

## RESEARCH ARTICLE

# Understanding the impact of COVID-19 pandemic on teleworkers' experiences of perceived threat and professional isolation: The moderating role of friendship

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**Abstract**

Drawing from conservation of resource theory and the social support resource theory, this study examines how the severity of an exogenous disruptive event – the COVID-19 pandemic – in one's community influences teleworkers' well-being outcomes indirectly through their perceptions of pandemic-related threat and experience of professional isolation, as well as the buffering effect of friendship on these relationships. Utilizing time-lagged data from participants of a two-wave survey panel ( $N = 351$ ) and objective data of COVID-19 severity from counties around the United States, we found that perceived threat, but not professional isolation, mediated the negative effect of proportion of confirmed COVID-19 cases in the community on teleworkers' well-being outcomes. Further, consistent with our predictions, support from friends significantly weakened the negative effects of threat and professional isolation on well-being. Key theoretical and practical implications of this study are discussed.

**KEYWORDS**

COVID-19 pandemic, friendship, perceived threat, professional isolation, well-being

The COVID-19 pandemic significantly altered the work and personal lives of workers worldwide (OECD, 2021), especially by disrupting work-processes (e.g., increased hygienic cautions), daily routines (e.g., limited opportunities for leisure), personal relationships (e.g., increased isolation), and job stability (Van Kessel et al., 2021), thereby diminishing well-being and health outcomes (Pietromonaco & Overall, 2021; Rettie & Daniels, 2021). Additionally, in the United States (US), over 70% of the survey respondents of a nationally representative sample reported transitioning to teleworking or remote work in the aftermath of the outbreak (Parker et al., 2020) and Gallup's State of the Workforce Study recently revealed that many are hoping to continue working remotely (Saad & Wigert, 2021). Unlike other tragic incidents such as wildfire and terrorist attacks, the negative effects of pandemics such as COVID-19 are not restricted to a specific geographic area or a short temporal duration. Further, the impact of COVID-19, as well as people's

responses to the perceptions of pandemic severity have been found to vary by geographic locations or communities (Centre for Disease Control COVID-19 Response Team, 2020; Liu et al., 2011). For instance, there is evidence that individuals in urban or suburban areas were more likely to wear protective masks than those living in rural areas (Haischer et al., 2020). Similarly, organizations differed in the speed of their adaptations (e.g., complete remote work, scaffolding; Eccles, 2020); and various states varied in their guidelines regarding "shelter-in-place" or "stay-at-home" orders (e.g., California was the first state issuing the order, Nebraska was one of the few states that never imposed the order).

Given the uniqueness of this pandemic event and the widespread variation in its severity across different communities, this study examines the influence of community level COVID-19 severity on worker perceptions and reactions to the pandemic. Specifically, focussing on workers who abruptly transitioned to telework in the

immediate aftermath of “shelter in place” and “stay at home” orders, we investigate the influence of community level COVID-19 rates on individual workers' negative perceptions of the pandemic (perceived threat of COVID-19) and professional isolation, and the moderating influence of a key social resource – friendship – on the relationship between these perceptions and the well-being of these workers. To the last point, it is important to recognize the role of social resources in helping workers cope with stressful experiences due to the pandemic. Specifically, building and maintaining sustained social relationships has been identified as one of ways to facilitate social resources and enhance well-being in nonwork domains (Craig & Kuykendall, 2019). Therefore, this study examines whether workers' perception of friendship serves as a form of social resource that better protects them from ill-being due to negative experiences (i.e., perceived COVID-19 threat and professional isolation).

In this study, we proposed and tested a conceptual model proposing that (a) workers residing in communities with high incidence of COVID-19 would be more likely to perceive this pandemic as a threat and experience professional isolation than those in low-incidence communities, (b) both perceived threat and professional isolation will impair well-being (work exhaustion, negative affect, and general health), and (c) friendship will moderate (buffer) the relationship between threat and professional isolation and well-being outcomes (see Figure 1). Our study contributes to extant research in three important ways. First, it helps expand the literature on individual experiences within disrupted contexts “triggered by extreme events that occur outside the core activities of organizations or communities” (Hällgren et al., 2018, p. 135). While past research in this domain has focussed on events related to natural disaster or terrorist attack (Byron & Peterson, 2002; Hochwarter et al., 2008), this study provides a more accurate representation of the variation in severity of a pandemic and investigates its disruptive influence on work experiences and well-being of teleworkers who experienced sudden changes in their ways of working (Morgeson et al., 2015). Specifically, we focus on three indicators of well-being: *work exhaustion*, which is an indicator of work-domain well-being, *negative affect*, which captures one's general affective well-being, and *general health*, which serves as a subjective evaluation of physical well-being.

Second, drawing from the conservation of resources theory (COR; Hobfoll, 1989; Halbesleben et al., 2014), this study investigates the mediating role played by perceived threat of COVID-19 and professional isolation in the relationship between the severity of COVID-19 incidence in communities and well-being outcomes of

teleworkers. We view these mediators as indicators of resource-loss resulting from actual threat to health and livelihood, as well as missed opportunities for professional advancement, respectively. According to COR theory, resource loss has a disproportionate larger effect on individuals than does resource-gain. While a disruption in work routines and a transition to remote work might have a silver lining in the form of potentially increasing time spent with one's family (Allen et al., 2015), it also results in higher levels of professional isolation (Golden et al., 2008) such that distance from previous organizational connections and routines triggers perceptions of being left out of key communication channels and developmental opportunities among others. These perceptions are likely to be exacerbated by the fact that transition to remote work during the early part of the pandemic was a sudden reaction to the salient threat of infections. The latter created uncertainty for many workers in terms of job security, financial stability, and health. Thus, in our study, we utilize both the perceived threat of COVID-19 and professional isolation as mediators considering them as addressing separate facets of resource loss emerging from the pandemic – one in the personal domain (perceived threat), and the other in the work domain (professional isolation). Our work contributes to the understanding of the COR theory by examining how an external disruptive event may threaten resource loss and negatively influence well-being.

Finally, building from the social support resources theory (SSR; Hobfoll et al., 1990), we explore the role of friendship in moderating the negative impact of perceived threat and professional isolation on well-being. As research on the psychological costs of the pandemic continues to unfold, we note the need for research on how to buffer these negative consequences and perhaps even facilitate well-being. Extant research on social support tends to focus on sources of support from work and family domains (e.g., Greenhaus & Kossek, 2014); however, support from friends has not been studied extensively. In this study, we further examine friendship as an important source of social support for teleworkers already struggling with the social aspects of remote work including decreased social interactions and lack of socialization.

In the following sections, we elaborate on theoretical arguments using existing empirical findings to develop our hypotheses. We then employ structural equation modelling to test our hypotheses using two-waves of time-lagged data collected during the early stage of the COVID-19 pandemic. We conclude by discussing the theoretical and practical implications of our work to the research on negative experiences and coping of disrupted events.

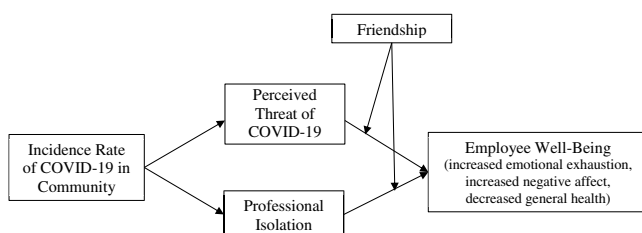


FIGURE 1 The conceptual model

## 1 | THEORY AND HYPOTHESES

### 1.1 | Linking COVID-19 incidence to perceived threat and professional isolation

COR theory suggests that individuals “strive to retain, protect, and build resources and that what is threatening to them is the potential or actual loss of these valued resources.” (Hobfoll, 1989, p. 513).

These valued resources are often referred to as physical, psychological, social, organizational, or contextual factors that help workers achieve work or life goals and prevent future resource loss (Halbesleben et al., 2014). Specifically, ten Brummelhuis and Bakker (2012) categorized these resources based on the source and the transience or stability; in particular, they recognized that individuals also obtain resources from the social context (i.e., macro resources), such as elements of culture, public policies, and economic status of their community. The COVID-19 pandemic undoubtedly influenced these macro resources. As workers perceive the net loss of resources or a lack of resource gain due to an exogenous event, they may be concerned with how to meet various demands in both general and specific domains (e.g., work), which would lead them to experience strain reactions (Hobfoll, 1989).

The COVID-19 pandemic can be considered an environmental-level contextual event that is characterized by its high levels of disruption, novelty, and criticality, which may further influence worker behaviours and experiences (Morgeson et al., 2015). This pandemic is (a) *disruptive*, because many people have been forced into making changes to routine behaviours and adjust to the “new normal,” including transitioning to shelter-in-place and working from home, wearing masks, and practicing social distancing; (b) *critical*, because, similar to other infectious disease (e.g., Inhorn & Brown, 1990), it has enormous impact on public health, environment, and the economy (Cheval et al., 2020; Lin & Meissner, 2020); and (c) *novel*, because it appeared unexpectedly. More importantly, though the coverage of COVID-19 is wide in the US, its severity differs between communities. A recent paper analyzed COVID-19 incidence and deaths by US county-level data and showed that the severity of the pandemic was affected by a variety of factors including population density, poverty rates, large presence of racial minorities, and political patterns (Desmet & Wacziarg, 2021). Thus, in conceptualizing the contextual influence of COVID-19, we investigated an objective crisis indicator of the pandemic at the level of where an individual resides, that is, proportions of confirmed COVID-19 cases in one's counties. The disruption, especially in areas with higher incidence, likely increases the *perception of threat of COVID-19*, which could be shown in various aspects. For instance, recent research showed that financial concerns and job insecurity experienced during the pandemic and the uncertainty of the event were linked to negative mental health outcomes (Lin et al., 2021; Satici et al., 2020).

In addition, the pandemic and related preventive measures such as social distancing also disrupted normal work routines and communication patterns in organizations. For instance, as workers abruptly transitioned to teleworking, natural forms of communication (e.g., small talk), which previously benefited their adaptation to work, were reduced (Methot et al., 2020). To that end, this study also investigates whether working during the pandemic also influences worker experiences of professional isolation, that is, beliefs that they lack sufficient connection to critical networks of influence and social contact (Golden et al., 2008). Findings from a qualitative study suggested that teleworkers experience professional isolation in part due to lack of opportunities for professional development (e.g., chatting

with a coworker, mentoring from coworkers or supervisors) and limited information sharing (Cooper & Kurland, 2002). We argue that teleworkers in communities with higher levels of COVID-19 severity are likely to experience more stringent restrictions related to physical proximity with others and spend longer periods of time away from their workplace (McKenzie & Adams, 2020), which may be associated with resource-loss in terms of lack of autonomy in conducting work and reduced social belongingness. The isolation imposed by others (in this case, the order of shelter-in-place) is also associated with control over one's interaction boundaries (Vega & Brennan, 2000). In addition, required and extended teleworking tend to have adverse impact on experience of professional isolation (Allen et al., 2015). Consistent with our argument, recent research conducted during the pandemic in Finland revealed that increase in remote working was associated with physical isolation (Van Zoonen & Sivunen, 2021). Thus, based on the COR theory, previous literature on disruptive events, and pertinent evidence of variation in COVID-19 severity, we hypothesize that,

*Hypothesis 1:* The severity of COVID-19 (measured by the proportion of confirmed COVID-19 cases in teleworkers' communities) will be positively associated with (a) perceived threat, and (b) professional isolation.

## 1.2 | Linking perceived threat and professional isolation to well-being

According to COR theory (Halbesleben et al., 2014), when individuals are in threatening situations, they experience resource loss that may lead to a loss spiral and subsequently negatively affect physical and psychological well-being. Accordingly, we examine three types of well-being related outcomes as consequences of negative experiences associated with teleworking during the pandemic. The first outcome is work exhaustion, representing “the depletion of emotional and mental energy needed to meet job demands” (Moore, 2000, p. 336). While voluntary teleworking comes with benefits in terms of job-related outcomes (e.g., reduced work-related stress, and increased job satisfaction; Gajendran & Harrison, 2007), these positive effects may decline as employees telework for extensive periods during the week (cf. Golden, 2006). Thus, as individuals get thrust into high-intensity teleworking regardless of their work preferences and while facing an environmental threat, they are likely to experience increased levels of work exhaustion. The second well-being consequence explored in this paper, is negative affect – a form of affective well-being. Experiences of negative and major events tend to activate negative affective reactions, which likely lead to downstream job-related attitudinal and behavioural outcomes (Weiss & Cropanzano, 1996). The third well-being outcome is subjective general health, wherein individuals provide a rating based on their summary of various subjective (i.e., body sensations, perceptions, and evaluations) and objective (i.e., information and knowledge from one's objective health reports) health indicators (Tissue, 1972; Ware et al., 1981). Although there have been several

recent studies on general health outcomes of COVID-19, findings related to how variations in geographic location contribute to one's subjective evaluation of health are still not clear (Vindegaard & Benros, 2020). As we have noted previously, subjective general health evaluations may vary depending on one's immediate communities, and our paper aims to investigate this assertion.

The three well-being indicators encompass work-related well-being, affective well-being, and global level evaluations of health. Recent literature has provided some initial evidence suggesting that perceived threat and professional isolation can drain personal resources, and lead to poor well-being consequences. Further, recent evidence suggests that perceived threat of COVID-19 is associated with higher levels of negative affective well-being (Pérez-Fuentes et al., 2020), and this relationship can be explained by anxiety related to uncertainties in the future (Paredes et al., 2021). The associated anxiety or worry about adapting to the 'new normal' of isolation and uncertainty in the new remote work arrangements may require more effort on the part of employees, leading to increased levels of exhaustion and other negative health outcomes (Brosschot et al., 2006). Additionally, research has consistently demonstrated that professional isolation is associated with impaired employee well-being (Charalampous et al., 2019; Van Zoonen & Sivunen, 2021), such that workers experiencing professional isolation may experience less satisfaction related to their belongingness needs and perceive losses in their opportunities for professional development (e.g., mentoring; Eby et al., 2008). Together, these factors can result in increased ill-being among teleworkers (Charalampous et al., 2019). Thus, we hypothesized that:

*Hypothesis 2:* (a) Perceived threat of COVID-19 and (b) professional isolation will be associated with increased level of work exhaustion and negative affect, and lower level of general health.

COR theory posits that resources expended while experiencing a threatening event may trigger further resource loss and exacerbate the difficult task of restoring or rebuilding resources (Halbesleben et al., 2014). The experiences of perceived threat and professional isolation are likely to continue negatively influencing emotional and mental resources in individual workers, manifesting in poor well-being outcomes. Thus, we propose that perceived threat and professional isolation will mediate the relationships between COVID-19 severity in teleworkers' community and their well-being outcomes.

*Hypothesis 3:* Proportion of confirmed COVID-19 cases will have indirect effects on work exhaustion, negative affect, and general health via (a) perceived threat of COVID-19 and (b) professional isolation.

### 1.3 | The moderating role of friendship

Friendship, referring to social relationships that are formed voluntarily, established with reciprocity of support and social exchange, and valued for a period of time, has been shown to be conducive to one's well-being (Hartup & Stevens, 1997; Rawlins, 1992). Building upon COR theory's fundamental proposition, SSR theory (Hobfoll

et al., 1990) proposes that "people will strive to maintain social support both to meet their needs to preserve particular resources and in order to protect and maintain their identity" (p. 467). These resources could offset the negative impact of work and nonwork demands. We suggest that friendship can serve as a key form of social support resource and help replenish teleworkers' resource reservoirs. Though social support may come from other life domains, such as work (coworker and supervisor support) and family (spousal and parental support), these domains also may impose demands on employees and require resource expenditure to meet pertinent demands (e.g., Greenhaus & Kossek, 2014). During pandemics, teleworkers may experience a rapid accumulation in household and childcare demands, while simultaneously adapting to new work patterns. In this context, friendship can play an important role in providing both emotional (i.e., provide encouragement) and instrumental support (i.e., help resolving problems) for individuals. In addition, friendships are formed and developed based on voluntary choices and mutual agreement between the person and their friend (Hartup & Stevens, 1997; Rawlins, 1992), which suggest that unlike the role demands in kin (family responsibilities) or workplace (work demands) relationships, friends tend not to have extensive requests or demands on others due to the potential threat to sustaining a friendship. To that end, support from friends, that are completely spontaneous and voluntary, signifies value for oneself, thereby enhancing psychological resources. Linking to teleworkers' experiences during this pandemic, sharing one's concerns and frustration related to the difficulties posed by the pandemic and discussing work- and career-related issues, such as promotion opportunities during a pandemic with friends, may alleviate the negative psychological experiences due to perceived threat and professional isolation.

Previous research using working adult samples has shown that support from friends can contribute to worker well-being via boosted self-esteem above and beyond support received from other domains (Craig & Kuykendall, 2019). In addition, friendship has been found to be critical in reducing resource-loss in navigating the work-family interface among dual-earner couples (Carlson et al., 2021), once again suggesting that it serves as a unique source of support. Recent research conducted in the pandemic context has also provided some initial evidence suggesting the importance of friendship in offsetting perceived stress among college students (Lippke et al., 2021; Ye et al., 2021). In addition, connecting with friends frequently via various media could help individuals to cope with the extended isolation in the forms of reducing loneliness and anxiety (Juvonen et al., 2021). We argue that friendship provides workers with resources outside of one's work and family domains to buffer negative resource-draining experiences such as pandemic-related threat and professional isolation.<sup>1</sup> Therefore, we propose that,

*Hypothesis 4:* Support from friends will moderate the relationships between (a) perceived threat of COVID-19, (b) professional isolation and well-being outcomes, such that the relationships will be weaker at high levels of support from friends.

## 2 | METHOD

### 2.1 | Procedure and participants

Two waves of data were collected from full-time employees in the US who transitioned to teleworking due to the COVID-19 outbreak. Participants were recruited via Qualtrics Panel Service, a tool that provides researchers with targeted individuals to collect data. Meta-analytic evidence suggested that online panels can be good sources for sampling working adults, and that the results from Qualtrics panels and other online panels may be as reliable and valid as data obtained through other sources of data (Walter et al., 2019). Participants were invited to complete two surveys with a one-week interval to separate the measurement of predictor and outcome variables. One-week lagged design has been used in other applied psychology research (e.g., Beck & Shen, 2019; Sousa & Neves, 2020); thus, we chose a one-week lag in measurement to not only help reduce common method bias (Podsakoff et al., 2003), but also to help study the effects of shorter time lags on work-related attitude and experiences (Dormann & Griffin, 2015). A total of 1029 responses were gathered from the Time 1 survey, which consisted of measures of perceived threat of COVID-19 and professional isolation and demographic questions. Out of these participants, 351 also completed the Time 2 survey, which consisted of measures of friendship and outcome variables, including work exhaustion, negative affect, and general health. Due to the high attrition of participants between the two surveys, we conducted attrition analysis to explore whether the retained and dropout samples differed symmetrically in terms of participants' demographics and response to study variables included in Time 1 survey. Specifically, we regressed participants' drop-out behaviour (no/yes) after the first survey on age, gender, race, marital status, organizational tenure, averaged work and telecommuting hours per week, and industry. Results of logistic regression analysis revealed that gender (odds ratio = 0.45,  $p < 0.001$ ) was the only variable with a significant effect, suggesting that male participants were more likely to remain in the study throughout both timepoints of the study. The data collection took place during 17 April 2020 and 30 April 2020, which was in the early critical stage of the pandemic when public health guidelines were first introduced and cases were rapidly rising nationwide.

The majority of the final sample ( $N = 351$ ) was male (69.8%) and white (83.2%), with 10.5% Asian, 4.0% Black or African American, 0.3% Native Americans, and 2.0% indicated as other races. The average age of the sample was 46.57 years old ( $SD = 11.84$ ). Most of our participants were married (63.5%), with 24.2% reported never married, 10.3% divorced, and 2% indicated other marital status (e.g., widowed). In comparison, slightly over half of full-time workers in the US are male (57.20%), white (77.20%), fall in the age bracket of 25–54 years, and married (77%; Bureau of Labor Statistics, 2020). Our sample consisted of moderately more male, more White, and less married participants than the general US population. The average hours worked per week was 42.44 ( $SD = 7.30$ ). The average hours of teleworking each week reported in both timepoints was 32.88

( $SD = 13.91$ ), which was much higher than the reported average hours of teleworking prior to COVID-19 outbreak ( $M = 16.34$ ,  $SD = 21.54$ ). In addition, the sample consisted of participants working in different industries, including service-related for-profit industries (45%), manufacturing-related for-profit industries (20%), federal or state or local government (16%), nonprofit (16%), and other industries (3%; e.g., education, art, healthcare). The majority (96%) of participants in our sample reported that an order of “shelter-in-place” or “stay-at-home” was issued in their respective zip-code areas at both timepoints. Our sample consists of participants from 43 states (with the largest responses from California [14.2%] and New York [11.7%]) and 329 zip-code areas were represented in our final sample.

### 2.2 | Measures

**Proportions of confirmed COVID-19 cases in one's localities.** A dataset of confirmed cases by county was obtained from Johns Hopkins University's Coronavirus Resource Centre. We mapped these data and the survey dataset by matching zip codes corresponding to the county in the COVID-19 cases dataset and zip codes corresponding to participants' geolocations. Then, we computed the proportion of confirmed COVID-19 cases in each zip-code area by dividing the total confirmed cases (as of the beginning of data collection process) by the total population in the corresponding zip-code area. The proportion of confirmed cases is negatively skewed, as many participants were living in areas with relatively low COVID-19 incidence. To address the violation of normality, we log-transformed this variable prior to hypothesis testing.

**Perceived threat of COVID-19 (T1).** We adapted items from Pew Research Center's (2020) American Trends Panel Survey. Participants were asked to rate the extent to which the coronavirus outbreak was a threat to their (a) personal health, (b) personal financial situation, and (c) day-to-day life using the scale of 1 (*not a threat*), 2 (*a minor threat*), to 3 (*a major threat*). This scale demonstrated good internal consistency ( $\alpha = 0.75$ ).

**Professional isolation (T1).** Professional isolation was measured using a 7-item scale developed by Golden et al. (2008). Participants rated the frequency with which they experienced professional isolation over the past week on a scale of 1 (*rarely*) to 5 (*most of the time*). An example item was “I felt left out on activities and meetings that could enhance my career.” This scale demonstrated high internal consistency over three timepoints ( $\alpha = 0.88$ ).

**Support from friends (T2).** The measure of friendship (Hawthorne, 2006) included six items asking about the extent to which participants felt socially connected to their friends in the past week by using a prompt, “think about your friends in general and rate the extent to which you felt that...”. Participants answered each item using a scale of 1 (*never*) to 5 (*always*). An example item was “it has been easy to relate to others.” This scale, used in previous research on teleworking (Anderson et al., 2015), demonstrated adequate internal consistency ( $\alpha = 0.79$ ).



**Work exhaustion (T2).** Work exhaustion was measured using a three-item scale adapted from the Maslach Burnout Inventory General Survey (Schaufeli et al., 1996), which has been used in previous studies (e.g., Demerouti et al., 2012). Participants were asked to indicate their level of work exhaustion over the past week on a scale from 1 (*not true*) to 5 (*always true*). An example item was “I felt emotionally drained.” This measure demonstrated good internal consistency ( $\alpha = 0.91$ ).

**Negative affect (T2).** Negative affect was measured using the negative affect subscale from the Positive and Negative Affect Schedule Short Form (PANAS-SF; Thompson, 2007). Participants rated how they felt over the past week on five items (e.g., “upset”, “hostile”) using a scale from 1 (*never*) to 5 (*always*). This validated measure has been previously used in organizational research (e.g., Wayne et al., 2013) and demonstrated adequate internal consistency ( $\alpha = 0.85$ ).

**General health (T2).** General health was assessed using one item, “over the past week, would you say your health in general is...” with a five-point scale ranging from 1 (*poor*) to 5 (*excellent*), which has been used widely in previous health-related psychological studies (Freyer-Adam et al., 2019).

**Control variables.** We considered teleworking hours computed by averaging the reported teleworking hours from both timepoints as a control variable, because professional isolation has been largely studied in the context of teleworking (Cooper & Kurland, 2002; Golden et al., 2008) and worker well-being outcomes (Allen et al., 2015). Similarly, sudden transition to working from home may accompany increased technological use for both work and nonwork purposes; much research has demonstrated that excessive use of technology use for work tends to have detrimental impact on well-being (e.g., Āuranova & Ohly, 2016). Thus, information and communication technology (ICT) use is important to be tested as another control variable to rule out potential explanations of changes in well-being due to the increases in ICT use. Lastly, following previous research on professional isolation and well-being of teleworkers (Golden, 2012; Golden et al., 2008), several demographic variables (i.e., age, gender, organizational tenure) that have shown significant correlations with at least one well-being indicators in the current study were also included as control variables.

## 3 | RESULTS

### 3.1 | Preliminary analysis

Descriptive statistics, reliabilities, and bivariate correlations among all variables are presented in Table 1.

Though our data is hierarchical (i.e., participants nested within the county or states), we found that 92.6% of participants resided in different zip-code areas and the largest county cluster only had six participants. We computed the intraclass correlation (ICC [1]) for all study variables to verify the amount of variance at the county- or the state-level. Results revealed null or very minimal between-county

(0.00–0.13) or between-state (0.00–0.06) variance (with an exception of COVID-19 cases having between-state variance), suggesting that variance of our variables came from between-person differences rather than between-county differences. Given that this study focuses on the individual perceptions of threat, isolation and well-being consequences, we decided to analyze our data at the between-person level.

We observed that the proportion of confirmed COVID-19 cases was positively correlated with perceived threat of COVID-19 ( $r = 0.20$ ,  $p < 0.01$ ), but not professional isolation ( $r = 0.09$ ,  $p > 0.05$ ). In addition, both perceived threat and professional isolation were positively related to work exhaustion ( $r = 0.23$ ,  $p < 0.01$ ;  $r = 0.44$ ,  $p < 0.01$ , respectively) and negative affect ( $r = 0.29$ ,  $p < 0.01$ ;  $r = 0.43$ ,  $p < 0.01$ , respectively), but negatively associated with general health ( $r = -0.21$ ,  $p < 0.01$ ;  $r = -0.11$ ,  $p < 0.05$ , respectively). These preliminary findings provided support for testing the main hypothesized model.

Before specifying structural models for testing hypotheses, we first specified a measurement model to ensure that all items loaded onto corresponding latent constructs. Item parcelling was used for two unidimensional constructs (professional isolation and friendship). Item-parcels tend to have higher reliability and higher likelihood of normal distribution than individual items; and additionally, models with item-parcels have fewer parameter estimates, reduced sources of sampling error, and reduced model complexity than models with only individual items (Bandalos, 2002; Little et al., 2013). Specifically, we used the balancing technique suggested by Little et al. (2013) to distribute items into parcels based on factor loadings; items for professional isolation were parcelled into three indicators (two parcels of two items and one parcel of three items); items for friendship were parcelled into two indicators (each with three items). We used chi-square tests, comparative fit index (CFI), root mean square error of approximation (RMSEA), and standardized root mean-square residual (SRMR) to evaluate measurement models (Hu & Bentler, 1999). Results from the confirmatory factor analysis of a five-factor model demonstrated an acceptable fit to the data,  $\chi^2(94) = 341.27$ ,  $p < 0.001$ ; CFI = 0.92; RMSEA = 0.08; SRMR = 0.06. Thus, we retained five factors in the structural model specification.

### 3.2 | Hypothesis testing

We used latent moderated structural equation (LMS) procedure to test hypotheses in *Mplus* 8.0 (Cheung et al., 2021). The LMS procedure is appropriate to use in the current study because this analytic approach does well with violation of normal theory assumptions and controls for measurement errors. Because *Mplus* does not provide conventional fit indices for evaluating the overall model fit with LMS models, we followed Cheung and colleagues' (2021) recommendations for evaluating model fit. We first specified a model without latent interaction terms (i.e., a mediation only model) for testing Hypothesis 1–3, and then we specified a model with latent interaction terms. Then we used a chi-square difference test based

TABLE 1 Descriptive statistics, reliability and bivariate correlations among study variables

	M	SD	1	2	3	4	5	6	7	8	9	10	11
1. Gender	1.30	0.46											
2. Age	46.57	11.84	-0.16**										
3. Organizational tenure	11.08	9.55	-0.01	0.46**									
4. Average teleworking hours	32.88	13.91	0.03	0.01	0.02								
5. ICT use	2.74	0.90	-0.04	-0.21**	-0.11*	0.08							
6. Proportion of confirmed COVID-19 cases	0.14	0.20	0.05	-0.04	-0.03	-0.01	0.08						
7. Perceived threat of COVID-19 (T1)	2.19	0.57	-0.01	0.01	0.03	-0.08	0.19**	0.20	<b>0.75</b>				
8. Professional isolation (T1)	2.47	0.97	-0.09	-0.10	-0.03	-0.05	0.24	0.09	0.16**	<b>0.88</b>			
9. Friendship (T2)	2.70	0.80	0.05	0.17**	0.16**	-0.09	-0.09	-0.00	-0.07	-0.43**	<b>0.79</b>		
10. Work exhaustion (T2)	2.22	1.01	0.11*	-0.24**	-0.12*	-0.01	0.19**	-0.01	0.23**	0.44**	-0.56**	<b>0.91</b>	
11. Negative affect (T2)	8.08	3.56	-0.00	-0.24	-0.11*	-0.09	0.33	0.00	0.29	0.43	-0.44**	0.65**	<b>0.85</b>
12. General health (T2)	4.18	0.77	-0.04	-0.05	-0.05	-0.02	0.02	-0.04	-0.21**	-0.11*	0.29**	-0.31**	-0.24**

Note:  $N = 351$ . Cronbach's alphas are reported on the diagonal in bold.

\* $p < 0.05$ . \*\* $p < 0.01$ .

on the log likelihood values and scaling correction factor estimated from the two models (Satorra & Bentler, 2010) using the calculator provided by Cheung et al. (2021).

First, we estimated a mediation only model specifying the main effect of the proportion of COVID-19 cases on three well-being outcomes via perceived threat and professional isolation for testing Hypothesis 1–3. This model showed an acceptable fit,  $\chi^2(92) = 321.95$ ,  $p < 0.001$ ; CFI = 0.91; RMSEA = 0.07; SRMR = 0.06. We also fit the same mediation model by including the control variables ( $\chi^2[142] = 384.63$ ,  $p < 0.001$ ; CFI = 0.90; RMSEA = 0.07; SRMR = 0.06). However, this model did not fit significantly better than the model without control variables ( $\Delta\chi^2[50] = 62.69$ ,  $p = 0.107$ ,  $\Delta\text{CFI} = 0.01$ ) and the significance of parameter estimates did not differ. Hence, we reported results of hypothesis testing without control variables (Becker et al., 2016).

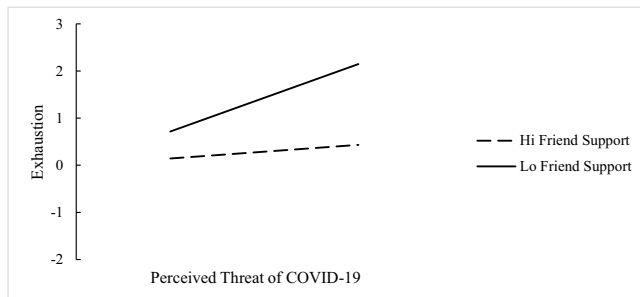
Specifically, the proportion of COVID-19 cases was positively associated with higher level of perceived threat ( $b = 0.19$ ,  $SE = 0.06$ ,  $p = 0.001$ ) but not significantly associated with professional isolation ( $b = 0.15$ ,  $SE = 0.11$ ,  $p = 0.209$ ), thus providing support for Hypothesis 1a but not 1b. Results also showed that perceived threat was associated with higher level of work exhaustion ( $b = 0.31$ ,  $SE = 0.10$ ,  $p = 0.005$ ) and negative affect ( $b = 0.33$ ,  $SE = 0.10$ ,  $p = 0.001$ ) and lower level of general health ( $b = -0.28$ ,  $SE = 0.10$ ,  $p = 0.003$ ), which fully supported Hypothesis 2a. In addition, we found that professional isolation was positively associated with work exhaustion ( $b = 0.62$ ,  $SE = 0.08$ ,  $p < 0.001$ ) and negative affect ( $b = 0.51$ ,  $SE = 0.08$ ,  $p < 0.001$ ), but not significantly associated with general health ( $b = -0.12$ ,  $SE = 0.06$ ,  $p = 0.058$ ); thus, Hypothesis 2b was partially supported.

To test Hypothesis 3 regarding indirect effects, we used bias-corrected bootstrapping methods to estimate confidence intervals

for indirect effects (Lau & Cheung, 2012; Preacher & Hayes, 2008). Given the nonsignificant association between proportion of COVID-19 cases and professional isolation, we only computed and tested indirect effects of COVID-19 cases on well-being outcomes via perceived threat of COVID-19. We found significant indirect effects of proportion of COVID-19 cases on work exhaustion ( $ab = 0.06$ , 95% C.I. [0.017, 0.128]), negative affect ( $ab = 0.07$ , 95% C.I. [0.021, 0.128]), and general health ( $ab = -0.06$ , 95% C.I. [-0.12, -0.02]) via perceived threat of COVID-19, thus supporting Hypothesis 3a.

Following the LMS procedure, the second model included friendship as a second-stage moderator. To evaluate the model fit of this LMS model, we conduct a chi-square difference test based on the log likelihood values and scaling correction factors estimated from this model ( $L_o = -6588.463$ ,  $c_1 = 1.4670$ ) and a model without the latent interaction ( $L_o = -6649.600$ ,  $c_o = 1.4697$ ). We found that the model with the interaction effect showed a significant improvement in model fit (Satorra-Bentler Scaled  $\chi^2(7) = 84.84$ ,  $p < 0.001$ ), and support from friends significantly moderated the relationship between perceived threat and work exhaustion ( $b = -1.04$ ,  $SE = 0.40$ ,  $p = 0.009$ ). Specifically, as shown in Figure 2, friend support weakened the negative effect of perceived threat of COVID-19 on work exhaustion. Given that perceived threat mediated the effect of COVID-19 cases on work exhaustion, we then tested conditional indirect effects at low ( $-1$  SD) and high ( $+1$  SD) levels of friend support. When friend support was low, there was a significant indirect effect of COVID-19 cases on work exhaustion via perceived threat ( $ab = 0.14$ , 95% C.I. [0.050, 0.248]), but the indirect effect was not significant ( $ab = 0.03$ , 95% C.I. [-0.016, 0.085]) when participants reported high levels of friendship.

We also found significant interactions between professional isolation and friendship in predicting work exhaustion ( $b = -0.48$ ,



**FIGURE 2** The moderating effect of friendship on the relationship between perceived threat of COVID-19 and work exhaustion

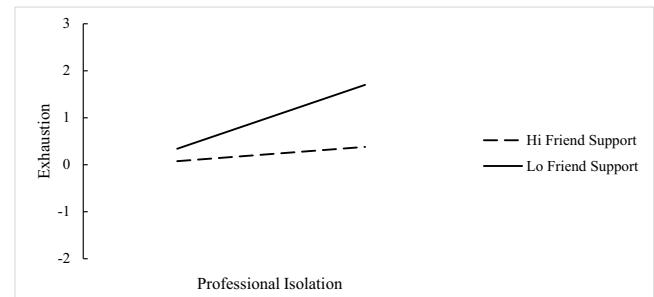
$SE = 0.18, p = 0.006$ ) and negative affect ( $b = -1.38, SE = 0.20, p < 0.001$ ). Specifically, friend support weakened the relationship between professional isolation and exhaustion (see Figure 3), such that the relationship was significant at low levels of friend support ( $b = 0.34, SE = 0.11, p = 0.003$ ) but not significant at high levels of friend support ( $b = 0.08, SE = 0.10, ns$ ). In addition, at low levels of friend support, professional isolation was significantly associated with higher levels of negative affect ( $b = 0.52, SE = 0.11, p < 0.001$ ); however, the relationship became negative at high levels of friend support ( $b = -0.24, SE = 0.06, p < 0.001$ ; see Figure 4). Overall, Hypothesis 4 was partially supported.

### 3.3 | Supplementary analysis

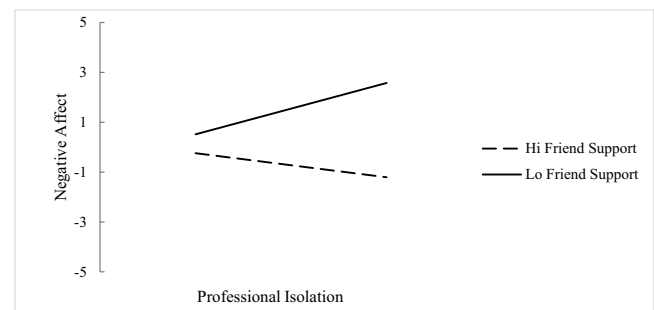
The role of trait negative affectivity as well as other individual difference characteristics are important to consider when interpreting how one's perceived threat of COVID-19 may influence psychological well-being (cf. Han et al., 2021; Liu et al., 2021). We explored whether the effects of perceived threat on well-being outcomes remained after controlling for negative affectivity (using negative affect at T2 as a proxy). Results showed that after controlling for negative affect, the effect of perceived threat on exhaustion became nonsignificant ( $b = 0.24, SE = 0.13, p = 0.059$ ), but the effect on general health still remained ( $b = -0.30, SE = 0.12, p = 0.017$ ). The moderating effect of friendship on the effect of threat on exhaustion also remained ( $b = -0.74, SE = 0.36, p = 0.040$ ), such that the effect was significant only when friendship was low. However, as negative affectivity could be linked to strain outcomes via different mechanisms, such as exposure to more stressors, hyper-responsivity to environments, thus statistically controlling for negative affectivity bias should be done with caution in future research (Spector et al., 2000).

## 4 | DISCUSSION

In the current study, we found that the perceived threat from COVID-19 significantly mediated the relationship between the proportion of COVID-19 cases in the community and teleworkers'



**FIGURE 3** The moderating effect of friendship on the relationship between professional isolation and work exhaustion



**FIGURE 4** The moderating effect of friendship on the relationship between professional isolation and negative affect

experienced work exhaustion, negative affect, and general health. Our findings corroborate the COR argument that the threat of resource loss can trigger strain and loss of well-being (Halbesleben et al., 2014). Specifically, teleworkers living and working in communities with high levels of COVID-19 infection incidents were more likely to perceive pandemic related threats such as infection, financial pressures, and job insecurity and experienced higher levels of emotional exhaustion and negative affect, and lower levels of subjective health, than those in communities with low levels of COVID-19 severity. In addition, our study revealed that the perceived displacement from a regular work routine, lack of access to social and professional contacts, and the increasing responsibility of managing the boundaries between work and family are likely to have played critical parts in resource depletion and ill-being.

Also consistent with COR and SSR theories (Hobfoll, 1989; Hobfoll et al., 1990), we found that friendship significantly weakened the negative effect of perceived threat of COVID-19 on work exhaustion. Specifically, the indirect effect of COVID-19 proportions on work exhaustion via perceived threat was significant when teleworkers reported experiencing lower levels of friendship. In addition, friendship weakened the relationship between professional isolation and well-being such that the relationships between professional isolation and both emotional exhaustion and negative affect were positive and significant when teleworkers reported low levels of friendship. These results corroborate SSR theory which views social support from friends to be a source of resource gain and a buffer against resource loss spirals



resulting from sustained levels of stress. Indeed, individuals turn to friends for support when experiencing suffering, major negative events, or unpleasant moments (Greco et al., 2015).

Our study did not support our prediction that the proportion of COVID-19 cases would influence teleworkers' experience of professional isolation. One reason for this might be that professional isolation is driven more by organizational factors (e.g., restricted access to professional resources, lower quality of social interactions with coworkers) rather than community characteristics. That is, organizations initiatives related to virtual communications, and flexible human resources policies might have reduced teleworkers' experience professional isolation even though the focal worker might have been located within a community with high pandemic prevalence. In addition, workers' expectations and value for professional development opportunities may play a role in how professionally isolated one may feel (Cooper & Kurland, 2002). Thus, future research could further examine both organizational and individual factors as potential antecedents of professional isolation.

#### 4.1 | Contributions of research

Together our findings contribute to multiple literature in significant ways. First, we demonstrated the role of an external disruptive event – the COVID-19 pandemic – in creating perceptions of threat and resource loss among workers. While past studies have examined the role of geographically targeted and temporally short events such as terrorist attacks and natural calamities in triggering resource loss and ill-being, our study examined the effects of a longer-term, pervasive, and globally impactful event on workers' experiences. Second, we attended to the role of a critical but underexamined construct – friendship, in buffering the negative influence of pandemic-related stress on workers' well-being levels. While friendship has been acknowledged as a central source of social support connected with the human need to affiliate with others and build relationships (Craig & Kuykendall, 2019; Greco et al., 2015), this study is among the very few that highlighted the role of this construct in mitigating the negative effects of resource loss, especially in the context of a critical event. Specifically, it brings out the importance of friendship – above and beyond family and other possible resources – in experiences of one's well-being. Third, we conducted this research with a sample of teleworkers who were suddenly thrust into remote work due to the pandemic. Remote work has become a pervasive feature of the pandemic era and is likely to continue as a work benefit provided to employees. Although this study was based on data collected during early stage of the pandemic, the emergence of new variants and changing public health guidelines have impacted a prolonged trend of remote working. Our study contributes to the growing body of research in this domain and highlights the demands placed on teleworkers who, while possessing higher degrees of latitude in planning and implementing their schedules, are not impervious to the anxiety and stress related to external disruptive events such as pandemics.

#### 4.2 | Strengths and limitations

Buttressing the above contributions is the strength of our study design. We utilized multi-wave panel data drawn from the breadth of the US and in addition, used objective data related to COVID-19 proportions in zip-codes. Utilizing these different data sources allowed us to provide a robust test of our mediation hypothesis that required time lags between the predictor (COVID-19 proportions), mediator (COVID-19 threat), and outcomes (well-being).

However, this study is also not without limitations. First, the time-lag between the mediator and the outcome was only a week, which was sufficient to reduce common source variance, but not enough to explore other alternative explanations or detect any changes in our key variables. Specifically, individual perceptions of COVID-19 pandemic have been heavily politicized in the US; recent evidence showed that partisanship has been linked to adoptions of preventive measures (e.g., physical distancing) and incidence and death rates, especially during the early stages of the pandemic (Clinton et al., 2021; Gollwitzer et al., 2020; Neelon et al., 2021). Thus, future research could explore how the perception of COVID-19 threat may differ due to regional differences in partisanship, which may explain the differential incidence rate of COVID-19 cases at a different level (e.g., county, state, country) of analysis. In addition, we recommend the utilization of longer time lags to capture changes in these constructs over time (e.g., Did threat perceptions and well-being change during the pandemic? Did the arrival of vaccines mitigate these threats? Did perceived threats change when exposed to a new variant?).

Another limitation of this study is that we did not explore the differing influences of the community and organizations where the teleworkers worked, on employees' perceptions and well-being. As we noted earlier, one possible reason why we did not notice an effect of COVID-19 proportions on professional isolation is that the latter variable might be driven more by organizational factors rather than the community. We recommend future studies to examine organizational variables such as organizational/supervisory support, flexible human resource policies/practices, and relationships with coworkers as higher-level predictors of individual level employee perceptions and well-being. Such a study would require hierarchically nesting multiple employees (level 1) within organizations (level 2), and organizations within the community (level 3), and examining these multilevel influences. Relatedly, although examining the impact of objective severity of COVID-19 on worker experiences contributes to further understanding of the consequences of an external event, this study did not directly measure employee perceptions of characteristics of an external event (i.e., disruption, novelty, and criticality). Individuals residing in areas with similar levels of COVID-19 severity may evaluate the event differently, which could result in variability in experiences of associated stressors (e.g., job insecurity) and various work outcomes (Lin et al., 2021). Future research could measure both subjective evaluation of the event and compare the results using objective measure of the event.

Finally, this study examined the role of general friendships, without specifying the sources. Friendships have been studied in the organizational context as the social processes have resulted in various benefits such as personal growth, career development, and creativity (Sias & Gallagher, 2009). As friendship at work could have a more focussed effect on facilitating domain-specific self-esteem and well-being (Craig & Kuykendall, 2019), future research could further explore whether workplace friendships may be more effective in offsetting the negative consequences of work-related stressors (e.g., experiences of work-related isolation). In addition, the methods used by individuals to stay connected socially has changed with the use of technology when physical proximity was limited (Pew Research Center, 2021). Even though past research provided evidence that physical proximity was not the most important indicator for initiating friendship under work context or when teleworking (Sias et al., 2012), future research is warranted to further explore the role of friendships in the virtual context; for instance, how technology use (e.g., smartphone apps, Zoom gatherings) and quality of communication (Stevic et al., 2021) may influence friendships as well as its role as a psychological resource.

### 4.3 | Managerial implications

This study has several managerial implications. First, we note the importance of organizations mitigating pandemic related threats through the implementation of safety-enhancing practices, and flexible and compassionate human resources policies (e.g., providing job-security, maintaining wages, providing additional personal and family health benefits) to reduce anxiety and uncertainty. Second, we recommend that organizations provide employees with the opportunity to build positive social relationships, including but not limited to friendship, which might serve similar resource-replenishing roles for enhancing satisfaction with work (Venkataramani et al., 2013). This could be accomplished through team-building sessions, social hours, collective volunteering activities, all of which could be implemented in face-to-face or virtual formats. Third, we recommend that organizations provide employees the resources needed to successfully transition to teleworking. This might include training on ICT use, tips for managing work and family boundaries, building virtual teams, and accessing organizational resources. Relevant training or information may help teleworkers to be better prepared for remote work and find ways to stay socially and professionally connected with others and the organization.

In conclusion, this study revealed a critical facet of work during situations of external disruption. We found that the prevalence of COVID-19 in the community plays a significant role in influencing teleworkers' well-being through its effect on these workers' threat perceptions. While the findings of this study are particularly relevant to pandemic situations requiring remote work, and entailing shut-downs, social isolation, and economic uncertainty, these findings might be applicable to a variety of crises: employees experience resource loss during uncertain and threatening times, as well as the

role of friendship in mitigating this loss. In this connected and increasingly turbulent world, the next crisis can come from almost anywhere. It behoves us to understand and manage employee reactions to this turbulence, and our study is a step in that direction.

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### CONFLICTS OF INTEREST

On behalf of all authors, the corresponding author states that there is no conflict of interest.

### ETHICS STATEMENT

This study received approval from the Institutional Review Board at Northern Illinois University prior to data collection.

### DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon request.

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### ENDNOTE

<sup>1</sup> Though the previous research has further studied the mechanisms of workplace/coworker friendships, such friendships could play complicated roles and induce negative reactions due to various psychosocial factors (e.g., social status, closeness; Pillemer & Rothbard, 2018). In addition, research examining the transition from coworker to close friendships showed that the context (work vs. nonwork) distinction is often blurry due to the "extra-organizational socializing" (Sias & Cahill, 1998). Thus, this study focuses on general friendship based on participants' own perception of access to and support from any friends.

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