Qualities of Peer Relations on Social Networking Websites: Predictions From Negative Mother–Teen Interactions

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This study examined associations between characteristics of teenagers' relationships with their mothers and their later socializing behavior and peer relationship quality online. At age 13, teenagers and their mothers participated in an interaction in which mothers' and adolescents' behavior undermining autonomy and relatedness was observed and indicators of teens' depressive symptoms and social anxiety were assessed. At age 20, youth self-reported on their online behaviors, youths' social networking webpages were observationally coded to assess peer relationship quality online, and symptoms of depression and social anxiety were reassessed. Results suggested that problematic mother–teen relationships were predictive of youths' later preference for online communication and greater likelihood of forming a friendship with someone met online, yet poorer quality in online relationships. Findings are discussed within a developmental framework suggesting the importance of considering youths' family interactions during early adolescence as predictors of future online socializing behavior and online interactions with peers.

Social networking websites have increased exponentially in popularity since the creation of Facebook and MySpace in 2003–2004. According to recent national estimates from data collected in 2006–2008, approximately 93% of U.S. youth are online, and 65% of these individuals report using social networking websites (Jones & Fox, 2009). Additionally, these data suggest that 42% of youth report communicating daily with friends via social networking websites, versus 26% via instant messaging and 16% via email. Conversely, 29% of online youth report communicating daily with friends via face-to-face interactions (Jones & Fox, 2009). These trends suggest that social networking websites are an increasingly important domain for adolescents' and young adults' peer relationships.

Although online communication has become a normative means of maintaining friendships for many youth, an emerging body of research has suggested that online communication may hold specific attractions for youth with certain psychological difficulties. Researchers have suggested that online social communication may be used by such youth as a supplemental, or even alternative, means to a normative

desired end of establishing positive relationships with peers (Buhrmester, 1998, 1990) that may be more difficult for them to attain through face-to-face interactions (Peter, Valkenburg, & Schouten, 2005; Valkenburg & Peter, 2007). However, to date, studies examining this hypothesis have focused primarily on youths' psychopathology (most often depressive symptoms and social anxiety) as predictors of their online socializing behavior with peers. Generally, this research has found that, in comparison to well-adjusted youth, youth with symptoms of depression and social anxiety tend to (a) prefer communicating with others online rather than in person (Caplan, 2007, 2003); (b) seek emotional support from others online when feeling isolated or depressed (Morahan-Martin & Schumacher, 2003; Peter et al., 2005), and; (c) form new relationships with people met online (Gross, Juvonen, & Gable, 2002; Ybarra, Alexander, & Mitchell, 2005).

Considerably less work has examined ways in which family relationships may also influence youths' online behavior. Although some initial evidence has suggested that family relationships may be important predictors of youths' online social interaction (Ledbetter, 2009; Livingstone & Helsper, 2007), specific family processes that may account for youths' online social behavior and the quality of online social interactions with peers remain unknown. The present study thus seeks to determine whether youth who experience negative interactions with their mothers as teenagers may, as young adults, (a) prefer com-

municating with others online rather than face-to-face, (b) engage in more negative peer interactions on social networking websites, and (c) have a greater likelihood of forming a new friendship with someone met online. These questions examine the potential long-term effects of negative mother–adolescent interactions for youths' future adjustment with peers in the online domain.

PARENTS' UNDERMINING YOUTHS' AUTONOMY AND RELATEDNESS

One family process that may be important for predicting youths' later online behavior with peers is the establishment of autonomy and relatedness within the parent–adolescent relationship (Allen, Hauser, O'Connor, & Bell, 2002; Grotevant & Cooper, 1985; Kuperminc, Allen, & Arthur, 1996). Parental behavior undermining youths' autonomy and relatedness, such as disregard for youths' opinions and expressions of overt hostility toward youth, may communicate to teens that their ideas are not worthy of respect or serious consideration from others. Internalization of such experiences may make youth less likely to reach out to others in more personal or self-disclosing ways, inhibiting the formation of close peer relationships (Allen, Hauser, Eickholt, Bell, & O'Connor, 1994). Additionally, social learning theory suggests that experiencing such behavior from parents may result in youth using similar relational strategies during interactions with peers, which may contribute to difficulties establishing or maintaining positive friendships.

Studies examining parent–adolescent relationships and youths' social functioning in offline domains support these hypotheses. Youth who do not perceive themselves as able to behave autonomously within their family relationships have been shown to develop decreased attachment to peers even after accounting for these individuals' social skills abilities (Engels, Deković, & Meeus, 2002). Moreover, teens who report higher levels of psychological control from their mothers tend to exhibit a similar, negative pattern of relationally aggressive behavior in their later peer romantic relationships (Leadbeater, Banister, Ellis, & Yeung, 2008). Poor autonomy and relatedness in parent–adolescent relationships has also been linked with other indicators of poor interpersonal adjustment, including depressive and externalizing symptoms, lower self-esteem, and reduced social competence (Allen, Hauser, Bell, & O'Connor, 1994; Allen Hauser, Eickholt, et al., 1994; Allen et al., 2006; Eccles, Early, Fraser, Belansky, & McCarthy, 1997; McElhaney & Allen, 2001). Despite

strong suggested links between autonomy and relatedness in parent–adolescent relationships and the quality of youths' subsequent peer relationships, we are not aware of any study to date that has extended these findings to youths' functioning with peers in online domains.

SOCIAL CONTEXT OF ONLINE COMMUNICATION

For youth who have experienced behaviors undermining autonomy and relatedness from their parents, online communication via social networking websites may offer opportunities for self-expression and interaction that are characterized by less reservation and greater perceived control than typically found within their families. For example, youth have more time online to think about and compose messages to others than they might have in face-to-face interactions. As a result, they may be more comfortable with the content they disclose online versus in person. Additionally, on social networking websites, youth may be permitted relief from concerns that their ideas will be rejected in the moment, as interactions on these websites do not necessarily take place in real time as they do in online chat, instant messaging, or in-person interactions. Indeed, research has shown that individuals who find in-person interaction uncomfortable are more likely than individuals without such discomfort to prefer the increased controllability of online communication and feel more disinhibited online, leading to greater self-disclosure (Schouten, Valkenburg, & Peter, 2007).

Despite the potential for greater comfort online, however, it is also possible that youth who have difficulties establishing autonomy and relatedness with their parents may replicate problematic relational expectations or strategies learned in parent–adolescent interactions with their peers online, contributing to peer difficulties in this domain. With regard to online behavior, adolescents' own display of behavior undermining autonomy and relatedness with a close peer at age 13 has been found to predict having fewer friends on their social networking pages years later (Mikami, Szwedo, Allen, Evans, & Hare, 2010), suggesting that teens' negative interaction styles in face-to-face relationships may indeed predict decreased social success online.

Youth who experience behavior undermining autonomy and relatedness from their parents may also be motivated to make new friendships online. A national survey conducted in 2006 by the PEW Internet and American Life Project found that of the 55% of youth who have a profile on a social networking website, the vast majority (91%) use these

websites to stay in touch with friends they see often in person. However, about half also report using these sites to make new friends online (Lenhart & Madden, 2007). It is possible that youth experiencing behaviors undermining autonomy and relatedness from their parents may seek new opportunities for relationship intimacy online to compensate for the lack of positive relationships they have with their families. Moreover, to the extent these youth may develop poorer quality relationships with known peers as a result of using problematic relational strategies learned from parents, they may be motivated to form new relationships online with the goal of establishing more positive friendships.

STUDY AIMS AND HYPOTHESES

To date, online communication research has relied almost exclusively on youths' self-reports of both their online socializing behavior and their adjustment—creating a problem of shared method variance. In addition to utilizing self-reported measures of online behavior, the present study also uses direct observations of young adults' social networking webpages as dependent measures of online peer relationship quality. We chose to assess constructs of peer quality commonly examined in the peer relations literature, including support, verbal aggression, and deviancy talk. These constructs were operationalized based on guidelines from established observational coding systems (see Allen, Hall, et al., 2001; Allen, Porter, & McFarland, 2001; Piehler & Dishion, 2004). Additionally, we included an assessment of differences in group size of same-age peers present in youths' photos as a marker of youths' social connectedness. Based on literature suggesting the utility of variables such as depressive symptoms and social anxiety for predicting online socializing behavior, we also included these variables as covariates in all analyses. Finally, we included a measure of adolescents' behavior undermining autonomy and relatedness toward their mothers in order to examine the relative contribution of mothers' behavior beyond what may be accounted for by adolescents' behavior.

We hypothesized that, beyond what may be accounted for by depressive symptoms, social anxiety, or adolescents' own negative behavior in mother–teen interactions, mothers' behavior undermining teens' autonomy and relatedness at age 13 would predict youths' greater preference for online communication at age 20. We also hypothesized that mothers' behavior undermining teens' autonomy and relatedness would predict poorer online peer relationship quality at age 20. Finally, we hypothesized that mothers' behavior undermining autonomy and relatedness would predict a greater likelihood that youth had ever formed a close friendship with someone met online. Although we did not hypothesize differences on any outcome measure based on participants' gender or parental income, we included these variables as covariates in all analyses because of previous research finding that older teenage girls may be more likely to use social networking webpages (Lenhart & Madden, 2007) and individuals from households with greater income may be more likely to go online (Madden, 2006).

METHOD

Participants

Participants were 138 youth answering questions about their online social interactions drawn from a larger longitudinal investigation of adolescent social development including 184 adolescents, their families, and their peers. Adolescents were recruited for participation in the larger study from the seventh and eighth grades of a public middle school drawing from suburban and urban populations in the southeastern United States. Students were recruited via an initial mailing to all parents of students in the school along with follow-up contact efforts at school lunches. Families of adolescents who indicated they were interested in the study were contacted by telephone. All participants provided informed assent before each interview session, and parents provided informed consent. Because questionnaires about online social behavior were added to the larger study and mailed to participants during the middle of an annual wave of data collection, the present sample of 138 youth include those who returned questionnaires before the close of the wave.

The sample of 138 youth in the present study was ethnically and socioeconomically diverse: 58 males and 80 females; 56% Caucasian, 33% African American, and 11% other/mixed ethnicity; median family income at Time 1 in the US$40,000–59,999 range. Of the 138 participants, 89 indicated that they had a social networking webpage on Facebook or MySpace and 63 granted us permission to directly access it. Such permission is nontrivial, even for adolescents participating in an extended study, because it presents one of the few opportunities in research to examine completely spontaneous, unfiltered, and potentially embarrassing or incriminating interactions between adolescents and their peers. The sample of 63 adolescents whose pages were coded

was also diverse: 25 males and 38 females; 67% Caucasian, 22% African American, and 11% other/mixed ethnicity; median family income in the US$40,000–59,999 range.

Youth were assessed on a variety of psychosocial measures at Time 1 (mean age = 13.23, SD = .66) and reassessed 7 years later at Time 2 (mean age = 20.53, SD = .97) on measures of online socializing behavior. There were no significant differences between youth who did (n = 138) versus did not (n = 46) answer questions about their online social interactions on any of the study's covariates or predictor variables. Participants who reported having a social networking webpage on Facebook or MySpace (n = 89) relative to those who did not have a webpage (n = 46) reported higher parental income, $t(133)$ = 3.01, $p < .001$. However, there were no significant differences between adolescents with Facebook or MySpace pages who did (n = 63) versus did not (n = 26) give us permission to access those pages on any of the covariates or predictor variables.

Time 1 Measures (Age 13)

Depressive symptoms. Adolescents completed the Children's Depression Inventory (Kovacs & Beck, 1977), a widely used self-report measure of depressive symptoms. The scale contains 27 items (sample item: "I am sad once in a while."), each rated on a metric from 0 to 2 with higher scores indicating a greater degree of depressive symptoms. Cronbach's α in this sample was .86.

Social anxiety. Adolescents' best friends completed the social withdrawal scale from the Pupil Evaluation Inventory, a reliable and valid sociometric measure of children's social behavior (Pekarik, Prinz, Liebert, Weintraub, & Neale, 1976). This scale consists of 9 items (sample item: "She is too shy to make friends easily.") scored on a metric of 0–2, with higher scores indicating greater withdrawal. Cronbach's α in this sample was .73.

Behavior undermining autonomy and relatedness. Adolescents and their mothers participated in a revealed differences task where they discussed a family issue about which they disagreed. Concrete guidelines in a standardized system were used to code the interactions for behaviors indicative of a single construct of undermining autonomy and relatedness for each member of the dyad (Allen, Hauser, Bell, McElhaney, & Tate, 1998). Five specific types of behavior undermining autonomy and

relatedness were coded separately for adolescents' behavior toward their mothers and mothers' behavior toward their adolescents on a 9-point scale, with higher scores representing more intense negative behavior: (a) treating disagreement as a personal fault of the other rather than as a difference in ideas (e.g., Mother: "If you were older, I think you'd understand better); (b) using pressuring statements to make the other uncomfortable maintaining their position (e.g., Mother: "If you don't start picking up your room, you can just move out."); (c) inhibiting discussion by simply placating the other without acknowledging their reasons or opinions (e.g., Mother: "Like I say, somebody is always to blame. First it was Mr. Jones, now it's the teacher." Teen: ". . . I'm telling you mom, Mr. Jones is a liar. I didn't do it." Mother: (*sounding frustrated*) "Alright, Jane."); (d) ignoring or interrupting the others' statements (e.g., Teen: But I did most of the cleaning, my sister only/Mother: No, no, the two of you/Teen: did the dishes/Mother: Alright, Sam, listen to me); and, (e) hostile, critical statements directed at the other (e.g., Mother: "That's a stupid thing to say."). Reliability for the adolescent and maternal undermining autonomy and relatedness variables used in the present study were computed using the intraclass correlation coefficient and were .88 and .73, respectively.

Previous research using this coding system has found links between observed autonomy and relatedness in parent–child relationships and adolescents' depressive symptoms (Allen, Hauser, Eickholt, et al., 1994; Allen et al., 2006), externalizing behaviors (Allen, Hauser, Eickholt, et al., 1994), self-esteem (Allen, Hauser, Bell, et al., 1994), and social competence (McElhaney & Allen, 2001). Although both youths' mothers and fathers were invited to participate in the larger longitudinal study, covariance coverage for paternal behavior undermining autonomy and relatedness and this study's outcome variables was sufficiently low (56%, as compared with 92% for maternal behavior) to suggest that it may be difficult to accept results using paternal behavior as reliable. Thus, only mothers' behavior undermining autonomy and relatedness was utilized in the present study.

Time 2 Measures (Age 20)

Depressive symptoms. Depressive symptoms at Time 2 were assessed using the Beck Depression Inventory (Beck, Rush, Shaw, & Emery, 1979; Beck & Steer, 1987). Each item was rated on a 4-point scale (0–3), with higher scores indicating greater severity of symptoms. Cronbach's α in this sample was .86.

Social anxiety. Social anxiety was assessed using youth self-report on the Social Anxiety Scale for Adolescents, a 22-item measure assessing social avoidance and distress (La Greca & Lopez, 1998). Higher scores indicate greater distress. Cronbach's α in this sample was .93.

Coded Social Networking Website Measures

In order to assess the quality of participants' online social interactions on social networking websites, an observational coding system was devised to capture constructs of interest to this study described in detail below. To view participants' profiles, trained research assistants logged on to a Facebook or My-Space profile created for the purpose of the study and requested to be added to the participants' friendship network, unless participants' profiles were already part of the public domain. If participants indicated they had a profile on both Facebook and MySpace, coders viewed the profile on the site participants reported using most often. Research assistants recorded information about various aspects of friendship quality present on the participants' pages. Thirty pages (out of 63) selected at random were double coded to provide an estimate of consistency between raters. Data for the present study were collected and coded between February 2007 and October 2007.

For all observationally coded measures of online social interaction assessing comments received from peers, coders examined the 20 most recent posted messages from friends displayed on the participant's web page. The 20 most recent posts were examined regardless of the number of different individuals who made the comments and regardless of the time period over which the comments occurred. The number of different individuals posting comments of each quality was chosen as the measurement unit in order to assess differences in ranges of respondents for each type of comment made. Discrepancies between coders were handled by taking the average of coders' scores.

Positive Peer Relationship Quality Online

Number of friends posting supportive comments. For supportive comments, coders recorded the number of different people posting messages characterized by strong words of encouragement, compliments, understanding, caring, or validation to capture supportive comments that seem most appropriate for and characteristic of an intimate

friendship. For example, posts such as "I miss you so much," "I love you," or "I'll always be there for you" exemplify support. Interrater reliability for this construct, assessed using the intraclass correlation coefficient, was .97.

Pictures of same-age peers. Coders examined pictures posted to youths' pages for the presence of groups of same-age peers as a measure of social connectedness with peers. Coders were instructed to consider individuals as same-age peers if they were likely to be within 2 years of age of the participant based on physical appearance. Photos posted to the participants' pages by participants and by participants' friends (which youth have the option of removing from their page) were considered. Coders considered youths' photos as a total set and, using visual cues, assigned a global rating of 1–3. Participants' pictures were rated "1" if the clear majority (>50%) of their pictures did not include any other same-age peers (such as a landscapes). Pictures were rated "2" if the clear majority of pictures featured one or two same-age people. Pictures were rated "3" if the clear majority of pictures featured larger groups (3+) of same-age peers. Interrater reliability for this construct, assessed using the intraclass correlation coefficient, was .85.

Negative Peer Relationship Quality Online

Number of friends posting deviancy talk comments. Coders recorded the number of different individuals whose posts on the participant's page indicated talk of social deviancy. Deviancy talk was defined as explicit profanity and indirect or direct references to alcohol use, drugs, delinquency, or sex. Interrater reliability for this construct, assessed using the intraclass correlation coefficient, was $r = .75$. Deviancy talk among friends in late adolescence has been associated with an increased probability for engaging in antisocial behavior in young adulthood (Dishion, Nelson, Winter, & Bullock, 2004).

Number of friends posting verbal aggression comments. Coders recorded the number of different individuals whose posts on the participant's page suggested verbal aggression. Verbal aggression was defined as posts aiming to belittle, criticize, insult, or manipulate the participant. An example of a post that communicates verbal aggression is, "You can't even write me in the morning, jerk! You wrote Sarah, whatever." Interrater reliability, assessed using the intraclass correlation coefficient, was $r = .84$.

Online Communication Questionnaire Measures

Preference for online communication. Preference for online communication over face-to-face communication was assessed with a 9-item measure derived from items used by Morahan-Martin and Schumacher (2003). Participants indicated their agreement with each item using a Likert scale ranging from 1 (*strongly disagree*) to 4 (*strongly agree*). Sample items included "I open up more to people online than in other communication modes." and "I prefer communicating online more than face-to-face" Cronbach's α in this sample was .92.

Close friendship with someone met online. This 1-item question asked participants if they had ever formed a close friendship, defined as someone with whom they could talk about important things, with someone they had met on the internet. Responses were coded as "yes" = 1 and "no" = 0 (Morahan-Martin & Schumacher, 2003).

Data Analytic Plan

Hypotheses were tested using a hierarchical multiple regression analysis for each designated criterion variable. At Step 1, we controlled for demographic variables of youths' family income and gender. Youths' depressive symptoms and social anxiety at Time 1 and Time 2 were entered at Steps 2 and 3, respectively. At Step 4 we controlled for adolescent effects by including a measure of adolescents' behavior undermining autonomy and relatedness toward their mother at Time 1. At Step 5 we tested the contribution of mothers' behavior undermining autonomy and relatedness at Time 1.

To best address any potential biases due to missing data in analyses, full information maximum likelihood methods were used. Because these procedures have been found to yield the least biased parameter estimates when all available data are used for longitudinal analyses (vs. listwise deletion of missing data; Enders, 2001), data from the full study sample of 184 youth were utilized to provide the best estimates of population variance for predictor variables in analyses examining youths' peer relationship quality on Facebook and MySpace where data were missing at random. However, analyses predicting youths' preference for online communication and online friendship formation were restricted to include data only from participants who reported having a webpage on a Facebook or MySpace at Time 2 of the study to aid in interpretation of the results discussed below.

RESULTS

Preliminary Analyses

Descriptive statistics are provided in Table 1. Distributions of all outcome variables were examined for the presence of extreme outliers. One outlier on the preference for online communication scale that was more than three standard deviations from the mean response score was trimmed to a value equivalent to three standard deviations from the mean response score. Correlations among the study variables are presented in Table 2.

Preference for Online Communication

This analysis was conducted using data from youth who reported having a social networking webpage on

TABLE 1
Means, Standard Deviations (*SD*), Maximum (*Max*), and Minimum (*Min*) Values for Predictor and Outcome Variables

	Males				Females			
	Mean	*SD*	*Min*	*Max*	*Mean*	*SD*	*Min*	*Max*
1. Depressive symptoms, age 13	4.79	3.24	0.00	14.88	5.30	5.05	0.00	26.25
2. Social anxiety, age 13	1.30	2.41	0.00	12.38	2.21	2.35	0.00	10.00
3. Depressive symptoms, age 20	5.05	6.33	0.00	30.00	5.36	5.77	0.00	27.30
4. Social anxiety, age 20	34.12	12.90	18.00	71.00	32.36	12.70	18.00	72.00
5. Teen undermining autonomy/relatedness	0.51	0.39	0.05	2.47	0.58	0.43	0.00	1.70
6. Mom undermining autonomy/relatedness	0.71	0.38	0.00	1.77	0.66	0.32	0.00	1.65
7. Preference for online communication	13.69	4.12	9.00	22.00	12.20	4.60	0.00	27.32
8. Supportive comments	1.04	1.31	0.00	4.00	2.08	1.30	0.00	5.00
9. Pictures of same-age peers	2.36	0.58	1.00	3.00	2.68	0.47	2.00	3.00
10. Deviancy talk comments	1.81	1.44	0.00	4.00	1.11	1.20	0.00	4.00
11. Verbal aggression comments	1.12	1.19	0.00	4.00	0.78	0.83	0.00	3.00
12. Close online friendship	0.15	0.33	0.00	1.00	0.13	0.35	0.00	1.00

TABLE 2
Correlations for Study Variables

	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Family income	—												
2. Gender	−.11	—											
3. Depressive symptoms, age 13	−.11	.06	—										
4. Social anxiety, age 13	−.07	.08	.06	—									
5. Depressive symptoms, age 20	−.01	.03	.20*	.14	—								
6. Social anxiety, age 20	.24**	−.07	.17*	.11	.42**	—							
7. Teen undermining autonomy/ relatedness	.02	.09	.13	.19*	.08	−.02	—						
8. Mom undermining autonomy/ relatedness	−.20*	−.08	.04	.00	.00	−.12	.38**	—					
9. Preference for online communication	.03	−.14	.10	−.07	−.01	.12	.05	.22*	—				
10. Supportive comments	.22	.37**	−.16	−.06	.10	.23	−.20	−.49**	−.04	—			
11. Pictures of same-age peers	.02	.00	.10	.00	−.13	.00	−.12	−.36**	−.12	.33*	—		
12. Deviancy talk comments	.00	−.26	−.17	−.10	.11	−.02	.01	.29*	.01	−.13	−.46**	—	
13. Verbal aggression comments	−.14	−.20	.00	−.19	.21	.03	.08	.29*	.02	−.20	−.11	.26*	—
14. Close online friendship	−.15	−.04	.00	−.12	.00	.00	−.06	.27**	.35**	.07	−.07	−.16	−.15

Note. Gender coded 1 = male, 2 = female. Analyses with variables 1–8: *n* between 141 and 181; variable 9: *n* between 119 and 132; variables 10–13: *n* between 50 and 62; variable 14: *n* between 125 and 137.
*$p<.05$; **$p<.01$.

Facebook or MySpace (*n* = 89). Depressive symptoms at Time 1 were positively associated with youths' preference for online communication at Time 2. However, depressive symptoms and social anxiety at Time 2 were negatively and positively related to youths' preference for online communication, respectively. Higher levels of mothers' behavior undermining autonomy and relatedness at Time 1 significantly predicted youths' preference for online social communication at Time 2. See Table 3.

Positive Peer Relationship Quality Online

Number of friends posting supportive comments. All analyses of online peer relationship quality used coded observations from youths' social networking webpages (*n* = 63). Table 4 presents results showing that females and youth with greater reported family income received comments from a greater number of friends indicating support. Social anxiety at Time 2 was associated with receiving support from a greater number of peers. Higher levels of undermining autonomy and relatedness behavior from mothers at Time 1 predicted fewer people posting supportive messages on young adults' pages at Time 2.

Pictures of same-age peers. Females and youth with higher reported family income had pictures posted on their social networking pages featuring

larger groups of same-age peers. However, higher levels of mothers' behavior undermining autonomy and relatedness at Time 1 significantly predicted

TABLE 3
Summary of Hierarchical Regression Analysis Predicting Preference for Online Communication From Teen Psychopathology and Mother–Teen Interaction Style (*n* = 89)

	Criterion Variable: Preference for Online Communication			
	β entry	β final	Change R^2	Total R^2
Step 1. Demographics			.01	.01
Family income	.04	.06		
Gender	−.06	.03		
Step 2. Age 13 psychopathology			.11**	.12
Depressive symptoms	.34**	.26*		
Social anxiety	−.10	−.12		
Step 3. Age 20 psychopathology			.07	.18*
Depressive symptoms	−.25*	−.24*		
Social anxiety	.23*	.26*		
Step 4. Teen behavior			.01	.19*
Teen undermining autonomy and relatedness	.09	.03		
Step 5. Mother behavior			.03*	.22**
Mother undermining autonomy and relatedness	.22*	.22*		

Note. Gender coded 1 = male, 2 = female. *n* = 89 youth reporting having a social networking webpage on Facebook or MySpace.
*$p<.05$; **$p<.01$.

TABLE 4

Summary of Hierarchical Regression Analysis Predicting Positive Online Peer Interaction Quality From Teen Psychopathology and Mother–Teen Interaction Style ($n = 63$)

	Criterion Variable: Supportive Comments From Peers					Criterion Variable: Pictures of Same-Age Peers			
	β entry	β final	Change R^2	Total R^2		β entry	β final	Change R^2	Total R^2
Step 1. Demographics			.23**	.23*	Step 1. Demographics			.24**	.24*
Family income	.30**	.20*			Family income	.36**	.31*		
Gender	.41**	.33**			Gender	.37**	.33**		
Step 2. Age 13 psychopathology			.04	.27**	Step 2. Age 13 psychopathology			.01	.25*
Depressive symptoms	−.14	−.14			Depressive symptoms	.06	.18		
Social anxiety	−.15	−.18			Social anxiety	−.01	.05		
Step 3. Age 20 psychopathology			.16**	.43**	Step 3. Age 20 psychopathology			.01	.26*
Depressive symptoms	.02	.06			Depressive symptoms	−.14	−.11		
Social anxiety	.34**	.28**			Social anxiety	.04	.02		
Step 4. Teen behavior			.03	.46**	Step 4. Teen behavior			.02	.28*
Teen undermining autonomy and relatedness	−.24	−.15			Teen undermining autonomy and relatedness	−.16	−.06		
Step 5. Mother behavior			.07**	.53**	Step 5. Mother behavior			.07*	.35**
Mother undermining autonomy and relatedness	−.33**	−.33**			Mother undermining autonomy and relatedness	−.29*	−.29*		

Note. Gender coded 1 = male, 2 = female. $n = 63$ youth whose social networking webpages on Facebook or MySpace were coded.
*$p < .05$; **$p < .01$.

youth posting pictures with smaller groups of same-age peers at Time 2. See Table 4.

Negative Peer Relationship Quality Online

Number of friends posting deviancy talk comments. Table 5 presents results showing that higher depressive symptoms for youth at Time 1 was associated with fewer friends posting deviancy talk comments on youths' pages. Youth whose mothers undermined their autonomy and relatedness at Time 1, in contrast, had a greater number of individuals posting comments on their pages that contained profanity or references to alcohol use, drugs, delinquency, or sex at Time 2.

Number of friends posting verbal aggression comments. Youth who were more socially anxious at Time 1 had fewer friends posting verbal aggression comments on their pages at Time 2. Higher levels of mothers' behavior undermining teens' autonomy and relatedness at Time 1 did not significantly predict youth having a greater number of friends posting comments indicating verbal aggression at Time 2 ($p = .09$). See Table 5.

Friendship Formation Online

Close friendship with someone met online. A hierarchical logistic regression analysis was conducted using data from youth who reported having a social networking webpage on Facebook or MySpace ($n = 79$). There were no significant relationships between income, gender, depression, or social anxiety and youths' online friendship formation. However, higher levels of behavior undermining autonomy and relatedness from mothers at Time 1 predicted a greater likelihood of youth ever having formed a close friendship with someone they had met online at Time 2. See Table 6.

DISCUSSION

The present study sought to determine whether youth who experience negative interactions with their mothers as teenagers may, as young adults, (a) prefer communicating with others online rather than face-to-face, (b) engage in more negative peer interactions on social networking websites, and (c) have a greater likelihood of forming a new friendship with someone met online. We found that youth whose mothers undermined their autonomy and related-

TABLE 5

Summary of Hierarchical Regression Analysis Predicting Negative Online Peer Interaction Quality From Teen Psychopathology and Mother–Teen Interaction Style ($n = 63$)

	Criterion Variable: Deviancy Talk Comments From Peers					Criterion Variable: Verbal Aggression Comments From Peers			
	β entry	β final	Change R^2	Total R^2		β entry	β final	Change R^2	Total R^2
Step 1. Demographics			.07	.07	Step 1. Demographics			.09	.09
Family income	−.05	.01			Family income	−.20	−.18		
Gender	−.27*	−.23			Gender	−.24*	−.17		
Step 2. Age 13 psychopathology			.09	.16	Step 2. Age 13 psychopathology			.04	.13
Depressive symptoms	−.24*	−.30*			Depressive symptoms	−.01	−.11		
Social anxiety	−.10	−.17			Social anxiety	−.22	−.34*		
Step 3. Age 20 psychopathology			.02	.18	Step 3. Age 20 psychopathology			.07	.20
Depressive symptoms	.17	.14			Depressive symptoms	.26*	.23		
Social anxiety	−.06	−.02			Social anxiety	−.05	−.01		
Step 4. Teen behavior			.03	.22	Step 4. Teen behavior			.05	.25*
Teen undermining autonomy and relatedness	.16	.09			Teen undermining autonomy and relatedness	.22	.16		
Step 5. Mother behavior			.06*	.28*	Step 5. Mother behavior			.04	.29*
Mother undermining autonomy and relatedness	.28*	.28*			Mother undermining autonomy and relatedness	.22	.22		

Note. Gender coded 1 = male, 2 = female. $n = 63$ youth whose social networking webpages on Facebook or MySpace were coded.
*$p < .05$.

ness at age 13 had an increased preference for online communication over face-to-face communication at age 20. Mothers' behavior undermining autonomy and relatedness also predicted multiple indicators of poorer observed friendship quality in youths' online relationships at age 20, including (a) fewer peers making supportive comments on youths' webpages, (b) smaller groups of same-age peers in youths' posted pictures, and (c) more peers making comments indicating deviancy talk. Mothers' behavior undermining autonomy and relatedness, however, did not significantly predict verbal aggression comments received from peers. Finally, mothers' behavior undermining autonomy and relatedness predicted an increased likelihood that youth had ever formed a close friendship with someone met online, reported at age 20. All findings remained after accounting for demographic variables, youths' depressive and social anxiety symptoms at ages 13 and 20, and adolescents' own behavior undermining autonomy and relatedness in interactions with their mothers at age 13.

One possible explanation for the association between mothers' behavior undermining autonomy and relatedness and youths' greater preference for online communication may be that experiencing such behavior within the family context creates negative expectations about communication with others. The

reduced social cues of online communication may be attractive to these youth because they lower the intensity of such expectations. For example, the time-lagged nature of wall-post communication via social networking websites permits individuals to worry less about being rejected in the moment, and the physical absence of others may make interactions feel less intimidating, perhaps allowing individuals to feel like they may take greater risks with their communication online as a result (Schouten et al., 2007; Suler, 2004).

Our findings also provide insight into variation in the communication that takes place over the internet. Although mothers' behavior undermining youths' autonomy and relatedness predicted a preference for online communication, it also predicted youth having fewer friends post supportive messages on their social networking webpage. As mentioned above, one possibility is that experiencing negative interactions with mothers creates expectations for future negative in-person interactions with others that lead youth to behave with peers in less intimate ways, even online (Allen, Hauser, Eickholt, et al., 1994). Although the disinhibiting features of online social communication might be expected to facilitate intimate disclosure that may elicit supportive messages from others, it may be that these features are not strong enough on social networking websites to provide youth with the social

TABLE 6
Summary of Hierarchical Logistic Regression Analysis Predicting Ever Having Formed a Close Online Friendship From Teen Psychopathology and Mother–Teen Interaction Style ($n = 79$)

	Criterion Variable: Ever Having Formed a Close Friendship With Someone Met Online		
	β entry	β final	Odds Ratio
Step 1. Demographics			
Family income	−.33*	−.21	0.61
Gender	.02	.20	1.56
Step 2. Age 13 psychopathology			
Depressive symptoms	.13	.16	1.46
Social anxiety	−.15	.02	1.04
Step 3. Age 20 psychopathology			
Depressive symptoms	−.17	−.15	0.73
Social anxiety	.20	.15	1.41
Step 4. Teen behavior			
Teen undermining autonomy and relatedness	−.29	−.37	0.42
Step 5. Mother behavior			
Mother undermining autonomy and relatedness	.35*	.35*	2.23
R^2 for model		.32*	

Note. Gender coded 1 = male, 2 = female. $n = 79$ youth reporting having a social networking webpage on Facebook or MySpace.
*$p < .05$.

confidence necessary to disclose intimate information to peers. Research has also suggested that youth may replicate problematic relational strategies learned from parents in other relationships (Leadbeater et al., 2008). These results leave open the possibility that such replication may extend to relationships in the online domain. To the extent that youth may exhibit behaviors that undermine their peers' autonomy and relatedness, it might be expected that these youth would receive less support from peers. This possibility is further supported by the finding that youth who experienced behavior undermining autonomy and relatedness from their mothers at age 13 also posted pictures on their social networking websites featuring smaller groups of same-age peers. Together these findings suggest that communication through social networking websites may not necessarily help expand the social networks of youth who have experienced maternal behavior undermining autonomy and relatedness.

Mothers' behavior undermining autonomy and relatedness was also associated with comments from more friends containing deviancy talk. Perhaps youth who experience this behavior from their mothers

become involved in deviancy in early adolescence due to a lower endorsement of parents' values given mothers' negative behavior. As a result, youth may end up selecting and engaging with deviant peers, which may help explain the continuity of the association between mothers' negative behavior and youth receiving deviancy talk comments. Although we do not know whether these observed patterns of online behavior are consistent with youths' concurrent behavior in face-to-face relationships, these results suggest that the expected effects of mothers' behavior undermining autonomy and relatedness in offline relationships (Allen, Hauser, Bell, et al., 1994; Allen, Hauser, Eickholt, et al., 1994; Allen et al., 2006; Eccles et al., 1997; McElhaney & Allen, 2001) may also be extended to the online domain.

Finally, higher levels of maternal behavior undermining autonomy and relatedness were predictive of youth having ever formed a close relationship with someone met online. One possible explanation may be that negative expectations about communication with known others lead youth to seek out unfamiliar peers on the internet for opportunities to make new friendships. However, it is important to acknowledge that the one question asking whether youth had ever formed a close friendship with someone met online cannot provide insight into the quality of these relationships. Additionally, because the question did not explicitly ask at what age youth may have formed such a friendship, it cannot be adequately conjectured whether such a friendship may have been potentially risky or more normative in nature.

The present study also found several associations between demographic variables and youths' online social networking behavior. Youth with greater reported family income were more likely to receive supportive messages from a greater number of friends and have pictures posted featuring larger groups of same-age peers. These findings are consistent with previous research demonstrating links between greater family income and youths' engagement in more positive relationships with peers (Cui, Conger, Bryant, & Elder, 2002). Lower reported family income was predictive of youth having ever formed a close friendship with someone met online. This finding corroborates the idea that youth from poorer socioeconomic backgrounds may have difficulty forming satisfying face-to-face friendships and feel more compelled to form relationships with others online as compared with wealthier youth.

The finding that females were more likely to receive supportive messages from peers is consonant with prior research indicating that females' same- and cross-sex relationships tend to be more intimate

and supportive than males' same-sex friendships (Buhrke & Fuqua, 1987; Kuttler, La Greca, & Prinstein, 1999). Females were also more likely to post pictures featuring larger groups of same-age peers, consistent with previous research finding that women are more likely to define themselves through photographs depicting smiling, touching, and groups of people than males, who more frequently define themselves through photographs depicting themselves alone (Clancy & Dollinger, 1993). Importantly, our findings suggest that these gender differences may be true of online relationships as well.

With regard to youths' psychopathology, depressive symptoms at age 13 predicted a greater preference for online communication, but depressive symptoms at age 20 predicted a lesser preference for online communication. It may be that depressive symptoms in early adulthood are more indicative of withdrawal from social relationships than depressive symptoms in early adolescence. However, the contradictory nature of these findings necessitates they be interpreted with caution and addressed in future research. Social anxiety at age 20 predicted a greater preference for online communication and receiving supportive comments from more friends, suggesting the possibility that socially anxious youth may feel more comfortable communicating online but also pull for more reassuring comments from friends than nonanxious youth. Moreover, greater depressive symptoms and social anxiety at age 13 predicted fewer friends posting deviancy talk and verbal aggression comments at age 20, respectively. Because depressive symptoms and social anxiety may be associated with withdrawal from friendships, it is perhaps not surprising that these youth would have fewer negative friendships online.

It should be acknowledged that generalizability of these findings is limited by the small sample from which they were derived. Although this study attempted to account for the possibility that associations between maternal behavior undermining autonomy and relatedness and online variables might be better accounted for by youths' depressive and anxiety symptoms, other unmeasured variables, such as personality traits, may also influence these associations. Additionally, it is possible that moderators of these associations may exist, evidencing social compensation for some individuals but continued risk for others. Such moderators deserve attention in future studies. Moreover, although our measurement approach was intended to capture the overall quality of interactions youth experienced online regardless of whether occurring with few or many friends, over short versus long periods of time, or how much time

youth spent online, we recognize that there are other metrics for standardizing what was assessed.

Another limitation of the current approach is the inability to adequately consider the potential influence of youths' social contexts on their online social networking behavior. Youth who go on to college, for example, may have access to more potential same-age friends than youth who do not. Similarly, youth who continue their education, as opposed to those who do not, may have higher socioeconomic status, allowing them greater access to technology used to maintain online social networks. However, it should be noted that post hoc analyses of this study's data did not reveal any significant correlations between youths' highest level of completed education and any of the study's variables except for family income ($r = .30$, $p < .001$).

Although this study represents a step forward in assessing youths' online peer interactions in a more objective manner than via youths' self-reports, it was limited by its inability to determine whether youth initiated interactions with peers or vice versa, and if youth initiated interactions, whether youths' comments to peers were positive or negative. Future studies would benefit from also observing communications from youth to peers, which may contribute a better understanding of whether peer responses may be due to the personal style of the participant or reflect patterns of communication established with peers over time.

Unfortunately, this study did not have measures of maternal behavior undermining autonomy and relatedness when participants were young adults in order to assess potential concurrent associations with online social networking behavior. It may be that early maternal behavior undermining autonomy and relatedness is predictive of similar behavior from youths' mothers in young adulthood, and that it is mothers' behavior in young adulthood that is ultimately predictive of youths' negative online interactions. We have conjectured that negative experiences with mothers may be internalized over time and contribute to negative expectations about communication with others or to the use of negative relational strategies with others, resulting in problematic behavior in peer interactions. Nevertheless, conclusions about the causality of effects in this study cannot be drawn from naturalistic longitudinal studies such as this one. It is possible, for example, that negative interactions with mothers may be a marker of other adolescent characteristics that have instead led to the online social behaviors assessed. Moreover, our focus on behavior undermining autonomy and relatedness was observed in terms of

individuals' behaviors, even though problematic interactions typically are inherently dyadic in nature. Future research might profitably examine potential dyadic variations in the way issues of autonomy and relatedness are handled within families. Finally, this study is also limited by its exclusion of fathers' behaviors, which undoubtedly also play an important role in shaping youths' social development.

Despite these limitations, this study nevertheless highlights the importance of considering adolescents' early social development within their families for predicting variation in their later online socializing behavior with peers. This study found that youth who experience negative interactions with their mothers during early adolescence and choose to establish social networking webpages (a) prefer communicating online versus face-to-face, (b) experience less positive and more negative interactions on these pages, and (c) are more likely to have ever formed a close friendship with someone they have met online. These findings suggest that simply seeking relationships in an alternative context in order to meet social needs, as preferred by youth who have experienced negative interactions with their mothers during early adolescence, may not be sufficient for establishing positive peer interactions. Most importantly, although features of online communication may allow individuals to feel more comfortable interacting with others and provide unique opportunities to make new friendships, it may be necessary for youth experiencing early negative mother–adolescent interactions to modify negative relational expectations or strategies learned within the family context in order to fully take advantage of these social opportunities.

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