



Published in final edited form as:

J Soc Pers Relat. 2022 November ; 39(11): 3415–3435. doi:10.1177/02654075221098419.

Effects of Mindful Emotion Regulation on Parents' Loneliness and Social Support: A Longitudinal Study During the COVID-19 Pandemic in the United States

Na Zhang¹, Beth Russell¹, Crystal Park², Michael Fendrich³

¹Department of Human Development and Family Sciences, University of Connecticut

²Department of Psychological Sciences, University of Connecticut

³School of Social Work, University of Connecticut

Abstract

The COVID-19 pandemic has introduced unprecedented challenges and demands for parents or caregivers of children who experienced disruptions in social support and feelings of isolation. Mindful emotion regulation may be a resilient factor for parents' psychosocial outcomes. Mindful emotion regulation refers to individuals' inherent capacities to regulate emotions mindfully, i.e., through paying attention to one's experiences in the present moment nonjudgmentally. Based on the theoretical and empirical literature associating mindful emotion regulation with loneliness and perceived social support, the current study tested the effects of mindful emotion regulation on later changes in perceived social support and loneliness in U.S. parents during the pandemic. Participants were 147 parents/caregivers who were living with at least one child or adolescent in their household during the pandemic in the USA. Data were collected from a national online sample at four time points: baseline (April 7–21, 2020), 30-, 60-, and 90-days later. Results of longitudinal mediational structural equation modeling showed that mindful emotion regulation was directly associated with increased perceived social support and decreased loneliness. Moreover, mindful emotion regulation was also associated with perceived social support indirectly through its effects on loneliness. Focusing on the needs of parents is important for promoting family and child wellbeing to ameliorate negative health consequences. More research is needed to elucidate whether and how mindful emotion regulation may be beneficial for parents in the social relationship domain.

Keywords

emotion regulation; loneliness; mindfulness; parent; perceived social support

Correspondence concerning this article should be addressed to Na Zhang, University of Connecticut, 1 University Place, Stamford, CT 06901. nazhang@uconn.edu.

We have no conflict of interest to disclose.

The data used in the research are available and can be obtained at: <https://osf.io/ywv38/>. The materials used in the research are available and can be obtained via corresponding author.

The COVID-19 pandemic has introduced unprecedented challenges and demands for parents or caregivers of children – a vulnerable group who have experienced overwhelming stressors. Data from a national sample of U.S. adults found that caregivers of children reported higher rates of anxiety, depression, suicidal ideation, and COVID-19 traumatic stress, relative to non-caregiving adults (Czeisler et al., 2021). Indeed, growing evidence suggests that parents have experienced concerning burden, distress, and mental health problems during the pandemic (Fong & Iarocci, 2020; Fontanesi et al., 2020; Horiuchi et al., 2020; McRae et al., 2021; Patrick et al., 2020; Pew Research Center, 2021; Russell et al., 2021). Parents' psychological distress can lead to family relationship problems and child maladjustment (Prime et al., 2020). More research is needed to understand potential risk or resilience factors related to parents' psychosocial outcomes. By considering parents as agents of change, such research will inform prevention and intervention development (e.g., parent training programs) to promote family resilience during crises (Holmes et al., 2020).

Social support is an important predictor of health outcomes (Cohen & Wills, 1985; House et al., 1988). For parents, social support also predicts parenting practice (DeGarmo et al., 2008; McConnell et al., 2011; Green et al., 2007; Izzo et al., 2000) and engagement in services for children's mental health (Sander & Mazzucchelli, 2022). During the pandemic, social support resources became less available or less accessible, especially for parents. Many parents have lost access to schools or daycare over long periods and experienced disruptions in their children's health care services (Patrick et al., 2020). To prevent COVID-19 infection, parents have avoided in-person contact with extended family members such as grandparents, who often provide childcare support for working parents (Griffith, 2020). In this context, parents' *perceived* support is crucial. Data supports the linkage between parents' perceived social support and positive psychosocial outcomes during the pandemic. For example, during the pandemic, parents' perceived partner support buffered against the negative impacts of their own distress on parenting (McRae et al., 2021). In addition, parents' perceived social support was positively associated with effective implementation of home learning activities for children during school closures (Oppermann et al., 2021).

Parents also have shown greater vulnerability to the experience of loneliness during the pandemic. A survey found that 51% of U.S. mothers reported severe feelings of loneliness, compared to 36% of all American who reported severe loneliness, and 47% of mothers reported an increase in loneliness since the pandemic (Weissbourd et al., 2021). This is not surprising given that a lot of parents have worked from home, constantly switching between job tasks and parenting duties (i.e., regular parenting responsibilities and homeschooling during school closures). Daily stress left little room for social interactions outside of the family, and minimizing social contact was one of the most effective ways to protect their children and family from infection.

Despite the prevalence of experiencing disruptions in social support and feelings of isolation, many parents remain resilient. What may explain the heterogeneity? The current study seeks to examine whether *mindful emotion regulation* would be a factor associated with later changes in perceived social support and loneliness among U.S. parents during the pandemic. Researchers have more commonly studied parents' dispositional mindfulness (Kil et al., 2021), which, in our view, is a broad term that encompasses mindful emotion

regulation. There is a consensus is that parents constantly regulate their own and their children's emotions (Rutherford et al., 2015). When parents described their own and their children's experiences during the pandemic, negative emotions such as stress, worry, anxious, fear, and sadness were highly prominent (Eales et al., 2021). Due to the stressful nature of the pandemic, emotion regulation is of great importance for parents. Data has also shown that emotion regulation is a resilience factor for general adults as well as parents during the pandemic (Low et al., 2021). Therefore, studying mindful emotion regulation as a specific tenet of dispositional mindfulness has practical implications for parents and family wellbeing (Russell et al., 2021). To the best of our knowledge, no research exists on how parents' MER is related to their social support and loneliness. The current study attempts to provide preliminary evidence in this nascent research area.

The concept and assessment of mindful emotion regulation

Discussions on mindful emotion regulation (MER) have scattered in the literature, which, in general, links MER to positive psychological outcomes (Chambers et al., 2009; Chiesa et al., 2013; Garland et al., 2015; Teper et al., 2013; Roemer et al., 2015; Rosenbaum et al., 2020). Based on extant theories (for reviews, see Arch & Landy, 2015; Chambers et al., 2009; Chiesa et al., 2013) that conceptualize mindfulness in a framework of emotion regulation (the process of modulating emotional responses; Gross, 2014), we operationalize MER as referring to individuals' inherent capacities to regulate emotions *mindfully*, i.e., through paying attention to one's experiences in the present moment nonjudgmentally. According to the emotion regulation framework, which posits five categories of emotion regulation strategies (i.e., situation selection, situation modification, attention deployment, cognitive change, and response modulation; Gross, 2014), MER can be understood as a type of adaptive attention deployment (Arch & Landy, 2015), in the sense that it occurs prior to cognitive change and modulation and predicts adaptive emotion regulation outcomes. In comparison, distraction is considered a type of maladaptive attention deployment (Naragon-Gainey et al., 2017). Moreover, MER is thought to be an antecedent-focused strategy that takes place early on and in turn influences other emotion regulation and responses down-stream in the processes of cognitive changes and/or response modulation (Arch & Landy, 2015). Evidence supporting this assertion is seen in a meta-analysis showing that MER is associated with cognitive change such as reappraisal ($r = .28$ based on 10 studies), acceptance (.32; 53 studies), rumination ($-.38$; 20 studies) and worry ($-.26$; 8 studies), and with response modulation such as experiential avoidance ($-.39$; 34 studies) and expressive suppression ($-.28$; 10 studies) (Naragon-Gainey et al., 2017). Of note, although MER involves acceptance (Aldao et al., 2010), a more nuanced distinction suggests that acceptance maps onto the cognitive change rather than attention deployment category (Naragon-Gainey et al., 2017).

In this study, we drew three measures to capture a latent construct of MER, given the novelty and complexity of this concept. The Cognitive and Affective Mindfulness Scale (CAMS-R) was developed by researchers with expertise in mindfulness and emotion regulation and was validated in a student sample showing acceptable reliability and construct validity (Feldman et al., 2007). The CAMS-R has four subscales – Attention, Present Focus, Awareness and Acceptance – covering theoretically integral elements of mindfulness (Lindsay & Creswell,

2017) but with a focus on mindful emotion regulation as a mechanism of change in psychotherapy (Bergomi et al., 2013). To complement the CAMS-R, we used the Attention subscale of the Abbreviated Barrat Impulsivity Scale 11 (Coutlee et al., 2014) which captures focused attention. Focused attention is a key characteristic that makes a mindful approach to emotion regulation distinguishable from other cognitive approaches of emotion regulation (Chambers et al., 2009; Chiesa et al., 2013). We also used the Difficulties in Emotion Regulation Scale – Short Form (DERS-SF; Kaufman et al., 2016) to include additional dimensions that are discussed in the mindful emotion regulation literature. For example, several items of the DERS-SF (e.g., “when I’m upset, I lose control over my behavior”) assess the lack of nonreactivity, an important regulatory dimension but one that is absent from the CAMS-R. Based on the mindful emotion regulation theories, lack of MER suggests over-identification with disruptive emotions and reactivity to unpleasant experiences, leading to emotion dysregulation (Chambers et al., 2009; Chiesa et al., 2013). The DERS-SF is conceptualized as an indicator of the lack of MER. Taken together, the three measures are conceptually proximal to the construct of MER and thus were chosen to be the indicators of a latent variable of MER.

MER, loneliness, and perceived social support

Individuals with higher MER levels may perceive greater social support and lower loneliness, compared to those with lower MER. Because MER reduce negative emotions by modulating cognitive processes, it may as well affect social cognition such as the perception of available support. Specifically, MER involves nonjudgmental attention to and “suspending” of disturbing emotions and thoughts, which prohibit the habituation of negatively biased appraisal responses. Such “suspending” leads to awareness of new situations and formation of adaptive appraisals by disrupting ruminative thinking of unpleasant stimuli (Farb et al., 2012). In short, MER contributes to adaptive social cognition by interfering with and extinguishing negative appraisals (Farb et al., 2014). Data has shown that mindfulness was associated with perceived social connection through effective emotion regulation in social contexts (Quaglia et al., 2015), which suggests a possible direct link between MER and perceived social support. Other studies measured dispositional mindfulness and found that it was concurrently associated with perceived social support (Sun et al., 2019; Swickert et al., 2019).

Loneliness is a negative emotional state that originates from perceived mismatch between one’s ideal social relationship status and actual circumstances (Heinrich & Gullone, 2006). It is related to but distinct from objective social isolation. Several intervention studies have suggested that mindfulness training reduced loneliness (Lindsay et al., 2019; Samhkaniyan et al., 2015; Zhang et al., 2018). For example, community adults reported reduced feelings of loneliness and increased social contact after completing mindfulness training that focused on awareness and acceptance (Lindsay et al. 2019). There is also evidence that emotion regulation collectively explained 52.2% of the variance in loneliness (Preece et al., 2021). Therefore, MER, as a tenet of dispositional mindfulness, may have an impact on loneliness.

MER may also predict loneliness or perceived social support through a mediating path via perceived social support or loneliness, respectively, because loneliness and interpersonal

appraisals have a bidirectional relationship (Käll et al., 2021). Lonely people often perceive their social relationships as threatening and rejecting, which motivate them to withdraw from social exchanges and experience less support from others. Theoretically, loneliness can sensitize individuals' attention to social threats (Cacioppo et al., 2014), which contribute to decreased feelings of social support. One study of young adults found that lonely people tended to have negative appraisals about interpersonal relationships (Duck et al., 1994). Another study showed that in samples of both university students and older adults, loneliness predicted lower perceived social support even after controlling for personality variables (Cacioppo et al., 2006). Finally, individuals who perceive less social support may feel lonelier later in life. Therefore, loneliness could mediate the association between MER and perceived social support, whereas perceived social support could mediate the association between MER and loneliness.

The current study

Since the beginning of the pandemic, COVID policies and community prevention efforts have been unfolding and brought significant uncertainty to family life (Horesh & Brown, 2020). As the summer of 2020 ended, parents had little information about the upcoming school year and whether the broader social services conveyed through the school system would be available. Not only have parents needed emotion regulation more than ever, they also have missed usual social support and social interaction that would help them in coping with the overwhelming situation of “pandemic parenting”. MER may be an inherent human capacity, mental resource and resilience factor that parents could rely on during such a unique context.

We used secondary data from a longitudinal dataset and formulated a structural model (Figure 1) that tests the relations between MER, loneliness, and perceived social support in parents of a child (between 0 – 18 years). In this model we included four waves of data spanning over half a year from T1 (baseline; April 2020) to T4 (about 90 days later; up to September 2020), we explored the following research questions: 1) Would MER at T1 be directly associated with changes in loneliness or perceived social support at later time points? 2) Would MER at T1 be indirectly associated with changes in loneliness via its effect on perceived social support? 3) And would MER at T1 be indirectly associated with perceived social support via its effect on loneliness?

Methods

Participants

Data for this analysis is drawn from a larger, national sample of adults who participated in a study of stress during the pandemic in the United States. Individuals 18 years or older, English-speaking, and living in the U.S. were eligible to participate through Amazon's online worker pool, Mechanical Turk (MTurk). The data used for the present analysis was from 147 participants who were caring for at least one child in their household during the COVID-19 pandemic. They were on average 34.45 years old (SD = 12.31; Range = 20 – 76). More than half self-identified as women (64.6%), men (n = 51; 34.7%) or non-binary/third gender (n = 1; 0.7%). Most participants were heterosexual (95.9%), with six individuals

(4.1%) were bisexual. Their racial identity was White (82.3%), Black/African American (8.8%), Asian/Asian American (8.8%), Native Hawaiian or other Pacific Islander (1.4%), or American Indian or Alaska Native (2.0%). The majority were non-LatinX (86.8%), with 6.8% as LatinX. Over three quarters of the sample (78.2%) were not students at the start of the study, with 10.2% full-time students and 6.1% part-time students. Over one fourth of the sample reported that their highest level of education was a GED (28.6%), 19.7% reported their highest level was an associate's degree, 38.8% a bachelor's degree, 10.2% a master's degree, and 2.8% a doctorate/professional degree (2.8%). More than half (53.1%) of the sample had multiple children currently living at home; the average number of children currently living at home was 1.73 (SD = 0.90). The percentages caring for at least one child under 5 years, between 6–11 years, and between 12–18 years were 53.1%, 42.1%, and 35.2%, respectively. No information on specific caregiving roles was collected. Although it is possible that a proportion of the sample were other family members such as grandparents, aunts, or older siblings, because participants were asked about their children who live in the same household with them, and because 74.8% of the sample indicated that they were married or partnered, it is reasonable to infer that most of the caregivers were parents. In this paper the terms “caregivers” and “parents” are used interchangeably.

Procedure

All study materials were approved by the BLINDED FOR REVIEW IRB (X20–0057). For the larger project, MTurk workers were invited to participate in a longitudinal anonymous study on stress and coping. Participants were compensated for their time to complete each survey; surveys included demographic information and psychological measurements (approximately 20 minutes, each). Participants received a \$2 incentive at baseline and a \$3 incentive for each follow-up. Data were collected online at baseline (April 2020), and 30, 60, and 90 days later (T1 – T4; during two-week data collection windows for each assessment point). Interested MTurk workers who met the larger study inclusion criteria reviewed a short study description and followed a hyperlink to the consent and survey materials at each time point. Given known challenges of crowdsourced online sampling, the study followed data management guidelines to eliminate substandard cases based on response patterns or time to completion that indicate inattentive responses (Kees et al., 2017; Sheehan, 2018). In this case, the study used multiple attention screening metrics including Captcha completion, distractor items (e.g., “do you live on Mars?”) and a time to completion metric to identify inattentive responders. The time to completion metric established a set of likely inattentive fast-responders based on those who completed the survey in less than 50% of the average response time calculated during the preliminary piloting of the survey (mean completion time of approximately 1,290 seconds). Any case completed in less than 645 seconds was identified as a fast-responder and dropped from analysis (of the larger baseline sample of over 1,500 participants, there were 169 fast-responders dropped).

To select a sample of caregivers from the larger study, we used the following criteria: 1) at T1 assessment, participants answered “yes” to the question “Are you a caregiver for someone living in your home with you?”; 2) at T1 assessment, they selected “Child (anyone under the age of 18 years old)” when they were asked to specify the persons they were taking care of; 3) at T2 assessment, they indicated at least one number greater than 0 when

answering the following questions: “How many children under the age of 18 years old do you have currently living in your home?”; “How many children ages 0–5 years or age currently live with you?”; “How many children ages 6–11 years or age currently live with you?”; and “How many children ages 12–17 years or age currently live with you?” This method yielded a total of 147 caregivers.

Measures

Mindful emotion regulation (MER).—To reduce measurement error that could bias the estimates of mediation models (Cole & Maxwell, 2003), a latent variable of MER was used. In line with our operationalized definition of MER, this latent variable has three indicators that were measured at T1. The three observed variables were strongly correlated with each other in expected directions (r_s .60~.67).

First, we used the 12-item Cognitive and Affective Mindfulness Scale-Revised (CAMS-R; Feldman et al., 2007) as a proxy of MER capacities or skills. Respondents rated each item on a 4-point scale ranging from 1 (*rarely/not at all*) to 4 (*almost always*). The CAMS-R was designed by experts in mindfulness and emotion regulation to be free of particular or specialized idiomatic language, suitable for uses in non-meditating samples, and related to psychological distress. The scale taps four dimensions: Attention (e.g., “It is easy for me to concentrate on what I am doing”), Present Focus (e.g., “I am able to focus on the present moment”), Awareness (e.g., “It’s easy for me to keep track of my thoughts and feelings”), and Acceptance (e.g., “I am able to accept the thoughts and feelings I have”). Importantly, unlike measures of mindfulness that include items about being mindful of body sensations or sounds, the CAMS-R exclusively evaluates respondents’ approaches to thoughts and feelings (Feldman et al., 2007). As such, this scale is a unique tool for assessing dispositional MER rather than dispositional mindfulness. Evidence has supported its internal consistency and convergent and discriminant validity (Feldman et al., 2007). In particular, scores of CAMS-R were found to be related to both adaptive (e.g., cognitive flexibility) and maladaptive (e.g., rumination) emotion regulation strategies in expected directions (Feldman et al., 2007). The measure also demonstrated acceptable internal consistency at T1 in the current sample ($\alpha = .88$). Higher scores indicate greater cognitive and affective mindfulness.

Second, we used the Abbreviated Barrat Impulsivity Scale-11 - Attention subscale (ABIS-A) (Coutlee et al., 2014) as a proxy of focused attention, an important element of MER, as discussed above. The Attention subscale assesses respondents’ abilities to focus on a given task at hand. The five items are rated on a scale (1 = *rarely/never* to 4 = *always/almost always*): “I don’t ‘pay attention’”, “I concentrate easily”, “I ‘squirm’ at plays or lectures”, “I am a steady thinker”, “I am restless at the theater or lectures”. The scale has demonstrated acceptable internal consistency (Coutlee et al., 2014) and strong internal consistency at T1 in the present sample ($\alpha = .89$). Higher scores indicate lower focused attention.

Thirdly, we used the Difficulties in Emotion Regulation Scale-short form (DERS-SF) (Kaufman et al., 2016) as a proxy of MER. As discussed above, MER is thought to facilitate downstream emotion regulation processes and emotion responses, associated with fewer difficulties in regulating negative emotions. The DERS-SF has 6 subscales (3 items each): Nonacceptance of Emotion Responses (e.g., “When I’m upset, I become embarrassed for

feeling that way”); Difficulties in Engaging in Goal Behaviors (e.g., “When I’m upset, I have difficulty concentrating”); Impulse Control Difficulties (e.g., “When I’m upset, I become out of control”); Lack of Emotion Awareness (e.g., “I pay attention to how I feel”); Limited Access to Emotion Regulation Strategies (e.g., “When I’m upset, it takes me a long time to feel better”); and Lack of Emotion Clarity (e.g., “I’m confused about how I feel”). Items are rated on a 5-point scale from 1 (*almost never*) to 5 (*almost always*). The scale’s construct validity has been supported (Kaufman et al., 2016). Internal consistency of the scale is excellent at T1 in the current study ($\alpha = .93$). Higher scores indicate greater emotion regulation difficulties or problems.

Loneliness was measured at T2, T3 and T4 (but not at T1) using a 3-item Loneliness Scale (“I feel left out”, “I feel isolated”, and “I lack companionship”; Hughes et al., 2004). Participants rated each item on a 3-point scale (1 = *hardly ever*, 2 = *some of the time*, 3 = *often*). This short measure has demonstrated adequate internal consistency (Hughes et al., 2004). The measure also has strong internal consistency in the current sample with $\alpha = .88$, $.89$, and $.91$, respectively, from T2 to T4. Scores are summed, with a possible range of 3 to 9. Higher scores indicate higher loneliness.

Perceived social support was assessed at T1-T4 with the 4-item Appraisal Support subscale of the Interpersonal Support Evaluation List (ISEL) (Brookings & Bolton, 1988). This subscale measures the extent to which respondents perceive that there is someone they can discuss personal issues with. Examples of the items include “When I need suggestions on how to deal with a personal problem, I know someone I can turn to” and “There is no one that I feel comfortable talking to about intimate personal problems.” Each item is rated on a 4-point Likert-type scale from 0 (*definitely false*) to 3 (*definitely true*). The appraisal subscale of the ISEL has demonstrated adequate internal consistency in the current sample with $\alpha = .86$ for T1 and $.88$ for T2, T3, and T4. A composite score was created (possible range from 0 to 12). Higher scores indicate higher levels of perceived social support.

Possible covariates.—We considered several possible covariates that may be associated with loneliness or perceived social support. Käll et al. (2020) suggested that contextual stressors and negative emotionality (e.g., depression and anxiety) may affect loneliness and social appraisals. For contextual stressors, we used T1 data on the COVID-19 Stressors Scale. This scale assesses 23 stressors such as infection-related stressors (e.g., risk of becoming infected), daily routine-related stressors (e.g., changes to daily work routines), and resource-related stressors (e.g., loss of current job security or income), and has demonstrated adequate reliability and validity in the U.S. (Tambling et al., 2021); internal consistency was also high in the present sample at T1, $\alpha = .86$. Participants reported whether they experienced each of the stressors (1 = *Yes* or 0 = *No*) and a composite score has a possible range of 0–23. Higher scores indicate greater stressor exposure during the first weeks of the pandemic. For negative emotionality, we used the depression and anxiety subscales of the Depression, Anxiety, and Stress Scales-21 (DASS-21; Antony et al., 1998). The DASS-21 has demonstrated good reliability and construct validity, with normative data available (Henry & Crawford, 2005). Each subscale has 7 items that are rated on a 4-point scale from 0 (*never/does not apply to me at all*) to 3 (*applies to me very much or most of the time*). Scores are summed and multiplied by 2 for comparability to the original 42-item DASS

(Lovibond & Lovibond, 1995); internal consistency was good at T1 in the sample ($\alpha = .93$ for depression; $\alpha = .90$ for anxiety). Scores on the two subscales were strongly correlated at T1 ($r = .75, p < .001$). We averaged the Z-scores of depression and anxiety to create a composite score of negative emotionality. Higher scores indicate higher levels of negative emotionality.

We also considered the following demographic variables as possible covariates (assessed at T1): gender, age (in years), education (0 = *high school or below*, 1 = *some college*, 2 = *Bachelor's degree or above*), employment status (1 = *Currently employed* or 0 = *not employed*), marital status (1 = *married/partnered* or 0 = *not married/not partnered*), and whether the participant has enough money to meet their needs (ratings ranged from 1 = *not at all* to 5 = *completely*). Two additional possible covariates were related to the participant's child: at T2, they reported number of children currently at home and whether they had a young child < 5 years (1 = *yes* or 0 = *no*).

Analyses

Screening of normality of data distribution for mediators and dependent variables found that skewness and kurtosis were all in the acceptable range. We specified a structural equation model using multiple waves of data based on recommendations on testing longitudinal mediation models (Cole & Maxwell, 2003). To allow stronger inferences of mediation effects, the model specifies that MER precedes loneliness in time and loneliness precedes social support in time, controlling for the stability of loneliness and perceived social support over time (Cole & Maxwell, 2007). As shown in Figure 1, we specified a parsimonious cross-lagged model including loneliness and perceived social support across T2-T4 (note that loneliness was not assessed at T1), using MER as an independent variable that predicts loneliness and perceived social support at each later time point. There are two mediational pathways that could test the hypothesized mediation effects (in bold): 1) T1 MER to T2 loneliness to T3 perceived social support; and 2) T1 MER to T3 loneliness to T4 perceived social support. We tested a total of eight variables as covariates of T2 loneliness and perceived social support. Given the relatively small sample size of the current study, we removed covariates that were not significantly associated with loneliness or perceived social support (one at a time). For paths among the key study variables that were not statistically significant, we constrained them to 0 and used chi-square difference tests for comparisons of competing models.

Once the most parsimonious model was finalized, we assessed mediation effects; the a path (independent variable \rightarrow mediator), b path (mediator \rightarrow dependent variable), and c' path (independent variable \rightarrow dependent variable after controlling for mediation effect) were estimated. If both a and b paths were statistically significant ($\alpha = .05$), bias-corrected bootstrapped 95% confidence intervals (CIs) for the indirect (mediation) effect ($a*b$) were computed (MacKinnon et al., 2002) based on 5,000 bootstrap resamples. Mediation effects were considered statistically significant if the CIs did not include zero. The bootstrapped method has better power than several other methods to detect mediation effects (MacKinnon et al., 2002). To confirm the sensitivity of our analyses, we tested two post-hoc models to evaluate whether our conclusion remains unchanged. One model tested the final model

with no covariates included and the other model tested the final model with an additional covariate (T1 perceived social support) for T2 perceived social support.

Model fit indices were evaluated using recommended criteria (McDonald & Ho, 2002). A good-fitting model has a chi-square ratio below 2.0, a comparative fit index (CFI) close to 1 (above 0.95), standardized root-mean-square residual (SRMR) below 0.08, and root-mean-square error of approximation (RMSEA) below 0.08. All models were estimated using the maximum likelihood estimator in Mplus 8 (Muthén & Muthén, 1998–2017).

Missing data.—T1 and T2 data did not contain any missingness on study variables except for parents' age (5.4% of the sample). Missing data on loneliness and perceived social support was found for 19.0% of the sample at T3 and 29.3% at T4. Little's Missing Completely At Random (MCAR) tests did not reject the hypothesis that the missingness was at random ($p > .05$). Thus, missing data was handled using Full Information Maximum Likelihood (FIML) in Mplus 8 (Muthén & Muthén, 1998–2017).

Results

Descriptive statistics and the bivariate correlation matrix (see Online Supplementary Table) showed that the percentage of parents who endorsed at least some loneliness (scored 4 or above on the Loneliness Scale) was 55.1% at T2, 50.4% at T3, and 47.1% at T4. Loneliness and perceived social support were both relatively stable over time ($r_s = .78-.79$, $p_s < .001$). The three indicators of T1 MER were moderately-to-strongly correlated with T2-T4 loneliness ($r_s = -.56-.32$; $p_s < .01$) and perceived social support ($r_s = .39-.52$, $p_s < .01$) in expected directions.

Based on a model including all covariates and paths (Figure 1), we removed the covariates that were not statistically significant ($\alpha = .05$). Specifically, female, age, education, employment status, number of children, and enough money to meet needs were not associated with T2 loneliness or perceived social support. Having a young child was not associated with T2 loneliness. Negative emotionality and COVID-19 stressors were not associated with T2 perceived social support. After removing these covariates, data fit was marginally acceptable: $\chi^2 = 91.41$, $df = 43$, CFI = 0.95, RMSEA = 0.09, SRMR = 0.04. Next, we constrained four paths to 0 because they were not statistically significant: 1) T2 loneliness \rightarrow T3 perceived social support ([unstandardized coefficient] $b = -0.04$, S.E. = 0.05, $p = .40$, [standardized coefficient] $\beta = -.06$); 2) T3 loneliness \rightarrow T4 perceived social support ($b = -0.09$, S.E. = 0.12, $p = .38$, $\beta = -.08$); 3) MER \rightarrow T4 loneliness ($b = -0.02$, S.E. = 0.04, $p = .62$, $\beta = -.04$); and 4) T3 loneliness T4 perceived social support ($b = -0.10$, S.E. = 0.12, $p = .39$, $\beta = -.07$). The final model was not significantly different than the previous model with these paths freely estimated, $\chi^2(4) = 2.46$, $p = .65$. Therefore, we report the more parsimonious model (Figure 2), $\chi^2 = 93.86$, $df = 47$, CFI = 0.95, RMSEA = 0.08, SRMR = 0.05. In this model, factor loadings of the CAMS-R, BIS-A, and DERS-SF were 0.70, -0.69 , -0.91 , respectively. The results showed that T1 MER was directly associated with T2 loneliness ($b = -0.11$, S.E. = 0.05, $p = .02$, $\beta = -.24$), T2 perceived social support ($b = 0.44$, S.E. = 0.07, $p < .001$, $\beta = .62$), T3 loneliness ($b = -0.14$, S.E. = 0.04, $p < .001$, $\beta = -.30$), and T4 perceived social support ($b = 0.14$,

S.E. = 0.06, $p = .03$, $\beta = .23$). In addition, T2 loneliness was directly associated with T3 perceived social support ($b = -0.46$, S.E. = 0.13, $p < .001$, $\beta = -.28$). The direct association between MER and T3 perceived social support was not statistically significant ($b = 0.11$, S.E. = 0.07, $p = .10$, $\beta = .16$). Because MER was associated with T2 loneliness, which was then associated with T3 perceived social support, the mediation effect was computed. Results showed a significant indirect effect ($a*b$) with bias-corrected bootstrapped 95% CIs = (0.013, 0.126): T2 loneliness significantly mediated the relation between T1 MER and T3 perceived social support. The model explained 44%, 72%, and 63% of variances in T2, T3, and T4 loneliness, and explained 52%, 69%, and 68% of variances in T2, T3, and T4 perceived social support. To conclude, MER showed direct effects on decreased loneliness (up to 60 days later) and increased perceived social support (up to 90 days later) as well as indirect effect on increased perceived social support via its effect on decreased loneliness.

We computed a final post-hoc analysis, constraining the path T2 \rightarrow loneliness T3 perceived social support to 0, which resulted in a significant path from MER to T3 perceived social support ($b = 0.16$, S.E. = 0.06, $p = .004$, $\beta = .23$). However, results from a chi-square difference test found that the final model with this path freely estimated fits the data better than when the path was fixed, $\chi^2(1) = 17.06$, $p < .001$. This suggests that the effect of MER on T3 perceived social support was an indirect effect via its effect on T2 loneliness.

Finally, the final model was estimated again by removing all covariates, and the conclusions remained unchanged. Also, when T1 perceived social support was added to the model as a covariate of T2 perceived social support, it did not change the findings regarding the direct and indirect effects of MER on loneliness and perceived social support.

Of note, among the covariates, T2 loneliness was associated with COVID-19 stressors ($b = 0.06$, S.E. = 0.03, $p = .05$, $\beta = .13$), negative emotionality ($b = 0.06$, S.E. = 0.03, $p = .02$, $\beta = .24$), and marital status ($b = -1.61$, S.E. = 0.28, $p < .001$, $\beta = -.39$). This pattern of associations suggests that caregivers who experienced more stressors, who were not married/partnered vs. married/partnered, and who reported higher levels of negative emotionality at baseline reported higher levels of loneliness 30 days later. On the other hand, T2 perceived social support was associated with marital status ($b = 2.22$, S.E. = 0.46, $p < .001$, $\beta = .34$) and having a young child ($b = 0.94$, S.E. = 0.30, $p = .002$, $\beta = .17$), suggesting that caregivers who were married/partnered or had at least one young child (<5 years) reported greater levels of perceived social support 30 days later.

Discussion

The COVID-19 crisis facilitated an examination of the potential role of psychological resilience in bolstering perceptions of support in a particularly vulnerable group, caregivers of children. The disruption in social support networks posed unprecedented challenges for parents, for whom there are considerable consequences such as loneliness, lack of perceived support, and psychological distress (Hall et al., 2020; Poppert Cordts et al., 2020). Based on four waves of data following the outbreak of the pandemic, we found that parents' MER was associated with decreased loneliness and increased perceived social support later in time. Moreover, we found preliminary evidence suggesting that the association between MER and

perceived social support was mediated by loneliness but not vice versa. To the best of our knowledge, this is the first study to demonstrate the effects of MER on perceived social support in a parent sample.

More research is needed to develop the theory of MER (Arch & Landy, 2015). Consistent with existing emotion regulation theory, MER involves adaptive cognitive and emotion functioning including focused and sustained attention to the present moment, without negative elaboration of the past or the future, and accepting feelings and thoughts as they are, without excessive evaluation and reactivity. We constructed a latent variable based on available measures in the secondary dataset, and the final structural model indicated a very high loading of DERS-SF (0.91), although the factor loadings of the other two indicators were also relatively high (.70 and $-.69$). The DERS-SF assesses emotion dysregulation, and several subscales of the DERS-SF, without naming “mindfulness” explicitly, are theoretically related to a mindful approach to emotion regulation, pointing to awareness, acceptance, and nonreactivity. Theoretically, MER and dispositional mindfulness are closely related. Dispositional mindfulness is a broader concept typically assessed using multidimensional scales such as the Five Facets Mindfulness Questionnaire (FFMQ; Baer et al., 2006) which involves observing, describing, nonreactivity, nonjudgment, and acting with awareness. It would be important in future studies to differentiate the unique predictive value of each of the two concepts for outcomes in the social domains. Given the complexity of mindfulness and MER (Chiesa et al., 2013), it might be useful to study specific processes related to mindfulness via conceptualization within existing theories such as emotion regulation. Understanding specific processes that are associated with desirable outcomes can help in designing more targeted interventions that are tailored to target specific skills or behaviors for use in daily life or when under unusual stresses.

A few cross-sectional studies have demonstrated that dispositional mindfulness was associated with social support in teachers (Sun et al., 2019) and college students (Kuhl & Boyraz, 2017; Swickert et al., 2019), but none of these studies tested possible mediators between the two concepts. During a crisis when social interactions and resources are scarce, the perceptions of social connectedness and support for parents necessitate cognitive and emotional processes, such as acceptance of feelings and thoughts, focused attention, and skills in regulating negative emotions via awareness, clarity, acceptance, intention, etc. In general, people with higher MER skills are more likely to afford creative and flexible appraisals and engage in a range of self-regulatory behaviors (Farb et al., 2012; Farb et al., 2014; Garland et al., 2015; Masicampo & Baumeister, 2007), which have impacts on perceptions of social relationships and support.

Although we did not find significant effect of perceived social support on loneliness, this effect is plausible (Käll et al., 2020). Our finding may be explained in part by how social support was used in the study. The appraisal subscale of the ISEL asks people’s perceptions of the availability of social supports. A different measure of social support such as one that focuses on satisfaction with the quality of social supports may be more likely to influence loneliness. Also, because the current study did not assess frequency of *received* social support or ratings of the *quality* of a given supportive social exchange, it remains unknown if MER has impacts on these aspects of social support. In a study of male adults

who recently lost jobs and their significant others (mostly wives), researchers found that receivers' perception of social support was predicted by both frequency of interpersonal transactions between the receiver and the provider, to a stronger extent, and the receivers' own cognitive or attributional style, to a lesser extent (Vinokur et al. 1987). Because MER may increase social contact in adults (Lindsay et al., 2019), we speculate that parents who reported higher MER may be more likely to reach out to social support resources and mobilize supportive behaviors and resources in their networks, despite the challenges of the pandemic, thereby increasing perceived availability of social support. Further research is needed to explicate these possibilities.

Our findings help inform the identification of a higher-risk subgroup of parents for targeted prevention. Those who experienced more COVID-19 stressors, were not married/partnered, and were already experiencing depression or anxiety showed greater vulnerability to loneliness. Parents whose children were all school-aged children or adolescents (without a child <5 years) showed greater vulnerability to the feelings of lack of social support. This echoes prior evidence that found greater mental health risks among older children and adolescents, who are more able to understand the meaning and impacts of the pandemic than younger children (e.g., Eales et al., 2021). Perceived social support (Cohen & Wills, 1985) and loneliness (Cacioppo et al., 2014) are both transdiagnostic psychosocial factors that affect physical and mental health as well as wellbeing. Considering the substantive evidence supporting the benefits of mindfulness interventions for health outcomes (Creswell, 2017), an under-explored area of research is whether loneliness and/or perceived social support might be a mediator explaining some of the benefits of mindfulness interventions. Mindfulness training is among the few effective intervention strategies to reduce loneliness that are feasible in the COVID-19 context (Williams et al., 2021). Utilizing evidence-based online interventions to train parents in MER may provide doubling benefits to not only reduce parents' loneliness but also improve their parenting practices and promote child and family wellbeing (Kabat-Zinn & Kabat-Zinn, 2021). More research using experimental designs and including measures on child wellbeing is warranted.

The current study has several limitations. First, the sample size of parents drawn from the larger study for the current analysis is relatively small. However, we have .8 power for detecting small effects for the a and b paths using the bootstrapped method (Fritz & MacKinnon, 2007). In future studies, additional analyses with larger samples of parents are warranted before more nuanced examinations can be undertaken. Second, the cross-lagged path between loneliness and perceived social support should be interpreted with caution. Our research questions were mostly concerned about the between-person associations with a focus on the effects of MER (within-person changes were not examined). MER from T1 precedes the cross-lagged panel modeling of loneliness and perceived social support from T2 to T4. Future studies may assess MER at multiple waves, and it would be advantageous to use advanced analytic approaches such as random intercept cross-lagged panel models to examine within- and between-individual differences. Third, given the context of the COVID-19 pandemic and the use of the MTurk work population for national sampling, it is unknown whether the findings would generalize to other groups or social contexts. Finally, disability was not measured in the study. Because of the impacts of disability on family stress and wellbeing, it should be assessed in future research.

Conclusions

Focusing on the needs of parents is an important strategy for ameliorating the negative public health consequences of the COVID-19 crisis by promoting child and family wellbeing. Our findings suggest that mindful emotion regulation (MER) may be a resilience factor and calls for more research to examine perceived social support and loneliness in parents during highly stressful times when social interactions are restricted and many social support sources are unavailable. More research is needed to establish the causal relation of MER to perceived social support and loneliness and to evaluate the efficacy of mindfulness training or parenting interventions that incorporate MER strategies for parents.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Funding information

This study was supported by a grant through the National Institute on Alcohol Abuse and Alcoholism (1R34AA027455-01A1) awarded to multiple PIs Drs. Park, Russell & Fendrich, as well as seed grant funding from the University of Connecticut's Institute for Collaboration on Health Intervention and Policy.

References

- Antony MM, Bieling PJ, Cox BJ, Enns MW, & Swinson RP (1998). Psychometric properties of the 42-item and 21-item versions of the Depression Anxiety Stress Scales in clinical groups and a community sample. *Psychological Assessment*, 10, 176–181. 10.1037/1040-3590.10.2.176
- Aldao A, Nolen-Hoeksema S, & Schweizer S. (2010). Emotion-regulation strategies across psychopathology: A meta-analytic review. *Clinical Psychology Review*, 30, 217–237. 10.1016/j.cpr.2009.11.004 [PubMed: 20015584]
- Arch JJ, & Landy LN (2015). Emotional benefits of mindfulness. In Brown KW, Creswell JD, & Ryan RM(Eds.), *Handbook Of Mindfulness: Theory, Research, And Practice* (p. 208–224). The Guilford Press: NY.
- Baer RA, Smith GT, Lykins E, Button D, Krietemeyer J, Sauer S, ... & Williams JMG (2008). Construct validity of the Five Facet Mindfulness Questionnaire in meditating and nonmeditating samples. *Assessment*, 15, 329–342. 10.1177/1073191107313003 [PubMed: 18310597]
- Bergomi C, Tschacher W, & Kupper Z. (2013). The assessment of mindfulness with self-report measures: Existing scales and open issues. *Mindfulness*, 4, 191–202. 10.1007/s12671-012-0110-9
- Brookings JB, & Bolton B. (1988). Confirmatory factor analysis of the Interpersonal Support Evaluation List. *American Journal of Community Psychology*, 16, 137–147. 10.1007/BF00906076 [PubMed: 3369379]
- Cacioppo JT, Hawkley LC, Ernst JM, Burleson M, Bertson GG, Nouriani B, & Spiegel D. (2006). Loneliness within a nomological net: An evolutionary perspective. *Journal of Research in Personality*, 40, 1054–1085. 10.1016/j.jrp.2005.11.007
- Cacioppo S, Capitano JP, & Cacioppo JT (2014). Toward a neurology of loneliness. *Psychological Bulletin*, 140, 1464–1504. 10.1037/a0037618 [PubMed: 25222636]
- Chambers R, Gullone E, & Allen NB (2009). Mindful emotion regulation: An integrative review. *Clinical Psychology Review*, 29, 560–572. 10.1016/j.cpr.2009.06.005 [PubMed: 19632752]
- Chiesa A, Serretti A, & Jakobsen JC (2013). Mindfulness: Top-down or bottom-up emotion regulation strategy? *Clinical Psychology Review*, 33, 82–96. 10.1016/j.cpr.2012.10.006 [PubMed: 23142788]
- Cohen S, & Wills TA (1985). Stress, social support, and the buffering hypothesis. *Psychological Bulletin*, 98, 310–357. 10.1037/0033-2909.98.2.310 [PubMed: 3901065]

- Cole DA, & Maxwell SE (2003). Testing mediational models with longitudinal data: questions and tips in the use of structural equation modeling. *Journal of Abnormal Psychology*, 112, 558–577. 10.1037/0021-843X.112.4.558 [PubMed: 14674869]
- Coutlee CG, Politzer CS, Hoyle RH, & Huettel SA (2014). An Abbreviated Impulsiveness Scale constructed through confirmatory factor analysis of the Barratt Impulsiveness Scale Version 11. *Archives of Scientific Psychology*, 2(1), 1–12. 10.1037/arc0000005 [PubMed: 26258000]
- Creswell JD (2017). Mindfulness Interventions. *Annual Review of Psychology*, 68, 491–516. 10.1146/annurev-psych-042716-051139
- Czeisler MÉ, Rohan EA, Melillo S, Matjasko JL, DePadilla L, Patel CG, Weaver MD, Drane A, Winnay SS, Capodilupo ER, Robbins R, Wiley JF, Facer-Childs ER, Barger LK, Czeisler CA, Howard ME, & Rajaratnam S. (2021). Mental Health Among Parents of Children Aged <18 Years and Unpaid Caregivers of Adults During the COVID-19 Pandemic - United States, December 2020 and February-March 2021. *Morbidity and Mortality Weekly Report*, 70, 879–887. 10.15585/mmwr.mm7024a3 [PubMed: 34138835]
- DeGarmo DS, Patras J, & Eap S. (2008). Social support for divorced fathers' parenting: Testing a stress-buffering model. *Family Relations*, 57, 35–48. 10.1111/j.1741-3729.2007.00481.x [PubMed: 19177181]
- Duck S, Pond K, & Leatham G. (1994). Loneliness and the evaluation of relational events. *Journal of Social and Personal Relationships*, 11, 253–276. 10.1177/0265407594112006
- Eales L, Ferguson GM, Gillespie S, Smoyer S, & Carlson SM (2021). Family resilience and psychological distress in the COVID-19 pandemic: A mixed methods study. *Developmental Psychology*, 57, 1563–1581. 10.1037/dev0001221 [PubMed: 34807681]
- Farb NAS, Anderson AK, Irving JA, & Segal ZV (2014). Mindfulness interventions and emotion regulation. In Gross JJ(Ed.), *Handbook of Emotion Regulation* (2nd ed.) (pp. 548–567). The Guilford Press: NY.
- Farb NAS, Anderson AK, & Segal ZV (2012). The mindful brain and emotion regulation in mood disorders. *The Canadian Journal of Psychiatry*, 57, 70–77. 10.1177/070674371205700203 [PubMed: 22340146]
- Feldman G, Hayes A, Kumar S, Greeson J, & Laurenceau J-P (2007). Mindfulness and emotion regulation: The development and initial validation of the Cognitive and Affective Mindfulness Scale-Revised (CAMS-R). *Journal of Psychopathology and Behavioral Assessment*, 29, 177–190. 10.1007/s10862-006-9035-8
- Fong VC, & Iarocci G. (2020). Child and family outcomes following pandemics: A systematic review and recommendations on COVID-19 policies. *Journal of Pediatric Psychology*, 45, 1124–1143. 10.1093/jpepsy/jsaa092 [PubMed: 33083817]
- Fontanesi L, Marchetti D, Mazza C, Di Giandomenico S, Roma P, & Verrocchio MC (2020). The effect of the COVID-19 lockdown on parents: A call to adopt urgent measures. *Psychological Trauma: Theory, Research, Practice, and Policy*, 12, S79–S81. 10.1037/tra0000672 [PubMed: 32525382]
- Fritz MS, & MacKinnon DP (2007). Required sample size to detect the mediated effect. *Psychological Science*, 18, 233–239. 10.1111/j.1467-9280.2007.01882.x [PubMed: 17444920]
- Garland EL, Farb NA, R. Goldin P, & Fredrickson BL (2015). Mindfulness broadens awareness and builds eudaimonic meaning: A process model of mindful positive emotion regulation. *Psychological Inquiry*, 26, 293–314. 10.1080/1047840X.2015.1064294 [PubMed: 27087765]
- Green BL, Furrer C, & McAllister C. (2007). How do relationships support parenting? Effects of attachment style and social support on parenting behavior in an at-risk population. *American Journal of Community Psychology*, 40, 96–108. 10.1007/s10464-007-9127-y [PubMed: 17610062]
- Griffith AK (2020). Parental burnout and child maltreatment during the COVID-19 pandemic. *Journal of Family Violence*. Advanced online publication. 10.1007/s10896-020-00172-2
- Gross JJ (2014). Emotion regulation: Conceptual and empirical foundations. In Gross JJ(Ed.), *Handbook of Emotion Regulation* (pp. 3–20). The Guilford Press: NY.
- Hall HK, Millier PM, & Summers MJ (2020). Modeling multivariate associations with parental loneliness via perceived closeness and support. *Journal of Social and Personal Relationships*, 37, 2651–2673. 10.1177/0265407520935193

- Heinrich LM, & Gullone E. (2006). The clinical significance of loneliness: A literature review. *Clinical Psychology Review*, 26, 695–718. 10.1016/j.cpr.2006.04.002 [PubMed: 16952717]
- Henry JD, & Crawford JR (2005). The short-form version of the Depression Anxiety Stress Scales (DASS-21): Construct validity and normative data in a large non-clinical sample. *British Journal of Clinical Psychology*, 44, 227–239. 10.1348/014466505X29657 [PubMed: 16004657]
- Holmes EA, O'Connor RC, Perry VH, Tracey I, Wessely S, Arseneault L, ... & Bullmore E. (2020). Multidisciplinary research priorities for the COVID-19 pandemic: A call for action for mental health science. *The Lancet Psychiatry*, 7, 547–560. 10.1016/S2215-0366(20)30168-1 [PubMed: 32304649]
- Horesh D, & Brown AD (2020). Traumatic stress in the age of COVID-19: A call to close critical gaps and adapt to new realities. *Psychological Trauma: Theory, Research, Practice, and Policy*, 12, 331–335. 10.1037/tra0000592 [PubMed: 32271070]
- Horiuchi S, Shinohara R, Otawa S, Akiyama Y, Ooka T, Kojima R, Yokomichi H, Miyake K, & Yamagata Z. (2020). Caregivers' mental distress and child health during the COVID-19 outbreak in Japan. *PLoS One*, 15, e0243702. 10.1371/journal.pone.0243702
- House JS, Landis KR, & Umberson D. (1988). Social relationships and health. *Science*, 241, 540–545. 10.1126/science.3399889 [PubMed: 3399889]
- Hughes ME, Waite LJ, Hawkey LC, & Cacioppo JT (2004). A short scale for measuring loneliness in large surveys: Results from two population-based studies. *Research on Aging*, 26, 655–672. 10.1177/0164027504268574 [PubMed: 18504506]
- Izzo C, Weiss L, Shanahan T, & Rodriguez-Brown F. (2000). Parental self-efficacy and social support as predictors of parenting practices and children's socioemotional adjustment in Mexican immigrant families. *Journal of Prevention & Intervention in the Community*, 20, 197–213. 10.1300/J005v20n01_13
- Kabat-Zinn J, & Kabat-Zinn M. (2021). Mindful parenting: Perspectives on the heart of the matter. *Mindfulness*, 12, 266–268. 10.1007/s12671-020-01564-7 [PubMed: 33437324]
- Käll A, Shafran R, Lindegaard T, Bennett S, Cooper Z, Coughtrey A, & Andersson G. (2020). A common elements approach to the development of a modular cognitive behavioral theory for chronic loneliness. *Journal of Consulting and Clinical Psychology*, 88, 269–282. 10.1037/ccp0000454 [PubMed: 32068427]
- Kaufman EA, Xia M, Fosco G, Yaptangco M, Skidmore CR, & Crowell SE (2016). The Difficulties in Emotion Regulation Scale Short Form (DERS-SF): Validation and Replication in Adolescent and Adult Samples. *Journal of Psychopathology and Behavioral Assessment*, 38, 443–455. 10.1007/s10862-015-9529-3
- Kees J, Berry C, Burton S, & Sheehan K. (2017). An Analysis of Data Quality: Professional Panels, Student Subject Pools, and Amazon's Mechanical Turk. *Journal of Advertising*, 46, 141–155. 10.1080/00913367.2016.1269304
- Kil H, Antonacci R, Shukla S, & De Luca A. (2021). Mindfulness and Parenting: A Meta-analysis and an Exploratory Meta-mediation. *Mindfulness*, 12, 2593–2612. 10.1007/s12671-021-01720-7
- Kuhl M, & Boyraz G. (2017). Mindfulness, general trust, and social support among trauma-exposed college students. *Journal of Loss and Trauma*, 22, 150–162. 10.1080/15325024.2016.1212610
- Lindsay EK, & Creswell JD (2017). Mechanisms of mindfulness training: Monitor and Acceptance Theory (MAT). *Clinical Psychology Review*, 51, 48–59. 10.1016/j.cpr.2016.10.011
- Lindsay EK, Young S, Brown KW, Smyth JM, & Creswell JD (2019). Mindfulness training reduces loneliness and increases social contact in a randomized controlled trial. *Proceedings of the National Academy of Sciences*, 116, 3488–3493. 10.1073/pnas.1813588116
- Lovibond PF, & Lovibond SH (1995). The structure of negative emotional states: Comparison of the Depression Anxiety Stress Scales (DASS) with the Beck Depression and Anxiety Inventories. *Behaviour research and therapy*, 33(3), 335–343. 10.1016/0005-7967(94)00075-U [PubMed: 7726811]
- Low RST, Overall NC, Chang VT, Henderson AME, & Sibley CG (2021). Emotion regulation and psychological and physical health during a nationwide COVID-19 lockdown. *Emotion*. Advance online publication. 10.1037/emo0001046

- Masicampo EJ, & Baumeister RF (2007). Relating mindfulness and self-regulatory processes. *Psychological Inquiry*, 18, 255–258. 10.1080/10478400701598363
- MacKinnon DP, Lockwood CM, Hoffman JM, West SG, & Sheets V. (2002). A comparison of methods to test mediation and other intervening variable effects. *Psychological Methods*, 7, 83–104. 10.1037/1082-989x.7.1.83 [PubMed: 11928892]
- McConnell D, Breitzkreuz R, & Savage A. (2011). From financial hardship to child difficulties: Main and moderating effects of perceived social support. *Child: Care, Health and Development*, 37, 679–691. 10.1111/j.1365-2214.2010.01185.x [PubMed: 21143271]
- McDonald RP, & Ho M-HR (2002). Principles and practice in reporting structural equation analyses. *Psychological Methods*, 7, 64–82. 10.1037/1082-989X.7.1.64 [PubMed: 11928891]
- McRae CS, Overall NC, Henderson AM, Low RS, & Chang VT (2021). Parents' distress and poor parenting during a COVID-19 lockdown: The buffering effects of partner support and cooperative coparenting. *Developmental Psychology*, 57, 1623–1632. 10.1037/dev0001207 [PubMed: 34807685]
- Muthén B, & Muthén L. (1998–2017). *Mplus User's Guide* (8th ed.). Muthén & Muthén: Los Angeles, CA.
- Naragon-Gainey K, McMahon TP, & Chacko TP (2017). The structure of common emotion regulation strategies: A meta-analytic examination. *Psychological Bulletin*, 143, 384–427. 10.1037/bul0000093 [PubMed: 28301202]
- Oppermann E, Cohen F, Wolf K, Burghardt L, & Anders Y. (2021). Changes in parents' home learning activities with their children during the COVID-19 lockdown – The role of parental stress, parents' self-efficacy and social support. *Frontiers in Psychology*, 12, 682540. 10.3389/fpsyg.2021.682540 [PubMed: 34393909]
- Patrick SW, Henkhaus LE, Zickafoose JS, Lovell K, Halvorson A, Loch S, Letterie M, & Davis MM (2020). Well-being of parents and children during the COVID-19 pandemic: A national survey. *Pediatrics*, 146. 10.1542/peds.2020-016824
- Pew Research Center. (2021, January 26). A rising share of working parents in the US say it's been difficult to handle child care during the pandemic. <https://www.pewresearch.org/fact-tank/2021/01/26/a-rising-share-of-working-parents-in-the-u-s-say-its-been-difficult-to-handle-child-care-during-the-pandemic/>
- Poppert Cordts KM, Wilson AC, & Riley AR (2020). More than mental health: Parent physical health and early childhood behavior problems. *Journal of Developmental and Behavioral Pediatrics*, 41, 265–271. 10.1097/DBP.0000000000000755 [PubMed: 31688659]
- Preece DA, Goldenberg A, Becerra R, Boyes M, Hasking P, & Gross JJ (2021). Loneliness and emotion regulation. *Personality and Individual Differences*, 180, 110974. 10.1016/j.paid.2021.110974
- Prime H, Wade M, & Browne DT (2020). Risk and resilience in family well-being during the COVID-19 pandemic. *American Psychologists*, 75, 631–643. 10.1037/amp0000660
- Quaglia JT, Goodman RJ, & Brown KW (2015). From mindful attention to social connection: The key role of emotion regulation. *Cognition and Emotion*, 29, 1466–1474. 10.1080/02699931.2014.988124 [PubMed: 25496330]
- Roemer L, Williston SK, & Rollins LG (2015). Mindfulness and emotion regulation. *Current Opinion in Psychology*, 3, 52–57. 10.1016/j.copsyc.2015.02.006
- Rosenbaum D, Kroczeck AM, Hudak J, Rubel J, Maier MJ, Sorg T, Weisbender L, Goldau L, Mennin D, Fresco DM, Fallgatter AJ, & Ehlis A-C (2020). Neural correlates of mindful emotion regulation in high and low ruminators. *Scientific Reports*, 10, 15617. 10.1038/s41598-020-71952-5 [PubMed: 32973143]
- Russell BS, Hutchison M, Park CL, Fendrich M, & Finkelstein-Fox L. (2021). Short-term impacts of COVID-19 on family caregivers: Emotion regulation, coping, and mental health. *Journal of Clinical Psychology*. Advance online publication. 10.1002/jclp.23228
- Rutherford HJ, Wallace NS, Laurent HK, & Mayes LC (2015). Emotion regulation in parenthood. *Developmental Review*, 36, 1–14. 10.1016/j.dr.2014.12.008 [PubMed: 26085709]

- Samhkaniyan E, Mahdavi A, Mohamadpour S, & Rahmani S. (2015). The effectiveness of Mindfulness-Based Cognitive Therapy on quality of life and loneliness of women with HIV. *Journal of Medicine and Life*, 8, 107–113. <https://www.ncbi.nlm.nih.gov/pubmed/28316716>
- Sanders MR, & Mazzucchelli TG (2022). Mechanisms of change in population-based parenting interventions for children and adolescents. *Journal of Clinical Child & Adolescent Psychology*. Advanced online publication. 10.1080/15374416.2022.2025598
- Sheehan KB (2018). Crowdsourcing research: Data collection with Amazon's Mechanical Turk. *Communication Monographs*, 85, 140–156. 10.1080/03637751.2017.1342043
- Sun J, Wang X, Wang Y, Du X, & Zhang C. (2019). The mediating effect of perceived social support on the relationship between mindfulness and burnout in special education teachers. *Journal of Community Psychology*, 47, 1799–1809. 10.1002/jcop.22229 [PubMed: 31374580]
- Swickert R, Bailey E, Hittner J, Spector A, Benson-Townsend B, & Silver NC (2019). The mediational roles of gratitude and perceived support in explaining the relationship between mindfulness and mood. *Journal of Happiness Studies*, 20, 815–828. 10.1007/s10902-017-9952-0
- Tambling RR, Russell BS, Park CL, Fendrich M, Hutchinson M, Horton AL, & Tomkunas AJ (2021). Measuring cumulative stressfulness: psychometric properties of the COVID-19 Stressors Scale. *Health Education & Behavior*, 48, 20–28. 10.1177/1090198120979912 [PubMed: 33307818]
- Teper R, Segal ZV, & Inzlicht M. (2013). Inside the mindful mind: How mindfulness enhances emotion regulation through improvements in executive control. *Current Directions in Psychological Science*, 22, 449–454. 10.1177/0963721413495869
- Vinokur A, Schul Y, & Caplan RD (1987). Determinants of perceived social support: Interpersonal transactions, personal outlook, and transient affective states. *Journal of Personality and Social Psychology*, 53, 1137–1145. 10.1037/0022-3514.53.6.1137 [PubMed: 3694453]
- Weissbourd R, Batanova M, Lovison V, & Torres E. (2021). Loneliness in America: How the pandemic has deepened an epidemic of loneliness and what we can do about it. Harvard University. https://static1.squarespace.com/static/5b7c56e255b02c683659fe43/t/6021776bdd04957c4557c212/1612805995893/Loneliness+in+America+2021_02_08_FINAL.pdf
- Williams CYK, Townson AT, Kapur M, Ferreira AF, Nunn R, Galante J, Phillips V, Gentry S, & Usher-Smith JA (2021). Interventions to reduce social isolation and loneliness during COVID-19 physical distancing measures: A rapid systematic review. *PLoS One*, 16, e0247139. 10.1371/journal.pone.0247139
- Zhang N, Fan FM, Huang SY, & Rodriguez MA (2018). Mindfulness training for loneliness among Chinese college students: A pilot randomized controlled trial. *International Journal of Psychology*, 53, 373–378. 10.1002/ijop.12394 [PubMed: 27704544]

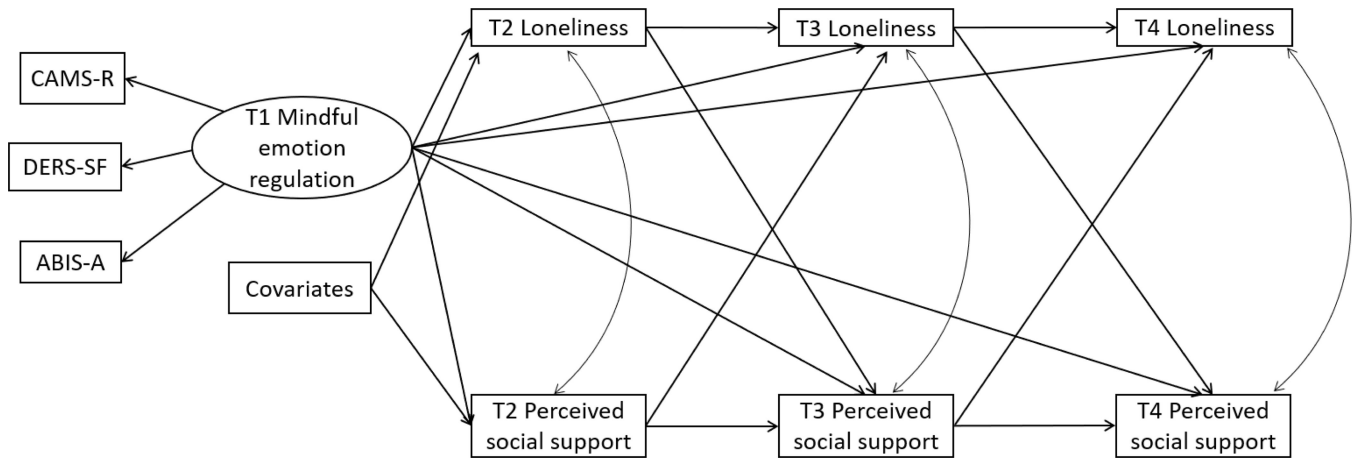


Figure 1. A longitudinal structural equation model testing the direct and indirect effects of mindful emotion regulation on perceived social support and loneliness.

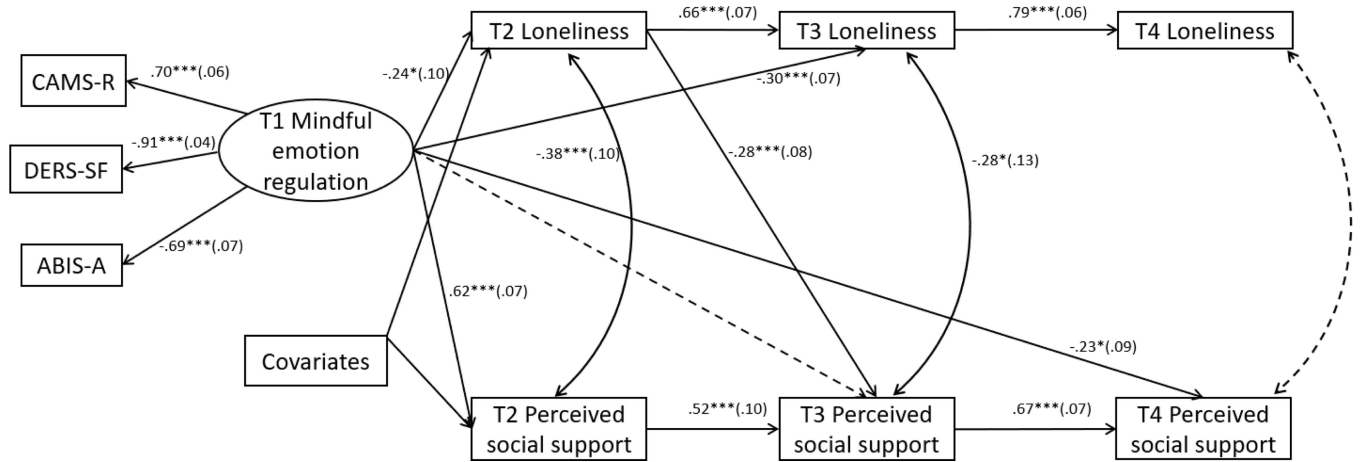


Figure 2.

Estimates of the final structural equation model.

Note: Standardized coefficients are shown. Standard errors are in parentheses. * $p < .05$. ** $p < .01$. *** $p < .001$. Only statistically significant covariates are controlled for in the model. Refer to manuscript for description of covariates. Model fit indices: $\chi^2 = 93.86$, $df = 47$, CFI = 0.95, RMSEA = 0.08, SRMR = 0.05.