Emotion

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Staying Connected: How Close Friendships Supported Emotional Well-Being During the COVID-19 Pandemic

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Close social relationships are critical for emotional well-being. The COVID-19 pandemic severely disrupted in-person contact with friends, particularly among young adults, for whom friendships support key developmental goals. In a longitudinal study of U.S. college students ($N = 205$; 10,088 observations), we examined how close friendship networks related to emotional well-being during the early months of the pandemic (May–October 2020). Leveraging prepandemic social network data and 28 days of ecological momentary assessments of affect and social interactions, we found that students with more close college friends reported higher positive affect and lower negative affect in daily life, even while physically separated from those friends. These individuals were buffered from the emotional toll of pandemic-related stressors, a pattern not explained by personality, interaction frequency, or living conditions. Rather, participants with more close friends experienced higher quality online interactions. Additionally, personal disclosures, whether in-person or online, were consistently associated with greater feelings of closeness. Notably, individuals with fewer close friends showed the largest boost in closeness following partner disclosures, suggesting that emotional sharing may play a compensatory role for those with limited social ties. These findings illustrate how friendships can continue to shape affective experiences from afar and highlight disclosure as a key mechanism through which closeness and its emotional benefits can be cultivated. Integrating social network structure, daily affect, and interaction-level processes, this work advances affective science by providing evidence of how the social regulation of emotion extends beyond physical proximity.

Keywords: social networks, emotion sharing, closeness, online communication, emotional well-being

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continued

Anticipating what would become a long tradition of scientific inquiry into the emotional significance of social ties, Cicero observed in the first century BC that "friendship adds a brighter radiance to prosperity and lessens the burden of adversity by dividing and sharing it (Cicero, 1923). Decades of research in affective science have since demonstrated that social ties are integral to emotional well-being. Although individual definitions vary, we adopt the view that emotional well-being reflects the balance and quality of one's emotional life: the ability to sustain positive emotions, recover effectively from negative ones, and experience a generally positive emotional tone (Diener et al., 2018; Park et al., 2023). Social ties provide opportunities for positive experiences, facilitate the regulation of negative emotions, and foster psychological resilience in the face of stress and adversity (Bonanno et al., 2007; Coan et al., 2006; Diener & Seligman, 2002; Holt-Lunstad et al., 2010). Beyond offering external support, social ties shape the very nature of emotional experiences, with growing theoretical consensus suggesting that emotions are not solely private, internal states, but dynamic processes shaped by the social relationships, communities, and cultural contexts within which they arise (Keltner et al., 2022; Lazarus, 1991; Parkinson et al., 2005). Yet, despite growing recognition that close relationships are vital to emotional well-being, there is still much to learn about the psychological mechanisms through which the emotionally supportive functions of close friendships can be sustained through remote, online interactions. We address this question here by examining how close friendships, formed in-person before the COVID-19 pandemic, supported young adults' emotional well-being through online interactions when they were physically distancing at the height of the pandemic. We focus on two core components of emotional well-being, negative affect and positive affect in daily life, which together capture the balance of daily emotional experiences (Diener et al., 2018).

Both theoretical and empirical work converge on at least three reasons why social connections are essential to emotional well-being. First, the need to belong has been conceptualized as a fundamental human drive, comparable in importance to physiological needs such as food or water (Baumeister & Leary, 1995; Tomova et al., 2021). Social interactions are inherently rewarding (Eisenberger & Cole, 2012; Tomova et al., 2021), offering rich opportunities to experience positive emotions and a sense of meaning (Diener & Seligman, 2002). In contrast, seclusion triggers neuroendocrine markers of stress and induces social pain and loneliness, an aversive affective state often described as a "craving" for social contact akin to hunger following fasting (Cacioppo & Cacioppo, 2014; Eisenberger & Lieberman, 2004; Hawkley & Cacioppo, 2003; Leigh-Hunt et al., 2017; Tomova et al., 2020). When chronic, loneliness can become a significant risk factor for affective disorders like depression (Cacioppo et al., 2010; S. L. Lee et al., 2021).

Second, social relations serve as a buffer against negative emotions by expanding the repertoire of coping resources available to individuals (Cohen et al., 1985; Rimé, 2009). In fact, social baseline theory posits that humans may have evolved to expect the presence of social support, which reduces the cognitive and physiological costs of managing stress (Beckes & Coan, 2011). Supporting this notion, studies have shown that anticipating a painful shock, while holding a partner's hand, as compared with a stranger's, dampens neural activity associated with both emotional reactivity (Eisenberger et al., 2007) and emotion regulation (Coan et al., 2006).

Third, emotions are not experienced in isolation but are shaped continuously through interpersonal processes. These include emotional contagion (Fowler & Christakis, 2008; Hatfield et al., 1993), synchrony (Feldman, 2012), shared appraisals (Parkinson & Simons, 2012), and direct social regulation of emotional states (Doré et al., 2017; He et al., 2025; Sahi, Schwyck, et al., 2021; Shu et al., 2021; Williams et al., 2018). Close relationships, in particular, provide frequent opportunities for such regulation, which can mitigate negative emotions, enhance positive affect, and promote adaptive coping during times of heightened stress (Butler & Randall, 2013).

Distinct types of social relationships, such as those with family members, friends, and romantic partners, play unique roles in supporting emotional well-being across different stages of development. During the transition to adulthood, friendships become especially salient, as they support key developmental goals related to autonomy, identity exploration, and social learning (Carstensen, 1995; Kahn & Antonucci, 1980). Friendships offer young adults both emotional intimacy and a sense of belonging beyond the family unit, helping them navigate an important shift toward independence. These developmental dynamics render young adults especially attuned to the presence, and absence, of friendship ties, a factor that likely magnified the emotional impact of social disruptions during the COVID-19 pandemic (Blakemore, 2008; Green et al., 2001; Qualter et al., 2015).

The pandemic abruptly curtailed opportunities for in-person peer interaction through physical distancing orders and campus closures, forcing many young adults to isolate at home with their immediate household members (Ellis et al., 2020; Huckins et al., 2020). Given their developmental need for autonomy and peer connection, young adults experienced disproportionately high levels of loneliness and emotional distress during this period, relative to other age groups (Carstensen et al., 2020; Czeisler, 2020; Ernst et al., 2022; C. M. Lee et al., 2020). These social disruptions were linked to increased negative affect, anxiety, and depression, with longitudinal evidence showing that reduced face-to-face contact predicted declines in emotional well-being from prepandemic levels (Elmer et al., 2020).

Despite growing attention to the mental health effects of pandemic-related isolation on young adults, a critical gap remains in understanding how remote friendships—that is, friendships maintained through online communication in the absence of physical proximity—shaped their emotional adjustment during this time. Specifically, it is unclear whether and how remote friendships moderated the impact of pandemic-related stressors on emotional well-being, particularly for those isolating with their immediate

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household members and lacking access to in-person friend support. Key unanswered questions include how young adults with larger or smaller remote friendship networks differed in the quantity or quality of their online interactions, and how they were able to sustain feelings of closeness through online means. This gap in knowledge is striking given the developmental importance of peer relationships during emerging adulthood (Carstensen et al., 2020; Kahn & Antonucci, 1980) and the growing relevance of online communication in modern social life (Thayer & Ray, 2006). Investigating these dynamics therefore is essential for understanding the protective role that remote friendships may have played during a period of heightened social and emotional vulnerability. More broadly, such work can inform theories of social regulation and emotional well-being in an increasingly online social landscape.

Against this backdrop, we examined how college students' friendship networks and their in-person and online interactions shaped their emotional adjustment to the stressors of the COVID-19 pandemic. To this end, we addressed three main research questions.

How Does the Number of Close College Friends Moderate the Impact of COVID-19 Stressors on Students' Emotional Well-Being?

First, we asked whether students' close college friendships buffered against or exacerbated the negative impact of stressors on emotional well-being in the early phase of the COVID-19 pandemic. During this period, most students were at home with their families, separated from college friends. Here, we sought to adjudicate between two alternative hypotheses. On the one hand, students with more close college friends might have experienced less negative and more positive affect because they had more resources available to cope with the situation, even if interactions were online. Such a finding would be consistent with studies showing that simply viewing a picture of an attachment figure when receiving painful shocks can reduce activity in brain regions associated with the experience of pain (Eisenberger et al., 2007). On the other hand, students with more friends may, in fact, have experienced more negative affect and less positive affect during the COVID-19 pandemic due to the sudden loss of in-person contact with their close peers, who typically play a central role in the daily emotional life of college students (Ellis et al., 2020). In addition, they were limited to in-person interactions with their immediate household members who can buffer against stress, but may also exacerbate negative emotions and regress their independence goals (Collins & Laursen, 2004; Platt et al., 2016).

How Does the Number of Close College Friends Relate to Students' Quantity and Quality of In-Person and Online Interactions During the COVID-19 Pandemic?

To understand how friends might influence emotional well-being when remote, our second question was whether students with more versus fewer college friends differed in the *quantity* or *quality* of their online interactions. In-person, face-to-face communications differ from online interactions in several meaningful ways: they involve physical closeness, are perceived to be more spontaneous, have different nonverbal cures, and are associated with a range of positive well-being indicators across diverse populations (Gruber et al., 2022; Lieberman & Schroeder, 2020; Nesi et al., 2018; Pea et al., 2012; Walther & Tidwell, 1995). Nonetheless, there are times when online interactions are necessary, because of restrictions on in-person interactions, or are even preferable, because of their distinct affordances (Bargh et al., 2002; Ruppel et al., 2017). With one notable exception (Towner et al., 2022), most studies have in fact found that having more online conversations during the COVID-19 pandemic was associated with more well-being, less loneliness, and less sadness (Liang et al., 2024; Petrova & Schulz, 2022; Sahi, Ninova, & Silvers, 2021; Stieger et al., 2023; Sun et al., 2022). Thus, it is possible that people with more close college friends capitalized on their remote connections by simply having more online conversations.

This hypothesis is in line with previous research, showing that young adults use social media to maintain friendships and build social capital (Ellison et al., 2014). Alternatively, the relationship between remote friendships and emotional well-being might be explained not by differences in the *quantity*, but rather by difference in the *quality* of online interactions. Online conversations have been associated with lower levels of satisfaction and positive affect (Gruber et al., 2022; Kafetsios et al., 2017). This effect, however, can vary significantly between people (Vaid et al., 2024), and it is unclear whether this heterogeneity can be explained by individual differences in one's number of close friends. As such, we tested whether the number of close college friends related to the quantity versus the quality of online and in-person interactions.

How Does the Number of Close College Friends Moderate the Relationship Between Disclosures and Feelings of Closeness in In-Person and Online Interactions?

Our third question asked what factors make a given person feel more or less close to their friends. Between-person analyses, like the ones addressed in the first two parts of this study, are limited insofar as they do not provide insight into the mechanisms through which individuals build closeness during in-person and online conversations. If intimate friendships protect against the negative impact of stressors on emotional well-being even from a distance, it is essential to understand how individuals build and maintain feelings of closeness in everyday life. As such, in the third part of this study, we asked how participants' subjective feelings of closeness fluctuated in everyday social interactions during the COVID-19 pandemic as a function of the following variables: the medium of the conversation (in-person vs. online), whether or not one of the interaction partners disclosed something personal, and participants' number of close friends.

We predicted that both in-person and online conversations would increase feelings of closeness when one of the interaction partners shared something personal. This prediction was based on previous research showing that self-disclosure, in general, is enjoyable and rewarding (Caprariello & Reis, 2013; Tamir & Mitchell, 2012), that relationship intimacy increases when a partner makes a disclosure (Laurenceau et al., 2005; Reis, 2017), and that experiences that are shared with another person feel more vivid and intense (Boothby et al., 2014). Importantly, self-disclosures do not require in-person contact and sometimes are facilitated by the absence of visual cues (e.g., in text messages; Antheunis et al., 2007; Bargh et al., 2002; Chu et al., 2023; Ruppel et al., 2017). Thus, we hypothesized that

disclosures were particularly important during the pandemic for boosting feelings of closeness, both during in-person and online conversations. Importantly, disclosure deepens close relationships for both partners: in the discloser, opening up fosters trust, while for the recipient, it invites opportunities for validation and care (Reis, 2018). As such, we expected that participants would feel closer to their interaction partners when either they themselves or the interaction partner made a disclosure as compared with when neither conversation partner did.

Finally, we also tested whether the relationship between disclosures and feelings of closeness depended on students' preexisting friendship networks. We formulated two competing hypotheses based on previous research (Hancock et al., 2022). On the one hand, we proposed that people with more friends might feel closer to their conversation partners when they shared something personal because they would be able to capitalize on their already-existing social resources ("rich get richer" hypothesis). On the other hand, we thought it would also be possible that sharing episodes would particularly help people with fewer close ties to compensate for their poorer social networks ("room to grow" hypothesis).

To address these research questions, we used a data set collected in the summer of 2020, as part of a longitudinal research study of college student groups called Social Health Impact of Network Effects (SHINE; Cosme et al., 2022). This study included pre-pandemic social network measures of close ties, a comprehensive assessment of participants' COVID-19-related stressors and living conditions, and 1-month of ecological momentary assessments (EMA) of emotional well-being and social interactions in daily life (Figure 1). Data were collected between May and October 2020.

Method

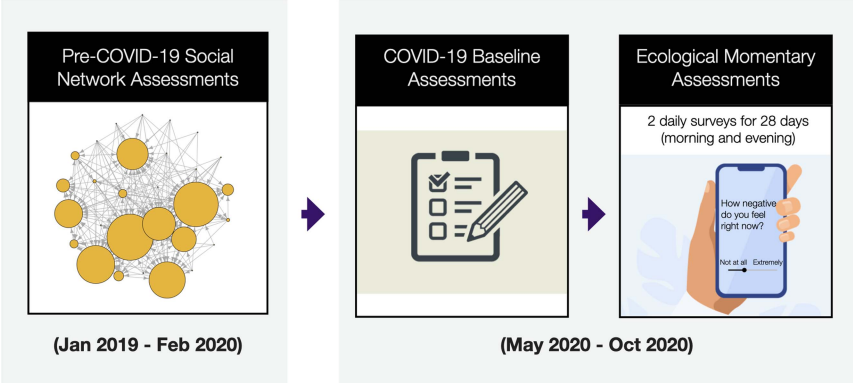
Recruitment and Procedures

Participants were recruited from a sample of undergraduate student groups at two Northeastern universities enrolled in the SHINE study, a longitudinal research project investigating social influences on health in student groups (Cosme et al., 2022). In the SHINE study, conducted between January 2019 and February 2020, we required at least 80% of a group's members to agree to complete an online social network questionnaire of their peer relations for enrollment. The groups recruited spent at least 10 hr per week together, had different missions (33% performing arts groups, 29% sororities or fraternities, 25% sports clubs, 8% technology clubs, 4% other), and differed in size from 20 to 87 (average size = 40 members).

During the summer of 2020, 24 college groups enrolled in SHINE were invited to participate in a follow-up study of the impact of the COVID-19 pandemic on college students' lives (Figure 1). The follow-up study was designed in two parts: a baseline survey in Qualtrics of stressors and living arrangements during the COVID-19 pandemic and 1-month of EMA of affect and social interactions. EMA surveys were delivered to the participants' smartphones in the morning and evening for 28 days using the Lifedata application (https://www.lifedatacorp.com). All data were collected between May 29 and October 16, 2020. Participants were compensated with a $30 Amazon gift card for the baseline survey and a $60 Amazon gift card for the EMA portion of the study. All research, methods, and study protocols were approved by the Institutional Review Board at the University of Pennsylvania.

Figure 1

Study Design, Timeline, and Key Measures



Note. Between January 2019 and February 2020, 24 student groups (e.g., sport teams, performance arts groups) completed baseline social network assessments. Participants are asked to indicate to which group members they are the closest; these answers are used to calculate their number of close friends in their student group prior to the COVID-19 pandemic. In May 2020, current and past members of all groups are invited to participate in a two-phase follow-up study about their social experiences and well-being during the COVID-19 pandemic. In Phase 1, participants completed a Qualtrics survey about their COVID-19 stressors and living situation. Starting the following day, in Phase 2, they received two short surveys on their phone for 28 days, which queried their current emotions and social interactions. All data were collected between May and October 2020, at the height of the COVID-19 pandemic, when students were remote from campus. Images are used with permission. See the online article for the color version of this figure.

$$\text{Number of close friends} = \frac{\text{Number of peers to which the participant feels close}}{\text{Group size} - 1} \times 100. \quad (1)$$

Sample

The sample included 205 students who completed (a) social network assessments of their peer relations in their college group prior to the COVID-19 pandemic, (b) the COVID-19 related online survey, and (c) at least 25% of all possible EMA (14 out of 56 possible total, or at least 1 week of assessments). We chose to include only participants with at least 1 week of EMA in accordance with previous research (Cranford et al., 2006; Kuppens et al., 2022; Peeters et al., 2006) and in recognition of the fact that many of the variables investigated in this study, such as affect and emotions, follow a daily and weekly cyclical rhythms (Liu & West, 2016). From 221 participants who started the EMA protocol, 16 participants were excluded for not meeting the inclusion criteria. On average, participants completed 86% of the assessments (mean number of assessments = 48 surveys out of 56 possible), for a total of 10,088 data points. The mean age was 20.2 years (SD = 2.05). The final sample included 25% men, 75% women, and 0% nonbinary; 41% White, 35% Asian, 9% mixed race, 8% African American, 6% Latino, 1% other individuals. Six percent were international students.

Most participants (69%) lived with family members during data collection, while 8% lived with a romantic partner, 13% with friends, 7% with roommates, and 4% lived alone. We chose to include all participants in the primary analyses regardless of living situation for both conceptual and methodological reasons. Conceptually, our central research question concerned participants' engagement with remote college friendship networks—that is, friendships originally formed in-person at college but maintained online during the early pandemic—rather than the effects of their immediate household composition. Including the full sample allowed us to capture the full range of experiences through which college-based friendships could continue to support emotional well-being despite different living arrangements. Methodologically, excluding participants living with friends could have introduced unnecessary bias and reduced statistical power, given that (a) our data do not identify whether cohabiting friends were part of participants' assessed college social networks and (b) individuals living with friends represented a meaningful segment of the sample (13%). Moreover, friendship ties during early adulthood often extend beyond household boundaries, and remote communication with friends outside one's residence remained a central feature of social life during the pandemic. Thus, retaining all participants ensured a more representative and ecologically valid picture of how college-based friendships functioned as sources of emotional support under conditions of physical distancing. Sensitivity analyses in which participants living with friends were excluded are provided in Supplemental Tables S13–S16.

Measures

Pre-COVID-19 Assessments

Social Network Measures of College Close Relations. Addressing the questions of interest required a measure of baseline levels of college close friendships before the pandemic began. The longitudinal design of the SHINE project provided an ideal opportunity to meet this need.

In the SHINE project baseline period, conducted between January 2019 and February 2020 (i.e., before the COVID-19 pandemic), all participants characterized their ties to other members of their college student group by answering the question "Which group members are you the closest to?" Participants were presented with a list of the names of their group peers and given the option to select as many group members as they desired. Aggregating participants' answers, we derived each group's close friendship network in which an edge from individual A to individual B indicates that A nominated B as a close peer.

Participants' number of close friends within their student group was calculated by counting how many peers they nominated as close as shown in Equation 1. We normalized this measure for group size to facilitate comparisons across groups.

(see Equation 1 above)

The minimum possible number is 0, indicating that an individual does not have any close friends in their group. The maximum possible value is 100, meaning that the individual nominated as close every single peer in the group. Self-nominations were excluded from our calculations. All groups' measures were positively skewed, suggesting that a few students felt close to significantly more members of their group than their peers (Supplemental Figure S1). The positive skew of these distributions is expected as many social networks measures are similarly distributed (Barabási & Albert, 1999). The median number of close friends was 15.2 (SD = 9.92, range = [1, 56]).

COVID-19 Assessments

COVID-19-Related Stressors. To measure individual differences in the experience of the COVID-19 pandemic, we asked participants to indicate in the baseline survey whether they were experiencing any of 12 possible COVID-19-related stressors (e.g., "Became ill from possible exposure to COVID-19," "Experienced disruptions in living conditions," "Experienced a reduction in social activities," "Experienced stigma/discrimination"). The stressors were selected based on a previous study from our laboratory assessing tolerance of uncertainty and emotion regulation in the context of the COVID-19 pandemic (Shu et al., 2022). On average, participants reported currently experiencing 6.04 stressors (SD = 2.51; range = [0, 12]). The three most reported stressors were "reduction in social activities," "inability to concentrate or focus on work," and "reduction in leisure activities."

COVID-19 Living Arrangements. The baseline Qualtrics survey assessed differences in participants' living situation during the COVID-19 pandemic. All students who enrolled in the study were asked to describe their relationship with the people they were living with (answer options: family, partner, friend/s, roommate/s, live alone), how satisfied they were with their living arrangement and how tense was the environment at home on a scale from 0 (*not at all*) to 100 (*extremely*).

Most participants (69%) indicated living with family. Eight percent lived with a romantic partner, 13% with friends, 7% with roommates, and only 4% lived alone. Students living with friends

reported the highest satisfaction with their living arrangements (M = 80.1, SD = 13.0), while those living with roommates reported the lowest (M = 65, SD = 18.1). On average, moderately low levels of tension were reported (M = 32.2; SD = 25.1; range = [0, 100]).

COVID-19 Physical Distancing. To measure social interactions within and outside of participants' households as a result of physical distancing recommendations, we asked them to rate on a scale from 1 (*never*) to 5 (*always*) how often they engaged in four behaviors: "stayed home and avoided all social contact, even if you have not been sick," "limited grocery shopping to once a week or less," "stayed at least six feet apart from others when in public," "avoided all public gatherings, even if you have not been sick." The items showed good reliability (Cronbach's α = .72). As such, we computed for each participant a general physical distancing score as the average rating on the four items, with 1 indicating that they never followed any physical distancing protocols and 5 indicating that they always followed them all. On average, participants reported limiting their in-person social interactions with other people outside of their households very often (M = 4.2, SD = 0.72, range = [1.25, 5]).

EMA

Affect in Daily Life. During the EMA period, positive and negative affect were assessed twice daily (morning and evening) for 28 days. Participants were asked to rate on a scale from 1 (*not at all*) to 100 (*extremely*) how positive and negative they felt "right now." Summary statistics when aggregating the data across all participants and time points were negative affect (M = 30.40, SD = 22.25, range = [1, 100]) and positive affect (M = 62.57, SD = 22.03; range = [1, 100]). A visualization of the time series of positive affect of 12 randomly selected participants over the 28 days study period is provided in Supplemental Figure S5D.

Social Interactions in Daily Life. As part of the EMA protocol, several questions about daily social interactions were also asked in the evening survey. These questions were adapted from the Rochester Interaction Record (Reis & Wheeler, 1991).

Number of In-Person and Online Interactions. Participants were asked the number of sustained interactions they had had in-person or online (over phone, text, video-chat, etc.) since the morning survey. Interactions were defined as any time spent with one or more people for 10 or more consecutive minutes. The maximum number of interactions someone could report was capped at 15. On average, participants reported 2.8 in-person interactions (SD = 2.46; range = [0, 15]) and 3.12 online interactions (SD = 3.4; range = [0, 15]) on any given day.

The Most Significant Interaction of the Day. If any interactions were reported, participants were asked to think about the most significant interaction and chronicle who was involved (answer options: family member(s), romantic partners, close friend(s), acquaintance(s), stranger(s), or other), how did the interaction take place (answer options: in-person, video, call, texting, other), whether they or their discussion partner shared something personal (answer options: yes/no), and whether there was tension or disagreement (answer options: yes/no). Finally, they rated how close they felt to the other person at the end of the interaction on a scale from 1 (*not at all*) to 100 (*extremely*), see Supplemental Figure S5 for an example.

When probed about the most significant interaction of their day, participants overwhelmingly reported in-person interactions (64% in-person; 15% text messages; 14% video; 6% phone calls, 1% other). We combined all interactions that were not face-to-face in one category called online interactions because we were interested in differences between in-person versus remote interactions and to increase the power of our analyses. Thirty-nine percent of interactions were with family members, 30% with a close friend, 18% with romantic partners, and 12% with an acquaintance or a stranger. In 31% of interactions, students disclosed something personal; in 27% of interactions, the discussion partner made a disclosure. Only 8% of interactions involved tension or disagreement. On average, participants felt relatively close to the other people involved at the end of the interactions (M = 68.67, SD = 21.69, range = [1, 100]). Descriptives for all EMA variables are presented in Supplemental Table S13.

Analysis Plan

All analyses were conducted using Bayesian inference, which has several advantages over classical statistics, including combining data and models to generate posterior distributions, offering simulation-based predictions for future outcomes, and providing more stable results when samples are small (Gelman et al., 2021). For each relationship estimated, a set of posterior simulations represented the uncertainty in the parameter estimates. In this article, whenever Bayesian inference results are reported, they include the following summary statistics: the medians of the posterior simulations (the central value), the 95% credibility intervals, and the percentage of the posterior distribution values above or below zero. In scatterplots displaying the relationship between two variables, inferential uncertainty in the fitted regression is represented by mapping the relationship between the two variables for the draws from the posterior distribution. Because we did not have strong priors, analyses were conducted with default weakly informative priors from the "rstanarm" package (Goodrich et al., 2023) in R (R Core Team, 2025). Additional details for each model individually are provided in the Supplemental Material. Results from general liner hypothesis tests are presented at the 1.5 *SD*s above and below the mean in the main article. Supplemental Material also includes the results for the 1 *SD* above and below the mean probing points.

Transparency and Openness

This study uses data from a broader project, the SHINE study, that examined how interactions between mind, brain, and community give rise to health and well-being (Cosme et al., 2022; https://osf.io/gkahy). Other publications using these data but focusing on different research questions include Jovanova et al. (2023), Kang et al. (2022, 2023), and Zhou et al. (2023). In this study, we report how we determined our sample size, all data exclusions, all manipulations, and relevant measures. The analysis code is available at https://github.com/ostanoi/COVID19-Friends. The deidentified data are available upon request for researchers. The data have not been made publicly available due to the risk of participant identification in small college groups based on the combination of two or more sensitive data points such as social network metrics, year in college, or gender. This study's design and analyses were not preregistered.

Results

How Does the Number of Close College Friends Moderate the Impact of COVID-19 Stressors on Students' Emotional Well-Being?

We first investigated how the number of close friendships within one's college group moderated the effect of the number of stressors they faced because of the COVID-19 pandemic on emotional well-being. If social baseline theory (Beckes & Coan, 2011) applies to remote relationships, then close friendships at college should have provided a buffer against COVID-19 stressors. If, however, students with more close friends at college experienced more negative affect and less positive affect during the pandemic because they had to cope with its negative effects without the social resources they had come to depend upon, then no buffering effect should emerge—and in fact, we should see the exact opposite.

We tested these competing hypotheses in two Bayesian multilevel linear regression models that treated median negative affect and median positive affect during the 28-day EMA period as outcome variables. The median rather than the mean of the two variables was used because their distributions were skewed (Supplemental Figure S2; results from parallel analyses using the mean are presented in Supplemental Table S5. The results are the same for both summary statistics). The two predictors of interest were the participants' number of close friendships in their college student group as reported prior to the beginning of the COVID-19 pandemic, the number of COVID-19 stressors reported at the beginning of the study period, and their interaction. We also included several control variables in our model to account for any variability that could be explained by differences in college year, gender, household income, parental education, household tension, physical distancing behavior, or completion rates. All the predictors were centered around the mean and the intercepts were nested within student groups. For a participant i belonging to a student group j, we estimated their median negative and positive affect in daily life as follows (Equation 2):

$$
\begin{aligned}
(1)\ \text{Median affect}_{ij} = {} & \beta_{0j} + \beta_1\,\text{Number of close friends}_{ij} \\
& + \beta_2\,\text{Number of COVID-19 stressors}_{ij} \\
& + \beta_3\,\text{Number of close friends}_{ij} \\
& \times \text{Number of COVID-19 stressors}_{ij} \\
& + \beta_4\,\text{College year}_{ij} + \beta_5\,\text{Gender}_{ij} \\
& + \beta_6\,\text{HH income}_{ij} + \beta_7\,\text{Parents' education}_{ij} \\
& + \beta_8\,\text{HH tension}_{ij} + \beta_9\,\text{Physical distance}_{ij} \\
& + \beta_{10}\,\text{EMA completion rate}_{ij} + \epsilon_{ij}. \\
(2)\ \beta_{0j} = {} & \gamma_{00} + \upsilon_{0j}. \qquad (2)
\end{aligned}
$$

Results supported a stress buffering account, including main effects of both variables of interest: the number of close friends in college and the number of COVID-19-related stressors (Supplemental Table S1). Students who had more close friends in their college social group prior to the COVID-19 pandemic reported, on average, less negative affect ($b = -0.31$, 95% CI [−0.51, −0.10], 99.8% of posterior distribution <0) and higher positive affect ($b = 0.29$, 95% CI [0.06, 0.52], 99.4% of posterior distribution >0) in daily life. For a hypothetical group of 100 members, having one extra friend was associated with a 0.31 reduction in median negative affect and a 0.29 increase in positive affect on a scale from 1 to 100.

As expected, we also found a main effect of the number of COVID-19 stressors experienced: participants who reported more COVID-19-related stressors also felt more negative affect ($b = 0.73$, 95% CI [−0.09, 1.53], 96.1% of posterior distribution >0) and less positive affect ($b = -0.90$, 95% CI [−1.75, −0.04], 97.8% of posterior distribution <0) during the 28-day EMA period. Each additional stressor was associated with a 0.73 increase in negative affect and a 0.90 decrease in positive affect. The relationship between the number of stressors experienced and affect was, however, moderated by the number of close relationships available at college prior to the COVID-19 pandemic ($b_{\text{interaction negative affect}} = -0.07$, 95% CI [−0.14, 0.00], 97.3% of posterior distribution <0; $b_{\text{interaction positive affect}} = 0.06$, 95% CI [−0.02, 0.14], 93.7% of posterior distribution >0; Supplemental Table S1).

We conducted two follow-up general linear hypothesis tests to understand better how the effect of COVID-19-related stressors on affect was moderated by the number of close college friends. The relationship between number of stressors reported and affect was estimated separately for students with relatively fewer close friends (defined as 1.5 × *SD* below the mean) and for students with relatively more close friends (defined as 1.5 × *SD* above the mean) in their college groups. We selected 1.5 *SD* below and above the mean as probe points to account for the skewed distribution of the moderator. This choice allowed us to explore the relationship between COVID-19-related stressors and emotions at values that are further out in the tails of the skewed distribution, but still within the meaningful, observed data range.

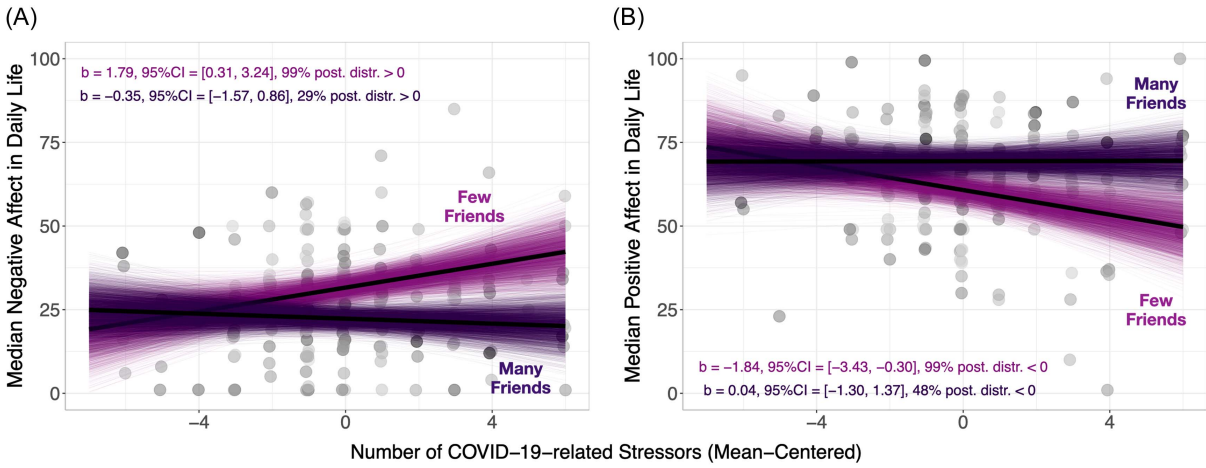
Tests revealed that, among participants with few close college friends, those who experienced more stressors because of the pandemic also felt more negative and less positive affect in daily life ($b_{\text{negative affect}} = 1.79$, 95% CI [0.31, 3.24], 99% of posterior distribution >0; $b_{\text{positive affect}} = -1.84$, 95% CI [−3.43, −0.30], 99% of posterior distribution <0). For them, each additional stressor was associated with a 1.79-point increase in median negative affect and a 1.84-point decrease in median positive affect on a scale from 1 to 100. This relationship, however, disappeared for participants with relatively more friends in college ($b_{\text{negative affect}} = -0.35$, 95% CI [−1.57, 0.86], 29% of posterior distribution >0; $b_{\text{positive affect}} = 0.04$, 95% CI [−1.30, 1.37], 48% of posterior distribution <0). They were protected against the negative influence of stressors on both negative and positive affect (Figure 2).

Between-group standard deviations were small ($SD_{\text{random intercept negative affect}} = 2.9$, $SD_{\text{random intercept positive affect}} = 2.4$). Thus, on average, student groups included in our sample experienced similar levels of daily negative and positive affect. Within-group standard deviations, however, were much larger, suggesting large individual differences in the median levels of affect experienced by different students ($SD_{\text{residual random intercept negative affect}} = 14.1$, $SD_{\text{residual random intercept positive affect}} = 15.2$).

Sensitivity analyses excluding participants living with friends revealed consistent main effects of the number of close college friends on affect: students with more close friends experienced less negative affect ($b = -0.28$, 95% CI [−0.49, −0.06], 99.3% of posterior distribution < 0) and more positive affect ($b = 0.24$, 95% CI [0.02, 0.48], 98% of posterior distribution >0) in daily life (Supplemental Table S13). Nonetheless, the relationship between the number of stressors and affect was attenuated ($b_{\text{negative affect}} = 0.59$, 95% CI [−0.29, 1.44],

Figure 2

The Number of Close Friends Moderated the Relationship Between COVID-19-Related Stressors and Median Affect During the COVID-19 Pandemic



Note. Plot of the estimated effect of COVID-19-related stressors on median (A) negative affect and (B) positive affect during the 28-day ecological momentary assessments period, presented separately for individuals with relatively few close friends (1.5 × *SD* below the mean—light purple) and for individuals with relatively many close friends (1.5 × *SD* above the mean—dark purple). Median levels of (A) negative affect and (B) positive affect are plotted on the *y*-axis. The number of COVID-19-related stressors reported by participants is plotted on the *x*-axis. Each point represents an individual participant's data. The intensity of a point's color indicates how many close friends an individual has in their college group (light gray = fewer friends; darker gray = more friends). For participants with many close friends, there was no link between the number of stressors experienced and affect. By contrast, for participants with few close friends, more COVID-19 stressors were associated with an increase in negative affect and a decrease in positive affect. CI = credible interval; Post. distr. = posterior distribution. See the online article for the color version of this figure.

90.8% of posterior distribution >0; $b_{\text{positive affect}} = -0.75$, 95% CI [−1.74, 0.21], 94% of posterior distribution >0) and the interaction between the number of close friends and number of stressors disappeared ($b_{\text{negative affect}} = -0.03$, 95% CI [−0.11, 0.05], 74.6% of posterior distribution <0; $b_{\text{positive affect}} = 0.02$, 95% CI [−0.07, 0.10], 67.7% of posterior distribution >0). This pattern suggests that the link between stressors and affect observed in the full sample may have been driven in part by students living with friends. One possible explanation is that students living with friends shared overlapping stress experiences and less structured forms of support, making their affective responses more closely tied to their stressors. Importantly, the main effects of the number of close college friends remained robust across both model specifications, underscoring their consistent association with better emotional well-being during the pandemic.

Overall, our results showing that participants with more close friends in their college groups were protected against the negative effects of COVID-19 on affect are striking given that most participants were separated from their social groups at college during the EMA period. We can imagine two possible explanations for our findings. On the one hand, it is possible that participants maintained their school relationships with the help of online means of communication. Here we can note that most of the interactions reported by participants took place in-person (64%), but a considerable proportion also occurred through text messages (15%), video conferencing (14%), and phone calls (6%). Students with more close relations at school might have had more opportunities to interact online with friends. On the other hand, they might have been better at capitalizing on online interactions, in general. With these possibilities in mind, in the next section we tested whether students' number of close friends at college influenced their social interaction patterns during the COVID-19 pandemic.

How Does the Number of Close College Friends Relate to Students' Quantity and Quality of In-Person and Online Interactions During the COVID-19 Pandemic?

We investigated whether students with more versus fewer close friends at college differed in the quantity or quality of in-person and online interactions. Students' number of friends at college should not have impacted their in-person interactions, which were likely to take place at home with their immediate household members. Nonetheless, students with more college friends could have maintained their remote friendships during the pandemic by spending more time interacting online. Alternatively, they might not necessarily have differed in the *quantity* of online interactions, but in the degree to which they benefited from them (i.e., the *quality* of the interactions). We tested these alternative explanations.

Quantity of In-Person and Online Interactions

For each student, the quantity of in-person and online interactions was operationalized as the median number of in-person and of online conversations reported on a typical day during the EMA period. In our main models, we used the median as our summary statistic to account for the skewed distribution of the variables (Supplemental Figure S3), but parallel analyses using the mean instead of the median obtained the same results (Supplemental Table S6). We then estimated the relationship between these scores

and the participants' number of close college friends in two Bayesian multilevel linear regression models (one for in-person interactions; one for online interactions), while holding constant differences in college year, gender, household income, parental education, household tension, physical distancing, and EMA completion rate. All predictors were centered around the mean and intercepts were nested within student groups. For a participant i belonging to a student group j, we estimated their median number of in-person and online conversations in daily life as (Equation 3):

$$\begin{aligned}(1)\ \text{Median number of interactions}_{ij} = {} & \beta_{0j} + \beta_1\,\text{Number of close friends}_{ij} \\ & + \beta_2\,\text{College year}_{ij} + \beta_3\,\text{Gender}_{ij} \\ & + \beta_4\,\text{HH income}_{ij} \\ & + \beta_5\,\text{Parents' education}_{ij} \\ & + \beta_6\,\text{HH tension}_{ij} \\ & + \beta_7\,\text{Physical distance}_{ij} \\ & + \beta_8\,\text{EMA completion rate}_{ij} + \varepsilon_{ij}. \\ (2)\ \beta_{0j} = {} & \gamma_{00} + \upsilon_{0j}. \end{aligned} \quad (3)$$

No relationship was observed between the participants' number of friends in college and the number of in-person interactions they had on a typical daduring the COVID-19 pandemic ($b = -0.00$, 95% CI [−0.02, 0.02], 46.7% of the posterior distribution >0). The buffering effect of college friendships could not be simply explained by the fact that people with more friends in college had more interactions with their household members. Interestingly, there was also no link between one's number of close friends in their college group and the number of online interactions on a typical day (b = 0.02, 95% CI [−0.03, 0.06], 80.2% of the posterior distribution >0; Supplemental Figure S4 and Supplemental Table S2). An analysis in which we estimated the proportion of online interactions instead of the absolute number of online versus in-person interactions also found no relationship (Supplemental Table S7). Together, our results suggest that students with more friends did not simply have more opportunities for in-person or online interactions.

Quality of In-Person and Online Interactions

Next, we investigated whether students with more close friends at school had better quality online interactions during the EMA period. The repeated measures design of our study allowed us to extract, for each individual, not only their average number of interactions in daily life, but also an estimate of the degree to which they felt more negative and more positive affect in the evening on days in which their most important interactions were in-person or online (our operationalization of interaction quality). Previous research shows that people tend to prefer and experience more positive affect following in-person as opposed to online interactions (Liang et al., 2024). Here we hypothesized that the relationship between the medium of the most important interaction of the day and evening affect might be moderated by an individual's number of close friends. Specifically, we expected students with more versus fewer friends in college to be less negatively impacted by online interactions.

Two Bayesian multilevel linear regression models tested this hypothesis with daily measures of evening negative affect and evening positive affect during the 28-days EMA period as outcome variables. The predictors of interest were (a) the participants' number of close friendships in their college student group as reported prior to the COVID-19 pandemic, (b) a binary variable indicating whether or not the most important conversation of the day took place online, and (c) their interaction. The models also included the same control variables as before. Since we had multiple observations per participant, intercepts were nested within participants, nested within student groups. Predictors were centered around their mean, except for the online conversation variable, which varied both within- and between-participants. To disentangle these two sources of variance, we separated the variable into its within- and between-participant components. Only the within-component was included in the model because our primary interest was understanding how fluctuations in online versus in-person interactions related to changes in affect within a person. Thus, for a participant i belonging to a student group j, we estimated their evening negative and positive affect at a given time point t as (Equation 4):

$$\begin{aligned}(1)\ \text{Evening affect}_{ijt} = {} & \beta_{0ij} + \beta_1\,\text{Number of close friends}_{ij} \\ & + \beta_2\,\text{Online conversation(WI)}_{ijt} \\ & + \beta_3\,\text{Number of close friends}_{ij} \\ & \times \text{Online conversation(WI)}_{ijt} \\ & + \beta_4\,\text{College year}_{ij} + \beta_5\,\text{Gender}_{ij} \\ & + \beta_6\,\text{HH income}_{ij} + \beta_7\,\text{Parents' education}_{ij} \\ & + \beta_8\,\text{HH tension}_{ij} + \beta_9\,\text{Physical distance}_{ij} + \epsilon_{ijt}. \\ (2)\ \beta_{0ij} = {} & \gamma_{00} + \upsilon_{0i} + \upsilon_{0j}. \end{aligned} \quad (4)$$

In support of the idea that college friends helped buffer emotional well-being during the COVID-19 pandemic with the help of online means of communication, we found that the relationship between the type of the most important interaction on a given day (either online or in-person) and evening affect was moderated by the nber of friends that students had in their college group. On average participants felt more negave affect (b = 2.43, 95% CI [0.96, 3.85], 99.9% of posterior distribution >0) and less positive affect (b = −3.07, 95% CI [−4.44, −1.66], 100% of posterior distribution <0) in the evening at the end of days in which the most important interaction of the day took place online as compared with in-person. The typical student in our sample felt 2.43 points more negative and 3.07 points less positive affect on days when their most important conversation of the day took place online relative to in-person. This relationship, however, was moderated by the participants' number of close college friends ($b_{\text{interaction negative affect}}$ = −0.16, 95% CI [−0.30, −0.02], 98.9% of posterior distribution <0; $b_{\text{interaction positive affect}}$ = 0.15, 95% CI [0.01, 0.30], 98.2% of posterior distribution > 0; Supplemental Table S3).

General linear hypothesis tests showed that students with few close friends in their college groups felt more negative affect and less positive affect when the most important interaction of the day was online. A student with 1.5 *SD*s fewer close friends than the sample mean felt on average 4.84 points more negative (b = 4.84, 95% CI [2.48, 7.20], 100% of posterior distribution >0) and 5.32 points (b = −5.32, 95% CI [−7.87, −2.77], 100% of posterior distribution <0) less positive affect in the evening on days in which their most significant conversation took place online compared with

in-person. In contrast, for students with many close college friends (operationalized as 1.5 *SD*s above the sample mean), evening negative and positive affect were not related to the medium of the most important interaction of the day ($b_{\text{negative affect}} = 0.01$, 95% CI [−2.69, 2.71], 50% of posterior distribution >0; $b_{\text{positive affect}} = -0.81$, 95% CI [−3.37, 1.75], 73% of posterior distribution <0; Figure 3). For them, whether they had the interaction in-person or online did not matter.

To further understand this effect, we conducted follow-up analyses in which we investigated whether evening affect was associated also with the proportion of online interactions throughout the day. On average, participants reported more negative and less positive affect in the evening on days when a greater proportion of their interactions took place online and this was the case irrespective of the number of close friends they had in college (Supplemental Table S8). Together, our findings suggest that online means of communication might have buffered against the negative impacts of physical isolation during the COVID-19 pandemic, but only for individuals who already had strong close friendships prior to the pandemic and only as long as they took place along in-person conversations, and not as a substitute.

How Does the Number of Close College Friends Moderate the Relationship Between Disclosures and Feelings of Closeness During In-Person Versus Online Interactions?

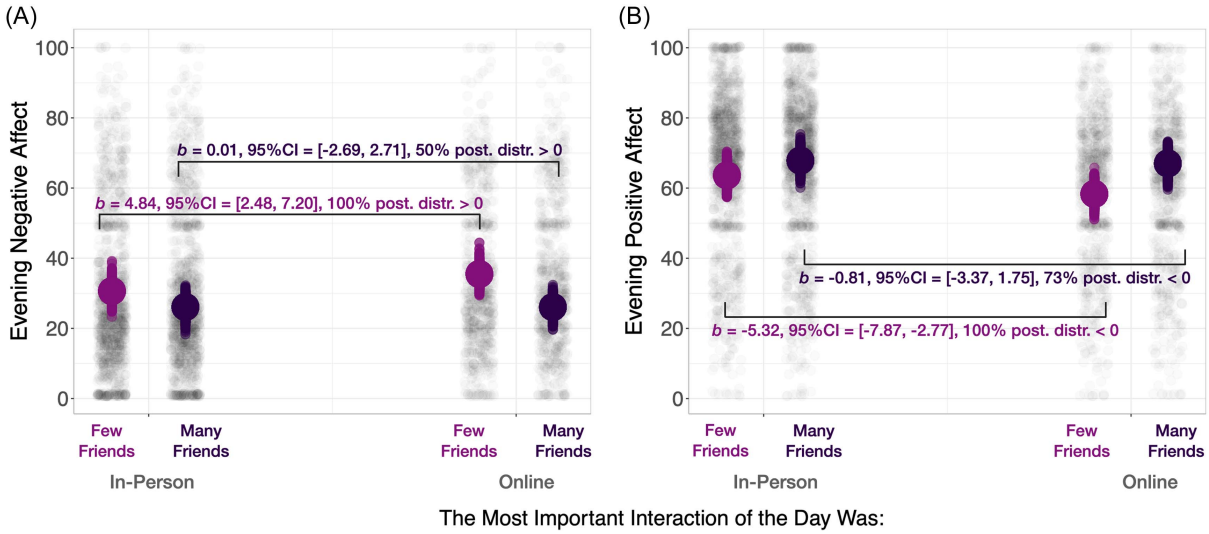
If intimate friendships protect against stressors even at a distance, it is essential to understand how people cultivate and maintain feelings of closeness in daily life through online communications. In this section, we proposed that personal disclosures in social interactions would enhance feelings of closeness, even when conversations take place online.

We examined the relationship between self/partner disclosures and feelings of closeness in two Bayesian multilevel linear regression models, Participants' number of close college friends was included as a moderator to test directly whether the relationship between disclosures and feelings of closeness depended on one's number of close college friends as reported prior to the pandemic. Because we were interested in understanding whether the relationship between disclosures and closeness was influenced by the medium of the conversation, we also added a binary variable to the model, indicating whether or not the conversation took place online.

Additional covariates captured whether the conversation involved tension or not and whether the conversation partner was someone close (a family member, romantic partner, or friend) or not (an acquaintance, stranger, or someone else). All time-varying predictors were decomposed into within- and between-participant components, and only the within-person components were included in the models to isolate day-to-day variation. Consistent with prior models, we controlled for demographic and contextual variables. All between-person predictors were mean centered. To account for the hierarchical nature of our data, in which we have repeated measures for participants belonging to different student groups, we nested the intercept and the disclosure slopes within participants, nested within groups.

Figure 3

The Number of Close College Friends Moderated the Relationship Between the Medium of the Most Important Interaction of the Day and Evening Affect



Note. Plot of the estimated evening (A) negative affect and (B) positive affect following in-person versus online conversations, presented separately for individuals with relatively few close friends (1.5 × *SD* below the mean—light purple) and for individuals with relatively many close friends (1.5 × *SD* above the mean—dark purple). Participants were split into two groups: students with relatively many friends (above or equal to median) and students with few friends (below median). The black points represent their raw data. For participants with many close friends, there was no relationship between the medium of the most important interaction of the day and evening negative/positive affect. In contrast, participants with few close friends reported feeling more negative affect and less positive affect following online relative to in-person interactions. CI = credible interval; Post. distr. = posterior distribution. See the online article for the color version of this figure.

$$
\begin{aligned}
(1)\ \text{Closeness at the end of the interaction}_{ijt} = {} & \beta_{0ij} + \beta_{1ij}\,\text{Self/partner disclosure(WI)}_{ijt} + \beta_2\,\text{Number of close friends}_{ij} \\
& + \beta_3\,\text{Self/partner disclosure(WI)}_{ijt} \times \text{Number of close friends}_{ij} \\
& + \beta_4\,\text{Conversation medium(WI)}_{ijt} + \beta_5\,\text{Tension(WI)}_{ijt} + \beta_6\,\text{Partner type(WI)}_{ijt} \\
& + \beta_7\,\text{College year}_{ij} + \beta_8\,\text{Gender}_{ij} + \beta_9\,\text{HH income}_{ij} + \beta_{10}\,\text{Parents' education}_{ij} \\
& + \beta_{11}\,\text{HH tension}_{ij} + \beta_{12}\,\text{Physical distance}_{ij} + \epsilon_{ij}. \\
(2)\ \beta_{0ij} = {} & \gamma_{00} + \upsilon_{0i} + \upsilon_{0j}, \\
\beta_{1ij} = {} & \gamma_{10} + \upsilon_{1i} + \upsilon_{1j}.
\end{aligned} \tag{5}
$$

Thus, we estimated the degree of closeness that student i in group j felt toward their conversation partner on day t as follows (Equation 5):

(see Equation 5 above)

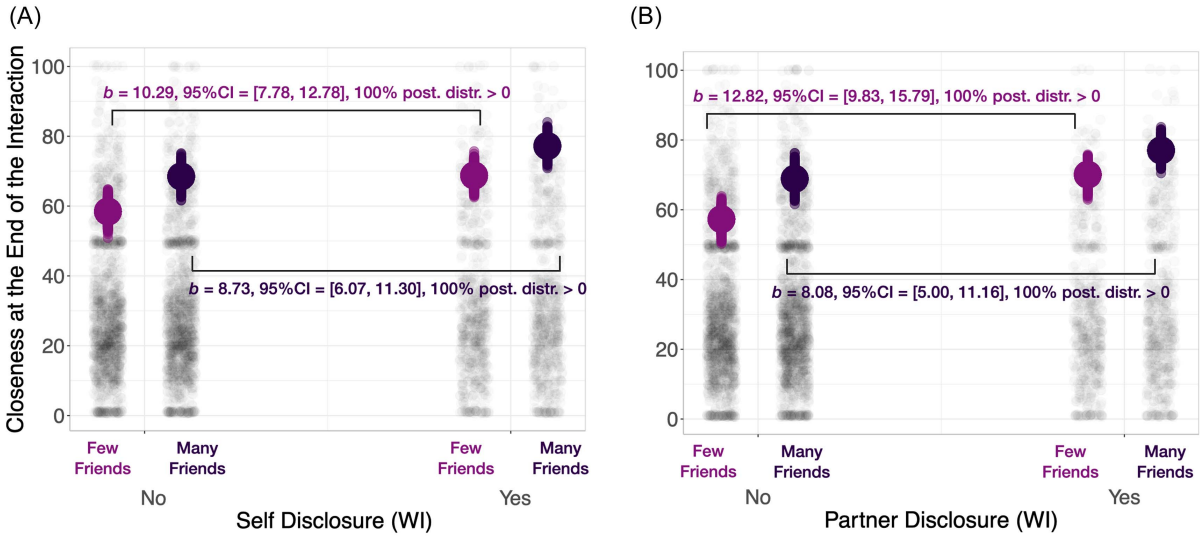
Our hypothesis that personal disclosures would be associated with stronger feelings of closeness was supported by the data (Figure 4). Notably, this effect emerged regardless of whether the disclosure was made by the participant ($b_{\text{self-disclosure within}} = 9.51$, 95% CI [8.13, 10.96], 100% of the posterior distribution >0) or by their interaction partner ($b_{\text{partner disclosure within}} = 10.45$, 95% CI [8.76, 12.09], 100% of the posterior distribution >0) and irrespective of whether the conversation took place online or in-person (Supplemental Table S4). For the typical participant, the presence of a disclosure during a conversation was associated with an approximately 10-point increase (on a scale from 1 to 100) in feelings of closeness toward the conversation partner at the end of the interaction.

Remarkably, all 205 participants showed a positive effect of disclosure on perceived closeness, as visible in the histograms of the person-level estimates (Supplemental Figure S6). Although everyone showed a positive effect, the large standard deviations of the random slopes ($SD_{\text{self disclosure}} = 2.07$; $SD_{\text{partner disclosure}} = 4.22$) indicate that students varied in their levels of benefit. We hypothesized that this heterogeneity could be partially explained by individual differences in the number of close friends participants reported.

Consistent with this hypothesis, the number of college friends moderated the relationship between partner-disclosure and closeness ($b_{\text{interaction}} = -0.16$, 95% CI [−0.33, 0.01], 96.8% of the posterior distribution <0), but not between self-disclosure and closeness ($b_{\text{interaction}} = -0.05$, 95% CI [−0.20, 0.09], 76.7% of the posterior distribution <0; Figure 4). Follow-up general linear hypothesis tests supported the "room to grow" hypothesis. Participants

Figure 4

The Relationship Between Self/Partner Disclosure and Closeness at the End of the Interaction



Note. Plot of the estimated fixed effects of (A) self disclosure and (B) conversation partner disclosure on feelings of closeness at the end of a social interaction, presented separately for individuals with relatively few close friends (1.5 × *SD* below the mean—light purple) and for individuals with relatively many close friends (1.5 × *SD* above the mean—dark purple). The *x*-axis indicates whether or not the interaction involved a disclosure from the participant (A) or from the conversation partner (B); closeness is plotted on the *y*-axis in both panels. Participants were split into two groups: students with relatively many friends (above or equal to median) and students with few friends (below median). The black points represent their raw data. Episodes of both self and partner disclosures are associated with stronger feelings of closeness toward the other person at the end of the interaction. Additionally, participants with few close friends got a higher boost to closeness when the interaction partner made a disclosure. CI = credible interval; Post. distr. = posterior distribution; WI = within-person (centered around the person mean). See the online article for the color version of this figure.

with few close college friends (defined as $1.5 \times SD$ below the mean) felt approximately 13-points closer to their conversation partner (on a 100-point scale) when the partner made a disclosure ($b = 12.82$, 95% CI [9.83, 15.79], 100% of posterior distribution >0). In contrast, students with many close college friends (defined as $1.5 \times SD$ above the mean) felt only about 8-point closer when the other person shared something personal ($b = 8.08$, 95% CI [5.00, 11.16], 100% of posterior distribution >0). The estimated difference in slopes suggests a likely group effect (diff = 4.74, 95% CI [−0.23, 9.72], 97% of the posterior distribution >0). Importantly, students with more friends reported higher baseline levels of closeness across interactions, regardless of whether a disclosure was made or not ($b = 0.31$, 95% CI [0.14, 0.49], 100% of posterior distribution >0). People with fewer friends, in turn, derived greater benefits from episodes of partner disclosure, as reflected in a larger boost to self-reported feelings of closeness during such interactions.

Discussion

This study sought to investigate how young adults' close college friendship networks shaped their emotional well-being during the COVID-19 pandemic through online interactions. We found that students with more close college friends reported both lower negative affect and higher positive affect in everyday life, even while physically separated from campus and their college friends. Crucially, these effects were not explained by the number of interactions participants had in-person or online, but by the *quality* of their most significant online interactions. Relative to their less connected peers, participants with more friends did now show an increase in negative affect and a decrease in positive affect following online relative to in-person interactions. This suggests that online conversations were essential to helping close friendships buffer against the emotional stress of the pandemic. Guided by prior work showing that self-disclosure fosters intimacy both in-person and online, we tested the link between personal disclosures and closeness in daily conversations next. Across both in-person and online settings, personal disclosures consistently emerged as strong predictors of closeness, even when the conversation involved tension. Strikingly, students with the fewest friends in college showed the largest increase in closeness when being the recipients of disclosures. This suggests that personal disclosures may be a powerful buffer against isolation for socially vulnerable individuals during times of stress.

This study contributes to affective science by offering real-world, dynamic evidence that affective experiences are socially coregulated and embedded in social interactions (Keltner et al., 2022; Lazarus, 1991; Parkinson et al., 2005). Extending social baseline theory (Beckes & Coan, 2011), our study adds to evidence that in-person contact is not required for the social regulation of emotion; close friendships continued to support emotional well-being through digitally mediated interactions (Doré et al., 2017; Ellison, 2020; Shu et al., 2021).

The robust association between the number of close friends and both reduced negative affect and enhanced positive affect supports the idea that friendships influence emotional well-being through multiple complementary pathways (Thoits, 2011). In our study, having more close friend ties was not only associated with less negative affect but also with more positive affective experiences, echoing Cicero's notion of the dual function of friendships to double our joys and divide our sorrows (Cicero, 1923).

Beyond its contributions to affective theory, this study also offers novel insights into how young adults leveraged online communication to navigate core developmental goals during a time of social upheaval. Young adulthood is marked by increased investment in peer relationships, identity exploration, and the pursuit of autonomy from family (Arnett, 2000; Kahn & Antonucci, 1980). Although the COVID-19 pandemic threatened these developmental processes by removing access to in-person friendship networks, our findings show that students with stronger prior friendship networks were able to sustain emotionally meaningful social connections through online interactions. Notably, these students did not simply engage in more online interactions; they experienced greater emotional benefits from them, indicating that preexisting close friendships protected emotional well-being even in constrained social conditions.

Our findings also offer perspective on the emotional impact of digital interaction in young adulthood. Online communication (e.g., texting) helped buffer against the negative impacts of physical isolation on emotional well-being during the COVID-19 pandemic, but only for young adults who already had strong close friendships and only as long as they were not used as a substitute for in-person interactions. As such, our study highlights the critical distinction between the quantity and quality of online interactions (Vaid et al., 2024). We offer a counterpoint to the debate on the link between online interactions and emotional well-being in young adults (Prinstein et al., 2020), by suggesting that online interactions can provide important benefits to emotional well-being to the degree that they occur alongside other in-person interactions within strong social networks (Ellison, 2020; Taylor & Bazarova, 2021).

That disclosure was a powerful predictor of closeness, regardless of the nature and medium of the interaction, highlights its critical role in maintaining and strengthening relationships during times of isolation. Although we do not know what information participants disclosed in their conversations, our findings are encouraging as they suggest that creating spaces in which young adults can be vulnerable and share their emotional experiences is one way to build close relationships, even when disclosures are made online or are accompanied by tension and conflict. This is consistent with prior research suggesting that online interactions might be particularly well-suited for self-disclosures (Antheunis et al., 2007; Bargh et al., 2002; Chu et al., 2023; Ruppel et al., 2017; Yau & Reich, 2018). Of course, the influence of self-disclosure on closeness may depend on the partner's responsiveness (Berg, 1987; Brudner et al., 2023). It may be reasonable to assume, however, that participants avoided disclosing to an unresponsive partner, and as such, we expected interactions with unresponsive partners to be characterized by a lower likelihood of personal sharing. This work, therefore, highlights the adaptive capacity of young adults to use online spaces not just for casual contact, but for deepening emotional bonds.

Although links between self-disclosure and closeness are well-established (Clark, 1988; Laurenceau et al., 1998; Sprecher et al., 2013), our findings extend this literature in several key ways. First, we provide a novel individual differences perspective by showing how the relationships between disclosure and closeness depends on one's structural connections. Self-disclosures provided a similar boost to closeness for all individuals, but *partner-disclosures* were especially important for fostering closeness among those with fewer close friends in college (Bazarova, 2012; Hancock et al., 2022;

Vaid et al., 2024). This mechanism-level perspective helps clarify how structural features of social networks, such as the number of close friends, relate to subjective feeling of closeness and for whom disclosures may be most beneficial. Second, by leveraging EMA during a period of enforced social distancing, we captured disclosure processes as they unfolded naturally under stress across both in-person and digitally mediated communication contexts (Antheunis et al., 2007; Bargh et al., 2002; Chu et al., 2023; Ruppel et al., 2017). Third, our data set offers a rare window into disclosure–closeness dynamics within real-life college friendship networks, a relationship context central to emerging adulthood (Abrams, 2023; Costello et al., 2024; Kito, 2005). Together, these contributions advance classic theories of intimacy and social emotion regulation (Keltner et al., 2022; Reis, 2018) by situating the disclosure–closeness link within broader friendship networks, digital contexts, and real-world emotional challenges. More broadly, our work reinforces theories that emotional experiences function not only as outcomes of close relationships but as mechanisms through which relationships are built (Laurenceau et al., 1998; Reis, 2017; Rossignac-Milon & Higgins, 2018).

Taken together, this study contributes a dynamic, multilevel view of how affective experiences are embedded in social networks and shaped in social interactions in daily life. By linking the structure of social networks with contextual information about participants' COVID-19 individualized experiences, and momentary experiences of affect and closeness, this work moves beyond global self-reports and instead captures affective experiences in their lived, relational context.

All this said, this present study also has some noteworthy limitations. One important limitation of our between-subject analyses is that we cannot exclude the possibility that our friendship network measure captured not only the number of close friends available to our participants, but also information about personality traits that are relevant for emotional well-being. For instance, an extrovert might feel more inclined to nominate neutral contacts as close and, at the same time, experience less stress and negative affect during the COVID-19 pandemic because of their trait predispositions (R. M. Lee et al., 2008; Naidu et al., 2022). Secondary analyses, however, did not support this hypothesis, as we did not find a significant correlation between participants' number of close relations at school and any of the Big-5 personality domains ($r_{\text{ageeableness}} = .003$, $p = .96$; $r_{\text{extroversion}} = -.009$, $p = .89$; $r_{\text{conscientiousness}} = .039$, $p = .58$; $r_{\text{emotion stability}} = .007$, $p = .92$; $r_{\text{openness}} = .027$, $p = .70$). Nonetheless, we cannot exclude the possibility that other covariates are at play or that structural differences may give rise to different *capacities* for navigating emotion in relationships. For instance, those with many close friends may have more prior experience engaging in vulnerable conversations or offering and receiving support. These relational skills could facilitate higher quality interactions, even when online. In contrast, people with fewer close friends may be less practiced in capitalizing on online emotional exchanges in general. Our findings that individuals with fewer friends reported greater boosts in closeness following partner disclosures suggests that this is likely not the case, but future studies should investigate how individual differences in relational skills (e.g., comfort with vulnerability, emotion regulation, or responsiveness) shape the ability to benefit from online interactions across different social network sizes.

A second limitation concerns the timing of data collection. Because our EMA data were collected during the summer, a season when college students are often physically separated from their peer groups, it is possible that the emotional impact we observed was not specific to the pandemic. Nonetheless, several aspects of our design suggest that the pandemic introduced a qualitatively different form of disruption. To begin with, the emotional disturbances we observed were tightly linked to participants' self-reported COVID-19-related stressors, and we found an interaction between stressor load and friendship network size in predicting negative and positive affect. This pattern suggests that COVID-19-specific stress, rather than seasonal disconnection alone, was driving emotional vulnerability. Second, our within-subject EMA design minimizes concerns about general seasonal mood shifts, as each participant serves as their own control across 28 days. Still, we acknowledge that some degree of physical separation from friends may be typical each summer. The pandemic, however, imposed restrictions on *all* forms of social interaction, including planned internships, travel, and informal gatherings, that likely made this summer of disconnection more profound. Future work should directly compare emotional experiences during typical summer separation versus pandemic-related isolation to better desegregate contextual effects.

Another limitation of this study is that our measures of online and offline interaction were fairly coarse. We did not assess the specific platforms young adults used to stay connected, nor did we capture qualitative aspects of their interactions (e.g., the emotional tone or content of the information disclosed). Furthermore, in our analyses, all non-face-to-face interactions (e.g., text messages, phone calls, and video calls) were grouped under the broad category of "online" interactions. Although this approach was necessary to ensure sufficient power, it may obscure important differences between communication modalities. For example, video calls preserve visual and paralinguistic cues that can mitigate some of the challenges of computer-mediated communication, such as reduced access to body language and affective expression, making them more similar to in-person interactions than to text-based exchanges (Derks et al., 2008; Nguyen et al., 2020; Short et al., 1976). Future research will benefit from integrating longitudinal assessments of close friendships and well-being with more detailed measures of communication, including platform characteristics and the qualitative nature of social exchanges.

Finally, it is also important to consider the social context of our sample. All participants were members of organized undergraduate student groups, which may be characterized by higher levels of cohesion, shared identity, and regular contact. Although our participants showed high heterogeneity in the number of peers to whom they felt close, it is possible that students outside such groups may have qualitatively different, perhaps less supportive and weaker friendship ties. Further research is needed to examine whether similar patterns hold for students who are more socially peripheral or who lack access to formal peer groups. For these individuals, online interactions may be less frequent, and disclosures less likely to occur, which could reduce the capacity of online interaction to provide emotional benefits. Interventions designed to foster vulnerable emotional exchange, especially among the socially isolated, may be critical in future work.

Constraints on Generality

Our findings are based on a sample of college students attending a university in the Northeastern United States who were part of

preexisting social groups, with recruitment limited to groups in which at least 80% of members expressed interest. The sample included a higher proportion of women than men and was studied in the context of a significant shared stressor, the COVID-19 pandemic. Although demographic differences were controlled for in our analyses, the use of a convenience sample presents important limitations to the generalizability of our results. Future research should examine the relationship between friendship networks, subjective feelings of closeness, and emotional well-being in diverse populations experiencing different stressors.

Conclusions

This study highlights the critical role of friendships in supporting young adult emotional well-being during the early months of the COVID-19 pandemic. For students with strong, preexisting college friendships, more COVID-19-related stressors did not translate into higher negative affect and lower positive affect in daily life. For them, significant online interactions served as a meaningful buffer against the negative effects of isolation on emotional well-being. Personal disclosures consistently fostered feelings of closeness in both online and in-person interactions across all participants. Notably, individuals with fewer close friends particularly benefited from these intimate exchanges, suggesting that open, vulnerable communication can strengthen social connections even in challenging times. Future studies should investigate how best to balance the pros and cons of online interactions to support emotional well-being in young adults.

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