Social Support and Adaptive Emotion Regulation: Links Between Social Network Measures, Emotion Regulation Strategy Use, and Health

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Social support, as perceived and experienced within one's social network, has been associated with greater well-being and favorable health outcomes. The transition to college marks a critical time in which social support not only strengthens interpersonal bonds, but also may help an individual discover and utilize various coping strategies to lower risks associated with negative emotions, which may result in better health and well-being. In the present study, we collected data from a large sample of undergraduate students ($N = 376$) and conducted preregistered analyses to examine links between students' perceived social support in residential college communities, patterns of emotion regulation strategy use, and multiple indicators of health and well-being. Overall, we found partial support for our hypotheses, with some associations between social support and patterns of emotion regulation strategy use, as well as associations between strategy use and health indicators. All results held when adjusting for participants' age and gender. Taken together, the present findings revealed reliable links between social network indicators, emotion regulation strategy use, and health. Future research can extend these findings by observing how these relationships unfold over time, to better understand how people manage their emotions by drawing on their personal networks.

Keywords: social support, emotion regulation, health, strategies, egocentric analysis

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Social connections are among the most important factors that contribute to human beings' health and well-being (Berkman & Glass, 2000; Holt-Lunstad, 2021; Holt-Lunstad et al., 2015; Kawachi & Berkman, 2001; Uchino, 2009). One critical stage to form interpersonal bonds is during the transition to college, when individuals engage in self-discovery and identity formation and can especially benefit from social support as they leave their households and begin navigating new friendship networks (Azmitia et al., 2013).

College students often turn to peers in their community for emotional support (Williams et al., 2018); and those who receive support from others are better able to regulate their own emotions and cope with stressors (Bolger & Eckenrode, 1991; S. Cohen & Wills, 1985; Wilcox et al., 2005). Importantly, perceived external support is strongly associated with stress coping, appraisal, and mental health (Bolger et al., 2000; Kawachi & Berkman, 2001; Uchino, 2009). Furthermore, having a source of external support can serve as a buffer against patterns of negative affect and dysphoria that put college-aged individuals at higher risk for affective disorders, which are often diagnosed when people are in their early or mid-20s (de Lijster et al., 2017; Zisook et al., 2007).

Having a greater number of social connections buffers mental health from the impacts of stress (Bolger & Eckenrode, 1991). Students who identify more supportive connections within their community (i.e., outdegree) experience less psychological distress and greater life satisfaction (Courtney et al., 2021). This relationship between social connections and health may occur via psychosocial mechanisms, including social support and coping effectiveness (Berkman & Glass, 2000). Larger social networks also permit more flexible emotional responses (Bonanno & Burton, 2013), as they provide more outlets for emotional expression. Indeed, prior research has related the use of expressive suppression, an emotion regulation strategy in which one inhibits their outward expression of emotions, to weaker social relationships (English et al., 2012; Gross & John, 2003). By contrast, those who lean on others for emotional support are likely to

increase the size of their social networks (Niven et al., 2015; Williams et al., 2018).

Emotion regulation is essential to everyday functioning and well-being in its own right (N. Cohen & Ochsner, 2018; Gross, 2015). Previous research has indicated that use of specific emotion regulation strategies such as cognitive reappraisal, which involves reframing a stimulus or situation in order to alter its emotional impact, has been associated with greater positive affect, reduced negative affect, and better overall health and well-being (Gross & John, 2003; Hu et al., 2014; Lopez & Denny, 2019). By contrast, research has shown that expressive suppression, which involves modulation of the outward expression of an emotion (e.g., stifling a grimace), is less adaptive (Gross, 2002; Ochsner & Gross, 2005). Indeed, some research has revealed a negative relationship between expressive suppression and outcomes related to socio-emotional functioning and well-being (Butler et al., 2003; English et al., 2012; Hu et al., 2014). The differences in adaptiveness observed may be the result of where these strategies fall along the emotion-generative process (Gross, 1998; Gross & John, 2003). Antecedent-focused emotion regulation strategies (e.g., distraction or cognitive reappraisal) intervene on the appraisal and impact of an emotion before an emotional response is generated, whereas response-focused strategies (e.g., expressive suppression) intervene on the emotional response after an emotion has already been generated (Gross & John, 2003). Thus, expressive suppression may be less adaptive than other strategies because it does not alter the emotion or its impacts. Furthermore, while strategies such as cognitive reappraisal initially require more cognitive resources to enact, subsequent emotional impacts of reappraisal are less cognitively taxing (i.e., more naturally result from the initial reappraisal), whereas expressive suppression requires continuous self-monitoring which may demand more cognitive resources throughout its implementation (Gross, 2002; Kobylińska & Kusev, 2019).

More recent theorizing suggests that successful emotion regulation relies not on strategy use alone, but rather on a dynamic process of interacting with person, situation, and strategy factors (Doré et al., 2016). For example, the intensity of a situation or stimulus can influence the preferred emotion regulation strategy (e.g., attentional deployment strategies such as distraction are more often preferred during high-intensity situations compared to cognitive reappraisal; Sheppes & Meiran, 2008; Webb et al., 2012). Additionally, some have suggested that adaptive emotion regulation is not about using or avoiding individual strategies. Rather, it is about knowing that multiple strategies are available to use when needed and when appropriate, based on situational demands and other factors (Aldao & Nolen-Hoeksema, 2013; Bonanno & Burton, 2013). A person's strategy repertoire, reflecting the range of strategies they can readily deploy, works like a "toolbox" (Fujita et al., 2020). Rather than exclusively relying on individual strategies that are more (or less) adaptive, a person with a greater strategy repertoire will selectively employ strategies that best fit the demands of the situation, resulting in successful regulation. This toolbox may also benefit the individual interpersonally in their social interactions with others.

Utilizing emotion regulation strategies in this way better reflects the changes that occur in our environment and its shifting demands, and, importantly, can bolster against emotion dysregulation associated with some mental health disorders (Aldao, et al., 2015; Bonanno, et al., 2004). Furthermore, emotion regulation strategies can be characterized as intrapersonal (i.e., within oneself) or interpersonal (i.e., with

others). Human beings rely on social interactions and networks to enrich their lives. Efforts to regulate emotions are rarely done in a social vacuum, as individuals will often seek out others for support in these efforts (Zaki & Williams, 2013). As mentioned earlier, social support can help reduce stress and regulate emotions (Bolger & Eckenrode, 1991; Bolger et al., 2000), which may be attributable to the fact that a strong support network enables the social sharing of emotions, which positively impacts the sharer and listener and is a key mechanism that bridges inward emotional experiences and their outward expression (see Rimé, 2009 for a review). Support and support seeking can be conceptualized as an interpersonal emotion regulation strategy that a person explicitly employs (Niven, 2017), but other work has shown that people can benefit from social support without being fully aware of it (Bolger & Eckenrode, 1991; Bolger et al., 2000). Therefore, social support—whether already present in one's network or deliberately sought out—is a critical form of emotion regulation, so it is worth further examining links between intrapersonal and interpersonal emotion regulation strategies.

With this in mind, the present study aimed to bridge the social support and emotion regulation literature by examining links between social support within a well-defined network, patterns of emotion regulation strategy use, and multiple health outcomes. The overarching goal was to assess how supportive network connections relate to use of emotion regulation strategies and overall health. To address this question, we had three a priori, preregistered[1] hypotheses: (H1) Social support, as captured by an egocentric social network measure (outdegree; see below for methodological details), will be correlated with greater use of typically adaptive emotion regulation strategies (e.g., situation selection, reappraisal), less use of expressive suppression, and greater collective use of multiple strategies, as captured by strategy repertoire/profile; (H2) Social support will also be positively correlated with overall health and well-being; and (H3) The association in Hypothesis 2 will be partially mediated by use of emotion regulation strategies, such that greater social support will be associated with more adaptive use of strategies (e.g., less expressive suppression), which will be associated with better health.

Method

Participants

Since we were interested in assessing socio-emotional support in well-established social networks, we recruited participants from the Rice University undergraduate population, a group with well-characterized networks defined by being randomly assigned to one of 11 residential colleges at matriculation. Indeed, as has been demonstrated at other universities that employ the residential college system (e.g., Yale University; Brasco, 2014), many students at Rice closely identify with their college and forge strong interpersonal bonds with others in their college, which is consistent with research on how friendships form in emergent network structures (Frank et al., 2013). Prospective participants were told they would complete an online, survey-based study. Before beginning the survey, all participants gave their informed consent in accordance with Rice University's Institutional Review Board. Three hundred eighty-seven Rice undergraduate students (230 women; $M_{age} = 19.3$ years, $SD_{age} = 1.05$ years) began the survey, with some giving incomplete

responses across surveys. Listwise deletion was used on an analysis-by-analysis basis, which resulted in *N*s ranging from 320 to 376 across our preregistered analyses. All participants received course credit for participating.

Measures and Assessment

Perceived Social Support (Via Social Network Nominations)

We adapted questions from a previous study by Morelli et al. (2017) on social networks (Morelli et al., 2017). Specifically, participants were asked to nominate between two and five unique individuals in response to the following eight questions: (a) "Who in your residential college are your closest friends?" (b) "Who in your residential college do you spend the most time with?" (c) "Who in your residential college have you asked for advice about your social life?" (d) "Who do you turn to in your residential college when something bad happens?" (e) "Who in your residential college do you share good news with?" (f) "Who in your residential college makes you feel supported and cared for?" (g) "Who in your residential college is most empathetic?" And (h) "Who in your residential college usually makes you feel positive?" Following a similar method from Courtney et al. (2021), we combined the unique nominations made across all subnetworks (represented by the eight questions above) to create a single, aggregate network per participant. The total number of unique support ties identified by the participant (i.e., network outdegree) served as a global measure of perceived social support (Courtney et al., 2021). In addition to this aggregate network measure, we also included nominations from individual subnetworks to compare, where relevant, all associations of interest using the aggregate measure versus subnetworks that may more directly index social support (e.g., "Who in your residential college makes you feel supported and cared for?").

Emotion Regulation Strategy Use

We used two scales to assess participants' use of four emotion regulation strategies: situation selection, distraction, cognitive reappraisal, and expressive suppression.

First, we administered the 10-item Emotion Regulation Questionnaire (ERQ; Gross & John, 2003) to assess participants' overall tendencies to employ two emotion regulation strategies: cognitive reappraisal (e.g., "I control my emotions by changing the way I think about the situation I'm in") and expressive suppression (e.g., "I keep my emotions to myself"; Gross & John, 2003). Participants endorsed all items using a 7-point Likert scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). Scores from each subscale (six items for cognitive reappraisal; four items for expressive suppression) were averaged to derive a total score for each strategy, with higher scores indicating greater use of the respective strategy. Internal consistency was sufficient for both the reappraisal subscale ($\alpha = .84$) and the suppression subscale ($\alpha = .77$).

We also administered additional items that assessed people's use of two additional emotion regulation strategies, situation selection, and distraction, respectively, as per the process model of emotion regulation (Gross, 1998). The item for situation selection was, "When I want to feel less negative emotion (such as sadness or anger), I change the situation that I'm in by finding a totally new one," and the item for distraction was: "When I'm faced with a stressful situation, I stay in the same place but try to think about something else entirely in order to stay calm." We intentionally worded these items to mirror that of the ERQ, and like the ERQ, participants used a 7-point Likert scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*) indicating their agreement with the statements.

Health Measures

We administered two measures of overall health: (a) the Short Form-8 (SF-8), a brief self-assessment of health that contains both physical and mental components (Ware et al., 2001) and (b) items from the Patient-Reported Outcomes Measurement Information System (PROMIS) Global Health survey, which assesses various facets of health and well-being (Hays et al., 2009) and predicts future health outcomes (Cella et al., 2010). For the PROMIS Global Health survey, following our previous work (Lopez & Denny, 2019), we computed sum scores based on responses to the following three questions: (a) "In general, would you say your health is"; (b) "In general, would you say your quality of life is"; and (c) "In general, how would you rate your satisfaction with your social activities and relationships?" For each item, participants gave ratings on a 1–5 Likert scale, with *poor*, *fair*, *good*, *very good*, and *excellent* as the response options. Higher scores represent greater health and well-being, and in this sample, there was high internal consistency ($\alpha = .82$).

We also administered two validated measures of mental health: (a) the Center for Epidemiological Studies Depression (CES-D) Scale (Radloff, 1977) to evaluate depressive symptoms and (b) The State-Trait Anxiety Inventory (STAI; form Y-2) to measure participants' dispositional tendencies to experience anxiety (Spielberger et al., 1999). In the present sample, items from both measures exhibited high internal consistency ($\alpha = .91$ for CES-D items and $\alpha = .91$ for STAI items).

Covariates

Following our preregistered analyses and similar work that has examined links between use of emotion regulation strategies and health indicators (Lopez & Denny, 2019), we included participants' age (in years) and identified gender as covariates in all analyses; we selected these particular covariates because of potential age and gender effects in familiarity and use of emotion regulation strategies (Brummer et al., 2014; Nolen-Hoeksema & Aldao, 2011), as well as gender differences in anxiety and depressive symptoms (e.g., Simonds & Whiffen, 2003).

Statistical Power Considerations

We ran this study with the goal of detecting small-to-medium correlations (and indirect associations assessed via mediation) for analyses testing multiple hypotheses. Thus, we conducted two sets of a priori power calculations corresponding to pairwise correlations and mediation models, respectively: (a) For pairwise correlations with 80% power to detect small pairwise correlations of interest (e.g., $r = .15$), we would need an *N* of at least 345 and (b) For indirect associations with 80% power to detect at least small- to medium-sized effects in any α and β paths making up an indirect effect, using percentile bootstrap estimation (Shrout & Bolger, 2002), the required sample size was about 400 (see Table 3 in Fritz & Mackinnon, 2007). Therefore, we aimed to recruit approximately

450 participants for this study with the goal of having usable data from about 400 participants to analyze.

Transparency and Openness Statement

We preregistered all present hypotheses and most of the analyses on the Open Science Framework (https://osf.io/xyzqc), but there are some changes in how we ended up analyzing and reporting the data that are worth noting. So, in the spirit of open and reproducible science, and to help guide the reader to make appropriate inferences, we would like to report and provide rationale for the deviations from (and additions to) what we had originally preregistered.

First, with the design and measures used in the present study, we realized we were not best suited to assess participants' strategy repertoire, which can be defined as "the ability to utilize a wide range of regulatory strategies that may accommodate divergent contextual demands and opportunities" (Werner & Ford, 2021). Since we employed a cross-sectional design and used measures that broadly assessed strategy use, we did not have more granular data to reflect participants' selective use of strategies based on situational demands. However, we were able to conduct a latent profile analysis (LPA) using participants' use of the four emotion regulation strategies described above. This allowed us to look at group differences for the same (preregistered) variables of interest for two classes (groups) that were identified from a best-fitting LPA model (we direct the interested reader to the online supplemental materials, in which we report the methodology and results from this analysis).

As an additional exploratory analysis, we computed incoming nominations (indegree) and tested for associations between indegree and all our preregistered variables of interest (outdegree, use of multiple emotion regulation strategies, and health measures). The proportion of participants with at least one nomination was relatively low ($N = 24$, approximately 6.4% of the sample), but we conducted preliminary analyses comparing health measures for nominated versus nonnominated participants, as well as correlations with health and social network measures within the nominated group (see the online supplemental materials).

Lastly, we focused on the PROMIS Global Health survey as our primary measure of general health, instead of the SF-8. This measure was used in previous, closely related work (Lopez & Denny, 2019), and it was designed as a more global measure of health and well-being, versus assessing specific physical/somatic symptoms. Results were very similar across these health measures, but we nonetheless include results using the SF-8, especially in figures, for comparison. Additionally, to present converging evidence for our hypotheses, we report results here using validated measures of depressive symptoms (CES-D) and anxiety (STAI).

Despite these changes, the hypotheses and overall analytic approach were consistent with our preregistration as we carried out the present analyses. We have also uploaded all data and R script files used in the present study to the Open Science Framework (https://osf.io/kcxgj/files/).

Results

Direct Relationships Between Social Support, Emotion Regulation Strategies, and Health

First, we computed descriptive statistics for all variables of interest (Table 1). To test the first hypothesis (H1: predicting strategy use

with outdegree), we computed zero-order correlations between outdegree (union network) and use of individual emotion regulation strategies. There were two statistically significant correlations: first, we observed a significant negative association between outdegree (aggregate support network) and distraction, with those individuals with higher outdegree values tending to use distraction less frequently, $r(374) = -0.122$, 95% CI $[-0.22, -0.02]$, $p = .02$. We saw a similar pattern with expressive suppression, such that those individuals with higher values for outdegree tended to use expressive suppression less often, $r(374) = -0.133$, $[-0.23, -0.03]$, $p = .01$ (see Table S1 in the online supplemental materials for all zero-order correlations between outdegree and use of all four regulation strategies). This pattern with expressive suppression was also observed for outdegree within specific subnetworks, such as the "Who makes you feel supported and cared for?" subnetwork, $r(370) = -0.16$, $[-0.26, -0.06]$, $p = .002$, and the "Who do you turn to when something bad happens?" subnetwork, $r(370) = -0.22$, $[-0.32, -0.12]$, $p < .001$. When adjusting for age and gender,[2] these negative associations held for the aggregate support network, $b = -0.06$, $[-0.10, -0.01]$, $t(372) = -2.57$, $p = .011$, supported/cared for subnetwork, $b = -0.15$, $[-0.25, -0.05]$, $t(368) = -2.82$, $p = .005$, and turn-bad subnetwork, $b = -0.25$, $[-0.37, -0.14]$, $t(363) = -4.27$, $p < .001$.

Next, in support of our second hypothesis (H2: predicting health measures with outdegree), we observed a significant positive zero-order correlation between outdegree (union network) and the PROMIS health measure, $r(376) = 0.13$, 95% CI $[0.03, 0.23]$, $p = .013$. This held when adjusting for age and gender, $b = 0.11$, $[0.03, 0.20]$, $t(374) = 2.55$, $p = .011$. We also observed significant negative correlations between outdegree and depressive symptoms, $r(378) = -0.14$, $[-0.24, -0.04]$, $p = .007$, and between outdegree and anxiety symptoms, $r(321) = -0.12$, $[-0.23, -0.01]$, $p = .027$. When adjusting for age and gender, the negative relationship between outdegree and depressive symptoms held, $b = -0.50$, $[-0.86, -0.14]$, $t(376) = -2.74$, $p = .006$; this was also true for the negative relationship with anxiety symptoms, $b = -0.45$, $[-0.80, -0.09]$, $t(319) = -2.44$, $p = .015$. See Figure 1 for relationships between outdegree and all health variables.

Indirect Relationships Between Social Support, Emotion Regulation Strategies, and Health

To test Hypothesis 3, we fit several mediation models to examine the strength of indirect associations between social support and health, via strategy use. First, following our preregistration, we fit a mediation model with outdegree (aggregate support) as the predictor variable, use of expressive suppression as the mediator, and the PROMIS health measure as the outcome variable, with age and gender as preregistered covariates. Outdegree was significantly negatively associated with use of expressive suppression, $b = -0.06$, 95% bootstrapped[3] CI $[-0.09, -0.02]$, $z = -2.68$, $p = .007$, and

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[2] Negative associations also held when controlling for either depressive symptoms (CESD), all $ps \leq .049$ or for anxiety symptoms (STAI), all $ps \leq .036$.

[3] Uncertainty estimates for all reported mediation models were computed from 5,000 bootstrapped resamplings of the original data using the bias corrected and accelerated method. In all cases, estimates were comparable when using other methods (e.g., percentile bootstrap and normal bootstrap).

Table 1

Descriptives of All Primary Variables of Interest, Including Outdegree (Aggregate Support Network), Use of Four Emotion Regulation Strategies, and Health Measures

Variable	N	M	SD	Min.	Max.
Outdegree (aggregate support network)	387	6.62	2.94	1.00	22
Emotion regulation—situation selection[a]	380	4.27	1.37	1.00	7.00
Emotion regulation—distraction[a]	380	4.01	1.45	1.00	7.00
Emotion regulation—reappraisal	377	4.62	1.00	2.00	7.00
Emotion regulation—suppression	377	3.82	1.26	1.00	7.00
Global health (SF-8 total)	377	95.00	12.60	56.90	118.00
Global health (PROMIS)	381	10.30	2.52	3.00	15.00
Depressive symptoms (CES-D)	383	16.60	10.50	0.00	48.00
Anxiety symptoms (STAI)	324	44.70	10.10	20.00	74.00

Note. SF-8 = Short Form-8; PROMIS = Patient-Reported Outcomes Measurement Information System; CES-D = Center for Epidemiological Studies Depression Scale; STAI = State-Trait Anxiety Inventory.
[a] Computed from single items.

suppression was negatively associated with overall health, $b = -0.34$, $[-0.55, -0.13]$, $z = -3.18$, $p = .001$. There was also a significant indirect path (ab), $b = 0.02$, $[0.005, 0.04]$, $z = 2.07$, $p = .038$, 39.5% partial mediation (see Table 2 for complete results from this model). In two alternative model specifications with the predictor, mediator, and outcome variables switched, there was an indirect association observed between health and outdegree, via suppression, $b = 0.03$, $[0.01, 0.09]$, $z = 1.97$, $p = .048$. Lastly, we specified anxiety symptoms (STAI scores) and depressive symptoms (CESD scores) as outcome measures in follow-up

Figure 1

Coefficient Plot Showing Relationships Between Outdegree (Aggregate Support Network) and Four Health Measures, Including the SF-8 and PROMIS (Overall Health and Well-Being) and CES-D (Depressive Symptoms) and STAI (Anxiety Symptoms)

Note. All values are standardized regression coefficients and uncertainty is indicated by standard error bars around the estimates. SF-8 = Short Form-8; PROMIS = Patient-Reported Outcomes Measurement Information System; CES-D = Center for Epidemiological Studies Depression Scale; STAI = State-Trait Anxiety Inventory. See the online article for the color version of this figure.
Level of statistical significance is indicated as follows: † $p = .07$.   * $p < .05$.   ** $p < .01$.

mediation models and observed similar indirect paths whereby outdegree (aggregate support) was associated with fewer depression/anxiety symptoms, via less use of expressive suppression (see Table S3 and S4 in the online supplemental materials).
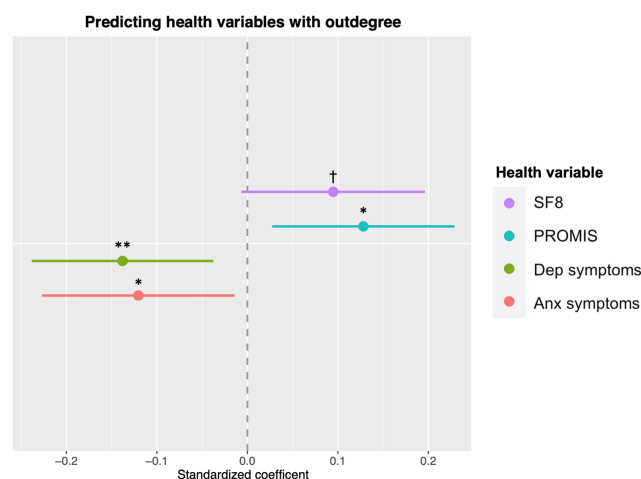
Next, since we observed the relatively strongest zero-order correlation between outdegree for the "Who do you turn to when something bad happens?" subnetwork and expressive suppression ($r = -0.22$), we fit an additional, follow-up mediation model with outdegree for this subnetwork as the predictor, use of expressive suppression as the mediator, and the PROMIS health measure as the outcome variable. In this model, outdegree was significantly negatively associated with use of expressive suppression, $b = -0.26$, 95% bootstrapped CI $[-0.38, -0.14]$, $z = -4.29$, $p < .001$, and suppression was negatively associated with overall health, $b = -0.27$, $[-0.48, -0.06]$, $z = -2.53$, $p = .011$. Critically, there was a significant indirect path (ab), $b = 0.07$, $[0.01, 0.15]$, $z = 2.08$, $p = .037$, 26.8% partial mediation. This indirect relationship held while controlling for age and gender in all paths, $b = 0.08$, $[0.03, 0.17]$, $z = 2.39$, $p = .02$, 29.2% partial mediation (see Table S2 in the online supplemental materials for all results from adjusted model). We also specified two alternative models with the predictor, mediator, and outcome variables switched. As we observed above, there was an indirect association observed between health and outdegree (in this case, the turn-bad subnetwork), via suppression, $b = 0.02$, $[0.006, 0.03]$, $z = 2.53$, $p = .011$.

Discussion

In this study, we tested preregistered, directional hypotheses about links between social support, as experienced in a well-defined network (i.e., tightly knit residential colleges at Rice University), emotion regulation strategy use (operationalized in several ways), and various health indicators. Overall, we gathered some support for our hypotheses and conducted additional analyses that further elucidated differences in health and social support as a function of participants' varying use of multiple regulatory strategies. First, with respect to H1 (positive correlations between social support and strategy use), we observed one robust association: values for outdegree (aggregate support network) were negatively associated with use of expressive suppression, and this held while controlling for age and gender. Similar patterns were observed for two subnetworks, the supported/cared for subnetwork and the turn-bad subnetwork.

Table 2

Preregistered Mediation Model Showing a Significant Indirect Path From Outdegree (Aggregate Support Network) to Health (PROMIS), Via Use of Expressive Suppression

Type	Effect	Estimate	SE	95% CI Lower	95% CI Upper	β	z	p
Indirect	**Outdegree ⇒ Suppression ⇒ Health**	**0.01907**	**0.00920**	**0.00495**	**0.0423**	**0.02212**	**2.073**	**.038**
	Age ⇒ Suppression ⇒ Health	0.00497	0.02140	−0.03703	0.0514	0.00207	0.232	.816
	Gender ⇒ Suppression ⇒ Health	0.17133	0.06998	0.06271	0.3479	0.03327	2.448	.014
Component	**Outdegree ⇒ Suppression**	**−0.05578**	**0.02080**	**−0.09311**	**−0.0116**	**−0.12946**	**−2.681**	**.007**
	Suppression ⇒ Health	**−0.34192**	**0.10768**	**−0.55387**	**−0.1284**	**−0.17086**	**−3.175**	**.001**
	Age ⇒ Suppression	−0.01452	0.05980	−0.13061	0.1043	−0.01209	−0.243	.808
	Gender ⇒ Suppression	−0.50107	0.12703	−0.75100	−0.2569	−0.19470	−3.945	<.001
Direct	**Outdegree ⇒ Health**	**0.09711**	**0.04256**	**0.01355**	**0.1819**	**0.11263**	**2.282**	**.023**
	Age ⇒ Health	0.04116	0.11579	−0.18786	0.2628	0.01713	0.355	.722
	Gender ⇒ Health	−0.71778	0.26659	−1.25250	−0.2047	−0.13937	−2.692	.007
Total	**Outdegree ⇒ Health**	**0.11618**	**0.04388**	**0.03018**	**0.2022**	**0.13475**	**2.648**	**.008**
	Age ⇒ Health	0.04612	0.12243	−0.19384	0.2861	0.01919	0.377	.706
	Gender ⇒ Health	−0.54645	0.26240	−1.06074	−0.0322	−0.10610	−2.083	.037

Note. Confidence intervals computed with method: bias-corrected bootstrap. Betas are completely standardized effect sizes. Effects of interest are in bold. PROMIS = Patient-Reported Outcomes Measurement Information System.

The reason behind this negative relationship between social support and use of expressive suppression could be that those individuals who are better supported in their network may have more opportunities to express thoughts and emotions to trusted others, thus negating the need to suppress their emotions. This is consistent with previous studies linking individual differences in strategy use and interpersonal functioning, specifically a negative relationship between suppression and quality of social relationships (English et al., 2012; Gross & John, 2003).

Next, we observed reliable correlations that supported our hypothesis about the links between social support and health indicators (H2). Specifically, there were positive associations between outdegree (aggregate support network) and overall health, such that those participants who nominated more individuals in their residential college (across subnetworks) reported being in better health than those with fewer nominations. These participants also tended to experience fewer anxiety and depression symptoms. These findings replicate previous studies examining positive links between quantitative measures of social support and mental health (Bolger & Eckenrode, 1991; Kawachi & Berkman, 2001). They also suggest that social support may confer various health benefits, especially in a population vulnerable to mental health disorders (i.e., college-aged students).

Although the findings discussed thus far suggest there are indeed links between measures of social support, emotion regulation strategies, and health, our third hypothesis served as a preliminary test of a possible mechanism. To test this hypothesis, we ran a mediation model with nominations from the aggregate support network as the predictor variable, use of expressive suppression as the intervening variable, and PROMIS scores as the outcome variable. We found a significant indirect effect, such that those participants with a greater number of overall nominations tended to use expressive suppression less frequently, which was then associated with better overall health. This pattern was replicated when using the subnetwork "Who do you turn to when something bad happens?" (i.e., "turn bad") as the predictor variable. Taken together, these preliminary findings suggest that individuals with greater social support may cope more effectively with stressors (e.g., by airing concerns and grievances openly to a trusted friend, vs. suppressing those emotions), which could in turn confer health benefits. If this is the case, then social support may be an adaptive precursor to deployment of emotion regulation strategies (suppression in particular), which have previously been shown to track with health indicators in the college-aged population (Lopez & Denny, 2019).

With respect to the exploratory analyses we report in the online supplemental materials, LPA revealed two subgroups in the sample who variably applied multiple emotion regulation strategies (i.e., situational strategies, distraction, reappraisal, and suppression), suggesting that people may exhibit different strategy profiles. These preliminary findings align with recent theorizing about a "toolbox" approach to self-regulatory processes (Fujita et al., 2020). For some individuals there may be under-reliance on multiple strategies that could be adaptive (e.g., situation selection, reappraisal) and relative over-reliance on a less adaptive strategy (suppression), indicating a different strategy toolbox or repertoire altogether. These findings are also consistent with a recent study in the appetitive domain that found that multiple regulatory strategies were effective in curbing eating behaviors (Lopez et al., 2021).

Although many findings we have reported here are consistent with our a priori, preregistered hypotheses, there are some caveats and considerations worth discussing, especially when determining how future research can scaffold onto the present study's design and analytic approach. First, all data collected in the present sample are cross-sectional, with no experimental manipulation of any variables of interest. Although we have provided evidence indicating reliable relationships between the variables, we cannot draw strong or conclusive inferences about underlying causality between them at present. For example, it could be that the amount of perceived social support within one's residential college subsequently impacts selection and implementation of various emotion regulation strategies (what we speculated might be the case with our first hypothesis). Alternatively, certain patterns of strategy use may affect the kinds of interpersonal bonds they form (e.g., those who suppress their emotions less frequently may be more open to forming new friendships and being more emotionally vulnerable with others; see Gross & John, 2003). Yet another possibility, raised by significant indirect paths in alternative mediation models

reported above, is that participants' health may impact how they approach their social relationships, which can be facilitated or hindered by use of emotion regulation strategies (e.g., someone who is in poorer health may not be as motivated or able to engage in support-seeking behaviors in their network, and this in turn may be linked to greater use of suppression as a coping strategy).

Next, in the interest of transparency and thoroughness, we computed outdegree for all subnetworks, as well as outdegree for the aggregate support (union) network. We did not have specific predictions about relationships with different subnetworks, so our preregistered hypotheses centered on relationships with the aggregate network. However, we also explored relationships with these distinct subnetworks. There were moderate correlations between the aggregate network and subnetworks, warranting use of the aggregate (union) network $(0.44 \leq r \leq 0.51)$ in our primary analyses. However, the strength of the reported findings varied across individual subnetworks. As shown in previous research (Williams et al., 2018), some of the subnetworks assessed here load onto different latent factors, namely support seeking (e.g., "Who in your residential college have you asked for advice about your social life?") and perceived support (e.g., "Who in your residential college makes you feel supported and cared for?"). Perceived support could be more predictive of one's health and adaptive emotion regulation strategy use than support seeking, which some recent work suggests may be the case (Uchino, 2009). It is also important to note that we only assessed the *quantity* of social support, as captured by the number of outgoing nominations in one's network, versus the *quality* of support participants experienced with each person they nominated. Thus, future work might consider comparing the predictive validity of quantitative and qualitative measures of support when establishing or replicating relationships with emotion regulation and health variables.

In addition to analyses using outdegree, we conducted preliminary exploratory analyses using the subgroup in our sample that received incoming nominations ($N = 24$; see the online supplemental materials for results). The effects with indegree were not as robust as others reported above, which may be attributable to indegree being more sensitive to sampling error—especially when a network has not been thoroughly sampled (Ribeiro et al., 2012), as was the case here. Nonetheless, we hope these findings can serve as an important point of comparison in light of related work showing links between indegree and well-being (e.g., Morelli et al., 2017), and also be a springboard for future research. Indeed, while we did not exhaustively sample from each residential college, which would have allowed us to compute other common network measures (e.g., reciprocity, density, second-degree ties), we recommend that follow-on studies replicate and extend the present work by computing a wider array of network-based metrics from more densely sampled networks and relate these to health indicators and strategy use, including those assessed here.

Lastly, the present study's cross-sectional design only gave us an overall snapshot into participants' broad patterns of emotion regulation strategy use and attendant associations with social support and health measures. Future studies could employ longitudinal designs using daily diaries or experience sampling to test more fine-grained hypotheses about the adaptiveness and fit of particular strategies. For instance, they might test for reciprocal relationships between social support, strategy use, and affective and health measures that might play out throughout the day or week. This would elucidate the exact causal relations between these variables and also establish the ecological validity of the employment of these regulatory strategies in daily life. We also recommend that researchers compare different ways to operationalize newer constructs of interest in the emotion regulation literature, such as strategy repertoire, and attendant effects on health. Others may even consider developing targeted interventions to strengthen social support, train emotion regulation, or a combination of both to maximize potential health benefits among college students.

To conclude, preregistered hypotheses and analyses revealed that there are indeed relationships between college students' experiences of social support in a relatively tightly knit, well-defined social network (one's residential college), emotion regulation strategy use, and various indicators of health and well-being. Specifically, and summarizing findings supporting our three primary hypotheses (H1–H3), those individuals who perceived greater social support in their residential colleges, as captured by outdegree measures, were more likely to employ multiple regulatory strategies that were adaptive in terms of their associations with health (e.g., less use of suppression, which was negatively associated with health). These findings replicate and extend previous work examining relationships between strategy use and health (Lopez & Denny, 2019), as well as studies linking interpersonal emotion regulation to social network measures (e.g., Williams et al., 2018). We also believe this study makes a needed first step in identifying important links between social support, emotional coping, and health in the college-aged population, which is currently experiencing many threats to their health and well-being.

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