual framework. *Journal of Research in Personality, 42*, 1285-1302.

Denissen, J. J. A., Penke, L., Schmitt, D. P., & Van Aken, M. A. G. (2008). Self-esteem reactions to social interactions: Evidence for sociometer mechanisms across days, people, and nations. *Journal of Personality and Social Psychology, 95*, 181-196.

Elphick, E., Halverson, C. F., & Marszal-Wisniewska, M. (1998). Extraversion: Toward a unifying description from infancy to adulthood. In I. Mervielde, V. L. Havill, G. A. Kohnstamm, & C. F. J. Halverson (Eds.), *Parental descriptions of child personality: Developmental antecedents of the big five?* (pp. 21-48). Mahwah, NJ: Lawrence Erlbaum.

Fleeson, W., Malanos, A. B., & Achille, N. M. (2002). An intraindividual process approach to the relationship between extraversion and positive affect: Is acting extraverted as "good" as being extraverted? *Journal of Personality and Social Psychology, 83*, 1409-1422.

Franck, E., De Raedt, R., Barbez, C., & Rosseel, Y. (2008). Psychometric properties of the Dutch Rosenberg Self-Esteem Scale. *Psychologica Belgica, 48*, 25-35.

Freedman, J. L., & Doob, A. N. (1968). *Deviancy: the Psychology of Being Different*. Oxford, UK: Academic Press.

Galin, A., Gross, M., & Gosalker, G. (2007). E-negotiation versus offline negotiation: What has changed—if anything? *Computers in Human Behavior, 23*, 787-797.

Gross, E. F. (2004). Adolescent Internet use: What we expect, what teens report. *Journal of Applied Developmental Psychology, 25*, 633-649.

Gross, E. F. (2009). Logging on, bouncing back: An experimental investigation of online communication following social exclusion. *Developmental Psychology, 45*, 1787-1793.

Hale, W. W., III. (2001). Behavioral social support between remitted depressed patients with partners and strangers. *Journal of Affective Disorders, 64*, 285-289.

John, O. P., & Srivastava, S. (1999). The Big Five Trait Taxonomy: History, measurement and theoretical perspectives. In L. A. Pervin &

O. P. John (Eds.), *Handbook of personality: Theory and research* (pp. 102-138). New York, NY: Guilford.

Kenny, D. A., Kashy, D. A., & Cook, W. L. (2006). *Dyadic data analysis*. New York, NY: Guilford.

Kimber, B., Sandell, R., & Bremberg, S. (2008). Social and emotional training in Swedish schools for the promotion of mental health: An effectiveness study of 5 years of intervention. *Health Education Research, 23*, 931-940.

Kline, R. B. (1998). *Principles and practice of structural equation modeling.* London, UK: Guilford.

Kraut, R., Kiesler, S., Boneva, B., Cummings, J. N., Helgeson, V., & Crawford, A. M. (2002). Internet paradox revisited. *Journal of Social Issues, 58*, 49-74.

Kraut, R., Mukhopadhyay, T., Szczypula, J., Kiesler, S., & Scherlis, B. (1999). Information and communication: Alternative uses of the Internet in households. *Information Systems Research, 10*, 287-303.

LaRose, R., Mastro, D., & Eastin, M. S. (2001). Understanding Internet usage: A social-cognitive approach to uses and gratifications. *Social Science Computer Review, 19*, 395-413.

Laursen, B., Bukowski, W. M., Aunola, K., & Nurmi, J.-E. (2007). Friendship moderates prospective associations between social isolation and adjustment problems in young children. *Child Development, 78*, 1395-1404.

Mesch, G. (2001). Social relationships and Internet use among adolescents in Israel. *Social Science Quarterly, 82*, 329-340.

Morgan, C., & Cotten, S. R. (2003). The relationship between Internet activities and depressive symptoms in a sample of college freshmen. *CyberPsychology and Behavior, 6*, 133-142.

Muthén, B. (2001). Second-generation structural equation modeling with a combination of categorical and continuous latent variables: New opportunities for latent class-latent growth modeling. In L. M. Collins & A. G. Sayer (Eds.), *New methods for the analysis of change* (pp. 291-322). Washington, DC: American Psychological Association.

Peter, J., Valkenburg, P. M., & Schouten, A. P. (2005). Developing a model of adolescent friendship formation on the Internet. *CyberPsychology and Behavior, 8*, 423-430.

Preacher, Kristopher J., Rucker, Derek D., & Hayes, Andrew F. (2007). Addressing moderated mediation hypotheses: Theory, methods, and prescriptions. *Multivariate Behavioral Research, 42*, 185-227.

Robins, R. W., Hendin, H. M., Trzesniewski, K. H. (2001). Measuring global self-esteem: construct validation of a single-item measure and the Rosenberg Self-Esteem Scale. *Personality and Social Psychology Bulletin, 27*, 151-161.

Rosenberg, M. (1965). *Society and the adolescent self-image*. Princeton, NJ: Princeton University Press.

Schouten, A., Valkenburg, P., & Peter, J. (2009). An experimental test of processes underlying self-disclosure in computer-mediated communication. *Cyberpsychology: Journal of Psychosocial Research on Cyberspace, 3*, 1-13.

Selfhout, M., Branje, S., Delsing, M., Ter Bogt, T., & Meeus, W. (2009). Different types of Internet use, depression, and social anxiety: The role of perceived friendship quality. *Journal of Adolescence, 32*, 819-833.

Selfhout, M., Branje, S., & Meeus, W. (2009). Developmental trajectories of perceived friendship intimacy, constructive problem solving, and depression from early to late adolescence. *Journal of Abnormal Child Psychology, 37*, 251-264.

Selfhout, M., Burk, W., Branje, S., Denissen, J. J. A., Van Aken, M. A. G., & Meeus, W. (2010). Emerging late adolescent friendship networks and big five personality traits: A dynamic social network perspective. *Journal of Personality, 78*, 509-538.

South, S. C., & Krueger, R. F. (2008). An interactionist perspective on genetic and environmental contributions to personality. *Social and Personality Psychology Compass, 2*, 929-948.

Subrahmanyam, K., Smahel, D., & Greenfield, P. (2006). Connecting developmental constructions to the Internet: Identity presentation and sexual exploration in online teen chat rooms. *Developmental Psychology, 42*, 395-406.

Swickert, R. (2009). Personality and social support processes. In P. J. Corr & G. Matthews (Eds.), *The Cambridge handbook of personality psychology* (pp. 524-540). New York, NY: Cambridge University Press.

Valkenburg, P. M., & Peter, J. (2007a). Internet communication and its relationship to wellbeing: Identifying some underlying mechanisms. *Media Psychology, 9*, 43-58.

Valkenburg, P. M., & Peter, J. (2007b). Online communication and adolescent well-being: Testing the stimulation versus the displacement hypothesis. *Journal of Computer Mediated Communication, 12*, 1169-1182.

Valkenburg, P. M., & Peter, J. (2007c). Preadolescents' and adolescents' online communication and their closeness to friends. *Developmental Psychology, 43*, 267-277.

Valkenburg, P. M., & Peter, J. (2009). Social consequences of the Internet for adolescents: A decade of research. *Psychological Science, 18*, 1-5.

Van den Eijnden, R. J. J. M., Meerkerk, G.-J., Vermulst, A. A., Spijkerman, R., & Engels, R. C. M. E. (2008). Online communication, compulsive Internet use and psychosocial well-being among adolescents: A longitudinal study. *Developmental Psychology, 44*, 655-665.

Verkuyten, M. (1995). Self-esteem, self-concept stability, and aspects of ethnic identity among minority and majority youth in the Netherlands. *Journal of Youth and Adolescence, 24*, 155-175.

Walther, J.-B. (1996). Computer-mediated communication: Impersonal, interpersonal, and hyperpersonal interaction. *Communication Research, 23*(1), 3-43.

Weiser, E. B. (2001). The functions of Internet use and their social and psychological consequences. *CyberPsychology and Behavior, 4*, 723-743.

Wellman, B., Quan-Haase, A., Witte, J., & Hampton, K. (2001). Does the Internet increase, decrease, or supplement social capital? Social networks, participation, and community commitment. *American Behavioral Scientist, 45*, 436-455.

Wolak, J., Mitchell, K. J., & Finkelhor, D. (2003). Escaping or connecting? Characteristics of youth who form close online relationships. *Journal of Adolescence, 26*, 105-119.

Yang, S. C., & Tung, C.-J. (2006). Comparison of Internet addicts and non-addicts in Taiwanese high school. *Computers in Human Behavior, 23*, 79-96.