Reliance on technology for communication has increased dramatically over the last three decades (Tapscott, 2009). Social networking websites such as Facebook provide users with new ways to communicate. Recent statistics estimated that more than 500 million people use Facebook daily (Facebook, 2012). As new ways of communicating develop, there is a need to understand the effects that these new forms of communication may have on the health and well-being of individuals. Prior research has shown that some forms of interpersonal communication may be adversely associated with health and well-being (Byrd-Craven, Geary, Rose, & Ponzi, 2008; Byrd-Craven, Granger, & Auer, 2011; Calmes & Roberts, 2008; Rose, 2002; Rose, Carlson, & Waller, 2007). Rose (2002) identified a type of communication that focuses on negative topics, in which individuals excessively rehash problems, as corumination. Higher levels of corumination have been positively related to symptoms of depression and anxiety (Rose, 2002; Rose et al., 2007; see also Calmes & Roberts, 2008). Recent work has also shown that higher levels of corumination are related to higher levels of cortisol and alpha amylase, which are two biological indicators of stress (Byrd-Craven et al., 2008; Byrd-Craven et al., 2011). The purpose of the present research was to investigate the novelty of the extent to which individuals using Facebook engage in corumination and whether corumination carried out on Facebook is associated with health.

Researchers have found that corumination occurs more often in the friendships of young girls than the friendships of young boys (Rose, 2002; Rose et al., 2007). This research has shown that corumination is positively related to beneficial aspects including relationship satisfaction and to detrimental aspects including depression. Young women and girls who report higher levels of corumination in their friendships feel closer to their friends than do those who report lower levels of corumination (Rose, 2002). Friends who engage in higher levels of corumination also rate their

**ABSTRACT.** Prior research has shown that face-to-face communications that involve excessive focus on problems and negative aspects of situations are related to higher stress. This type of communication has been called corumination (Rose, 2002). We hypothesized that corumination can also occur in communications carried out on Facebook. We analyzed 100 female college students’ communications carried out through Facebook and examined their self-reported corumination behaviors from daily life. The results supported the hypothesis that individuals coruminate when communicating through Facebook conversations similar to the way that individuals communicate face to face. The results showed that corumination in daily life had a significant negative association with health in an analysis that took into account the positive effects of social support, \( F(3, 89) = 3.81, p = .02 \). Implications for interventions designed to reduce stress and to improve overall health of Facebook users are discussed.
friendships as higher quality than those who engage in lower levels of corumination (Rose et al., 2007). However, number of friends has been negatively associated with corumination in which individuals who coruminate more often have fewer friends. (Tompkins, Hockett, Abraibesh, & Witt, 2011). Research on corumination has also shown that the amount of corumination occurring in friendships was positively related to depression and anxiety (Rose et al., 2007).

Recent work (Byrd-Craven et al., 2008; Byrd-Craven et al., 2010) has shown that corumination has biological consequences, which are likely related to negative health outcomes. In a study of young college women, Byrd-Craven et al. (2008) found that higher levels of corumination occurring between friends were related to higher levels of cortisol, a stress hormone. In a more recent study, Byrd-Craven et al. (2011) found that higher levels of corumination were related to higher levels of alpha-amylase, an enzyme associated with the stress response, as well as higher levels of cortisol. The authors pointed out that the biological effects of corumination are complex, involving both the hypothalamic-pituitary-adrenal axis (cortisol) and the sympathetic nervous system (alpha-amylase). Both cortisol and alpha-amylase have been associated with various times throughout a stressful situation (Engert et al., 2011). Stress has been shown to have negative effects on the immune system (for a review, see Denson, Spanovic, & Miller, 2009).

Stress is also believed to be a major factor in many physical illnesses such as cancer, asthma, and gastrointestinal conditions or stomach problems (Goldstein & Kopin, 2007).

Social networks have been associated with beneficial aspects to relationships including increasing social capital through maintenance of close and distant relationships (Steinfield, Ellison, & Lampe, 2008; Subrahmanyan, Reich, Waechter, & Espinoza, 2008). Raacke and Bonds-Raacke (2008) found that social networks such as Facebook are used to locate old friends and form new friendships. Users of Facebook are able to communicate with one another in several ways such as communicating instantly or asynchronously. Users may also play games (e.g., Farmville®, Mafia Wars®), which frequently involve other users. Many of these games often allow users to exchange messages in real time (Pempek, Yermolayeva, & Calvert, 2009). Sheldon (2008) investigated individual differences in willingness to communicate and found that users of Facebook communicate via Facebook the way they do in face-to-face communications.

In the present study, we aimed to determine the extent to which college students engage in corumination when using Facebook and the extent that corumination through Facebook relates to health. Adult women are more likely than adult men to endorse Facebook relationship status as containing more meaning such as exclusive relationships and long-term stability (Fox & Warber, 2013) and report having more online relationships (Nice & Katz, 1988). Women are also more likely than men to exhibit higher levels of internalizing problems (Tompkins et al., 2011). Although Facebook is used more often for social interaction, Facebook has been associated with identity expression in emerging adulthood (Pempek et al., 2009). Older adolescents have also been shown to use the Internet to communicate with existing personal networks more than younger adolescents who are more likely to establish relationships with strangers (Valkenburg, Schouten, & Peter, 2005). Because social networks such as Facebook have been shown to relate to more young adult women than men and young adolescents, the focus of the research was on a college female population. By analyzing Facebook conversations between same-sex close friendship dyads for corumination and assessing health outcomes, the relationship between corumination, health, and social networks can be studied. Additionally, much of the research on corumination has found that women coruminate more than men, particularly with same-sex friends, in both adolescent (Rose, 2002; Rose et al., 2007) and emerging adult populations (Byrd-Craven et al., 2011). Because this was our primary construct of interest, we decided to limit the sample to young women. We hypothesized that individuals would coruminate in their Facebook communications in a similar way that individuals communicate face-to-face. Furthermore, we hypothesized that corumination both on Facebook and self-reported would be negatively related to overall health. Specifically, we hypothesized that higher levels of corumination would be associated with lower health scores as has been documented in the literature for face-to-face relationships. In addition, we hypothesized that social support would be positively related to health.

Method

Participants

Participants were recruited using an online system (i.e., SONA) that allows researchers to post descriptions of research studies and allows
participants to sign up for appointments. Only women were included in the study. Participants were given either course credit or extra credit in a course as compensation for participating in the study. Participants were 100 female undergraduates enrolled in psychology and speech communication courses at a large public university. All participants were 18 years of age or older. All 100 participants submitted copies of their Facebook interactions with a close friend of the same sex. The 100 participants included 11 dyads (i.e., 22 participants in which both friends participated in the study and contributed 11 Facebook conversations). No further demographic information was gathered from participants.

Materials
All participants completed the corumination questionnaire (Rose, 2002), the Research and Development (RAND) Health Survey (Version 1.0, Ware & Sherbourne, 1992), the Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988), and the Medical Outcomes Study (MOS) Social Support Survey (Sherbourne & Stewart, 1991). A summary of the descriptives of the measures that pertain to the study are displayed in Table 1.

Corumination. The corumination questionnaire (Rose, 2002) was administered to assess participants' levels of corumination in their friendships. The questionnaire contains 27 statements that relate to the type of conversation that participants have when they talk to another person about their problems and contains statements such as “After my friend tells me about a problem, I always try to get my friend to talk more about it later.” Participants were asked how well the statement described them on a 5-point Likert-type scale of 1 (not at all true) to 5 (really true). The scale ranges from 27 to 135 in which higher scores on the corumination questionnaire indicate that participants engage in higher amounts of corumination. The corumination questionnaire has been found to have high internal reliability (α = .96, Rose, 2002). In the current study, we observed its reliability to be α = .98.

Health. The RAND 36-Item Health Survey (Version 1.0, Ware & Sherbourne, 1992) was used to establish a general overview of participants’ health conditions. The RAND asked questions that covered participants’ personal physical and emotional health. Some questions were reversed scored to account for both positive and negative stated health questions. The RAND includes two questions that measure global self-rated health and how a person’s health has changed over the past 12 months. The RAND also includes eight other subscales: Energy Level, Pain, Physical Functioning, Role Limitations resulting from Physical Problems (physical limitations), Role Limitations resulting from Emotional Problems (emotional limitations), Social Functioning, General Health Perceptions, and General Mental Health. A total RAND score can be calculated by combining average responses to each of the 10 components (i.e., 2 general questions and questions for the 8 subscales). Each subscale on the RAND ranges from 0 to 100 percent with higher scores on the RAND indicative of a healthier response to questions. The reliability of the RAND has been found to be α ≥ .70 (Busija et al., 2011). In the current study, we observed its reliability to be α = .98.

Mood. The PANAS questionnaire (Watson et al., 1988) was used to assess the average mood of participants. The PANAS contains 20 different positive and negative adjectives. Participants were asked “in the past few weeks” how well the adjectives described them on a 5-point Likert-type scale from

<p>| TABLE 1 |
| Summary of Descriptive Statistics for the Measures Used in the Study |</p>
<table>
<thead>
<tr>
<th>Measure</th>
<th>n</th>
<th>M</th>
<th>SD</th>
<th>Variance</th>
<th>Min.</th>
<th>Max.</th>
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<tr>
<td>Physical Functioning</td>
<td>99</td>
<td>90.66</td>
<td>18.96</td>
<td>359.51</td>
<td>5.00</td>
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<td>Limitations (Physical)</td>
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<td>91.92</td>
<td>18.84</td>
<td>354.95</td>
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<td>100.00</td>
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<tr>
<td>Limitations (Emotional)</td>
<td>99</td>
<td>68.35</td>
<td>37.31</td>
<td>1391.70</td>
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<td>100.00</td>
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<td>Energy</td>
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<td>16.40</td>
<td>269.03</td>
<td>0.00</td>
<td>100.00</td>
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<tr>
<td>Emotional Well-Being</td>
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<td>13.74</td>
<td>188.79</td>
<td>24.00</td>
<td>100.00</td>
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<td>22.46</td>
<td>504.62</td>
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<td>100.00</td>
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<td>21.77</td>
<td>474.12</td>
<td>15.00</td>
<td>100.00</td>
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<tr>
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<td>13.17</td>
<td>173.37</td>
<td>20.00</td>
<td>100.00</td>
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<td>308.58</td>
<td>20.38</td>
<td>97.50</td>
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<td>11.63</td>
<td>135.32</td>
<td>81.00</td>
<td>146.00</td>
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<td>79.78</td>
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<td>PANAS (Negative)</td>
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<td>8.67</td>
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<td>23.39</td>
<td>547.24</td>
<td>27.00</td>
<td>135.00</td>
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<td>Facebook Corumination</td>
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<td>30.63</td>
<td>8.86</td>
<td>78.47</td>
<td>12.00</td>
<td>59.00</td>
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</table>

Note. RAND = Research and Development Health Survey; MOS = Medical Outcomes Study; PANAS = Positive and Negative Affect Schedule.
Corumination and Health in Young Women  
Swearingen, Byrd-Craven, and Kennison

1 (very slightly or not at all) to 5 (extremely). Questions were also divided into positive and negative adjectives to describe the mood. Each subscale of the PANAS ranges from 10 to 50 with higher scores on the PANAS indicative that participants considered themselves to have more positive attitudes or negative attitudes. The reliability of the PANAS has been found to be .85 for negative affect and .89 for positive affect (Crawford & Henry, 2004). In the current study, we observed its reliability to be \( \alpha = .90 \) for negative affect and \( \alpha = .90 \) for positive affect.

**Social support.** The MOS of Social Support (Sherbourne & Stewart, 1991) measures the overall functional social support that participants receive and contains four subscales of social support. Scores range from 0 to 100 percent with higher scores on the overall social support and on the four subscales indicative of a higher social support. Participants were instructed to complete the survey when considering the social support of their friend. The reliability of the MOS has been found to be between .92 and .97 (Sherbourne & Stewart, 1991). In the current study, we observed its reliability to be \( \alpha = .93 \) for overall social support.

**Procedure**

After Oklahoma State University institutional review board approval (AS-10-113) was given, participants were able to sign up for the study using the online system. Participants who signed up for the present study received an e-mail asking them to come to the laboratory with a copy of Facebook conversations that occurred between the participant and a close female friend. They were sent a consent form for their friend, which gave permission for the conversations to be used in the research. The conversations were to have occurred over a 3-day period for at least 15 min a day. Participants were asked to save the formatted conversations into a Microsoft Word document and to replace the names involved in the conversation with the letters A for themselves and B for the other party in the conversation. When participants arrived at the lab session, they were asked to sign a consent form and provide the consent form from their friend in the conversation. They were asked for the formatted conversations and asked to fill out the four additional questionnaires. All participants received instructions in the e-mail to (a) pick a close female friend with whom they regularly use Facebook Chat; (b) chat with the friend at least 15 min each day through Facebook Chat; (c) save each file with their participant identification number; (d) copy and paste all conversation from their text window on Facebook Chat into the Word document; (e) remove their name from the transcript; and (f) print the transcript to submit to the laboratory.

The Facebook conversations were coded for the content and amount of corumination within the conversation. The coding for each conversation was conducted by three trained undergraduate research assistants. The system of coding corumination developed by Rose, Schwartz, and Carlson (2005) was adapted for the present study. The conversations were divided into four areas of corumination. Examples of each of the areas were provided for clarification for the coders. Rehashing was characterized by “talking about every detail of the problem, talking about parts of the problem over and over.” Examples of speculating were “talking about why the problem might have happened, talking about bad things that might happen because of the problem, talking about parts of the problem that are not understood.” Dwelling on negative affect pertained to “talking about how bad the person with the problem feels, talking about how upset, sad, or mad the person with the problem feels (or should feel).” Encouraging problem talk was exemplified by “trying to keep one another talking about the problems, trying to get each other to tell every detail about the problems.” Each coder rated the conversations on a 1 to 5 scale for the four different areas. Coders rated a core set of conversations until their reliability was \( \alpha > .90 \). After the initial core set of conversations, every 10th participant was double coded to ensure consistent reliability. The interrater reliability for each area was as follows: rehashing (\( \alpha = .82 \)); speculation (\( \alpha = .88 \)); negative affect focus (\( \alpha = .92 \)); mutual encouragement (\( \alpha = .89 \)).

When the total scores for all areas were calculated, the average of the three raters was taken whenever the raters score fell within 2 points of each other. Differences between the raters were more than 2 points apart, the outlier was dropped and the average of the two similar scores was taken. The averages from the coders provided an indication of the amount of corumination that was found within the conversations.

**Results**

We analyzed participants’ self-reported daily corumination, their corumination carried out through Facebook, as well as their self-reported health, mood, and social support. In an effort...
to address the data dependency between dyads that participated together, participants filled out questionnaires separate from their dyadic partner. Conversations were only scored based on the individual responses without consideration to what the other partner in the conversation stated. Table 1 displays the descriptive statistics for these variables. The results supported that individuals coruminate in daily life when communicating through Facebook. Similar amounts of corumination were observed in each of the three conversations carried out through Facebook. Total observed Facebook corumination was used as a predictor in lieu of average observed corumination to reduce the influence of outliers, as was done in previous studies (Byrd-Craven et al., 2008; Byrd-Craven et al., 2011). The total observed Facebook corumination in the first conversation significantly predicted the total observed Facebook corumination in the second conversation, $F(1, 88) = 34.53, p < .001, \beta = .53, r^2 = .28$, and the total observed Facebook corumination in the second conversation significantly predicted the total observed Facebook corumination in the third conversation, $F(1, 88) = 24.42, p < .001, \beta = .47, r^2 = .22$.

Regression analyses were also conducted to analyze the subcomponents of corumination (i.e., Rehashing, Speculation, Encouraging Problem Talk, and Negative Affect). The results showed that Rehashing observed in Facebook communications predicted the amount of rehashing occurring in reported communications, $F(1, 88) = 16.18, p < .001, \beta = .39, r^2 = .16$. The amount of Rehashing in the second conversation on Facebook predicted Rehashing in the third conversation, $F(1, 88) = 25.18, p < .001, \beta = .54, r^2 = .22$. Speculation in the first Facebook conversation predicted Speculation in the second Facebook conversation, $F(1, 88) = 5.40, p = .02, \beta = .23, r^2 = .06$. Negative Affect Focus in the first Facebook conversation predicted Negative Affect Focus in the second Facebook conversation, $F(1, 88) = 10.75, p = .001, \beta = .32, r^2 = .11$, and Negative Affect Focus in the second Facebook conversation predicted Negative Affect focus in the third Facebook conversation, $F(1, 88) = 14.64, p < .001, \beta = .45, r^2 = .14$. Encouraging Problem Talk in the first Facebook conversation predicted Encouraging Problem Talk in the second Facebook conversation, $F(1, 88) = 16.83, p < .001, \beta = .35, r^2 = .16$, and Encouraging Problem Talk in the second Facebook conversation predicted Encouraging Problem Talk in the third Facebook conversation, $F(1, 88) = 16.55, p < .001, \beta = .49, r^2 = .16$.

Correlational analyses were conducted to investigate the interrelatedness of the subscales of the RAND, the PANAS, the MOS, corumination on Facebook, and self-reported daily corumination. A summary of these results are displayed in Table 2. As in prior research (Hays, Sherbourne & Mazel, 1995), the subscales of the RAND health measure were positively related to one another. Total social support measured through the MOS scale was positively correlated with general health scores ($r = .23, p = .02$). Further analyses suggested that self-reported daily corumination was positively associated with emotional limitations ($r = .20, p = .05$), and observed Facebook corumination was positively associated with physical health ($r = .21, p = .05$) and physical functioning ($r = .23, p = .03$). Physical functioning was negatively related to the positive subscale of the PANAS ($r = -.21, p = .04$), as higher levels of physical function were related to lower levels of positive affet.

To investigate how self-reported daily corumination and corumination on Facebook predicted health, we conducted a multiple regression using a hierarchical approach. We used the total score for the RAND for each participant as the dependent variable in the hierarchical regression. We investigated whether self-reported daily corumination and corumination on Facebook could significantly improve model fit, explaining variance in addition to the variance accounted for by the total social support as measured by MOS. Table 3 displays a summary of the variables, standard errors, beta values, standardized betas, and $R^2$ from this analysis. Both models had acceptable Variance Inflation Factor (VIF) and Tolerance values. In Block 1, VIF ranged from 1.00 to 1.03, and Tolerance ranged from .70 to .87. In Block 2, VIF ranged from 1.05 to 1.44, and Tolerance ranged from .97 to .99. Additionally, with means at or around zero, the following diagnostic statistics indicated that both models were a good fit: Residual, Cook’s Distance, Studentized Residual, and Centered Leverage Value. The predictor entered into the first block was the MOS, which accounted for 4% of the variance, Block 1, $F(1, 89) = 3.35, p = .07$. There was a nonsignificant trend for those with higher levels of social support having higher levels of overall health. The predictors added into Block 2 along with MOS were self-reported daily corumination and corumination on Facebook. The predictors included in Block 2, $F(3, 89) = 3.81, p = .02, r^2 = .12$, accounted for 12% of the variance in overall health. As expected, the addition of corumination significantly improved
the fit of the model. Controlling for social support, self-reported daily corumination was a significant predictor of overall health, indicating that a higher level of daily corumination was associated with lower levels of health. Social support was also a significant positive predictor of health. See Table 3 for the standardized beta weights, standard errors, beta values, and $R^2$ change.

**Discussion**

The results of the present research supported that corumination does occur in young women’s communications through Facebook. The elements of corumination (i.e., Rehashing, Speculation, and Negative Affect) were related in the three conversations carried out on Facebook, which suggested that corumination through Facebook continues throughout the interaction. Correlation results also showed that the observed Facebook corumination was significantly positively related to health factors, and self-reported corumination was also positively, but not significantly, related to health factors. Although this result may seem contradictory, beneficial aspects of corumination such as higher quality relationships (Rose, 2002) have to be considered. The results confirmed that, when the positive benefits of social support were controlled in a hierarchical regression analysis, self-reported daily corumination negatively predicted overall health as measured by participants’ total RAND scores. It is important to note that reported self-reported daily corumination and observed Facebook corumination are not correlated but are both predictors of the health factors. Given that both having observed Facebook conversations and daily self-perspective of corumination add unique view points to the situation, the lack of association was not surprising. The lack of association may also be influenced by observed corumination in Facebook conversations only accounting for a small portion of corumination that an individual is partaking on daily basis.

The results suggested that some users of social networking sites such as Facebook unknowingly engage in communications that may adversely affect their health. Because of the increasing availability of smart cellular phones and other devices such as tablets that allow users to communicate through social networking throughout the day, we expect that individuals who regularly engage in communications that may adversely affect their health. Because of the increasing availability of smart cellular phones and other devices such as tablets that allow users to communicate through social networking throughout the day, we expect that individuals who regularly engage in corumination with close friends will have more opportunities to do so. Those individuals engaging in high levels of corumination are likely to not only experience higher levels of stress at the time

### TABLE 2

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Note: WB = Well-Being; RAND = Research and Development Health Survey; MOS = Medical Outcomes Study; PANAS = Positive and Negative Affect Schedule; SR = Self-Reported; FB = Facebook. *p < .05; **p < .01; ***p < .001.
that the communications occur, but may also put themselves at risk in the future because overall health can decline as the result of chronic stress.

In the present study, we allowed participants to select any conversation that occurred over the 3-day period to submit to the study for analysis. We recognize that this was an important limitation of the study. It is possible that participants’ choices might have led to an underestimation of the corumination occurring in their relationships because participants might have avoided sharing conversations that focused on especially private life experiences. In future research, it may be possible to enroll participants in the study and to collect conversations (with participants’ permission) as they occur in real time. This method would create a sample of conversations that are more representative of the entire range of conversation topics that young women experience. Additional characteristics of the individuals’ social network such as number of friends and time spent using social networks and in depth demographics were also not assessed. Number of friends has been shown to be negatively related to personality factors such as shyness (Orr et al., 2009) and to corumination (Tompkins et al., 2011). Future research should expand upon details of individuals’ social networks that could influence online behaviors. In addition, small effect sizes and correlations limited the interruption of the data and warrant future replication and more research.

Future research should also explore the extent to which corumination carried out on social networking sites such as Facebook lead to changes in the biological markers for stress (i.e., cortisol and alpha amylase). Prior research has found that corumination occurring in face-to-face communications was related to higher levels of cortisol and alpha amylase (Byrd-Craven et al., 2008). We expect that similar results would be obtained during communication regardless of the mode of communication (i.e., face-to-face vs. on a cellular phone vs. via a social-networking site). Because individuals may communicate more often via cellular phones and social networking sites than they communicate face-to-face and because there may be differences in characteristics of the communications (e.g., duration, intensity), differences in the biological stress responses may be found for the different methods of communicating.

In sum, the present research provided evidence that young women coruminate when communicating through Facebook. Their levels of corumination in daily life predicted overall health with those engaging in the highest levels of corumination in daily life having the lowest health scores when the positive benefits of social support were statistically controlled. We anticipate that the use of social networking sites such as Facebook will increase in the future. Consequently, there is the danger that the prevalence of corumination will increase. We hope that this initial study of corumination on Facebook provided an impetus for others to investigate corumination, health, and/or stress response in studies of human communication.

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