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Troubles on troubled minds: an intensive longitudinal diary study on the role of burnout in the resilience process following acute stressor exposure

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ABSTRACT

Burnout negatively affects employees' health, life satisfaction, and performance. However, little is known about how burnout shapes employees' resilience process in daily life to produce these adverse effects. Therefore, we present a 30-day diary study among an international sample of 410 employees, studying burnout-related differences in response to an acute stressor (i.e., learning about the COVID-19 diagnosis of a close friend or family member). Specifically, we investigate how this event affects COVID-19-related worrying, positive and negative affect, and work engagement, both on the day itself and across several post-event days. Multilevel analyses with cross-level interactions between individual-level burnout and day-level stressor occurrence reveal that employees high in burnout score significantly higher on negative affect and lower on positive affect and work engagement on the day the stressor occurred. Additionally, discontinuous random coefficient growth modelling with burnout-time interactions shows that employees high in burnout sustain higher levels of COVID-19 worrying, but their negative and positive affect return to pre-event levels in the post-event days. These findings shed important new light on how burnout affects employees' resilience process in response to acute stressors, thereby potentially identifying a key proximal mechanism by which burnout's negative distal effects on health, well-being, and performance emerge.

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Burnout; resilience; work engagement; positive and negative affect; worrying

Burnout is a work-related state of exhaustion characterized by extreme tiredness, reduced cognitive and emotional regulatory abilities, and mental distancing (Schaufeli, de Witte, et al., 2020) affecting up to an estimated 25% of the general working population (Eurofound, 2018). During crises like the COVID-19 pandemic burnout prevalence might be even higher, as it originates from continued exposure to stressors in the work and/or private sphere (e.g., Joshi & Sharma, 2020). Consequences of burnout range from differential processing of immediate stressors (de Vente et al., 2015; Wekenborg et al., 2019) to deteriorations in health (Cox et al., 2017; Salvagioni et al., 2017), and poorer long-term career outcomes (Barthauer et al., 2020). Via these consequences, burnout creates economic burdens for both organizations (Swider & Zimmerman, 2010) and society (Maslach et al., 2001). Given its high prevalence and severe consequences, understanding how burnout affects workers is essential.

Burnout theory and research focus on antecedents of burnout to identify the factors (e.g., job demands) contributing to its genesis (Alarcon, 2011), while everyday consequences of burnout remain insufficiently understood. The few existing studies on burnout's consequences typically focus on distal outcomes, such as absenteeism (Schaufeli et al., 2009), health (Cox et al., 2017; Salvagioni et al., 2017), career outcomes (e.g., Barthauer et al., 2020), and performance (e.g., Kim et al., 2019). These distal outcomes likely originate from more proximal dynamic processes, particularly a differential processing of acute stressors (e.g., LeBlanc, 2009), but only a few studies examined this (de Vente et al., 2015; Jönsson et al., 2015; Wekenborg et al., 2019). Despite their merits, these cited studies' lab-based settings and artificial stimuli limit generalizability, their single-day timeframe does not provide insights into longer lasting (e.g., multi-day) effects, and their scope of outcomes does not include cognitive, affective, and motivational responses simultaneously. As such, multiday longitudinal studies on burnout-related response-differences to real-life acute stressors with multiple response variables are necessary.

Recent developments in resilience research also call for investigating (interpersonal differences in) the dynamic response trajectories of individuals in face of acute stressors (Bonanno & Diminich, 2013; Britt et al., 2016). Resilience can be defined as a dynamic process of positive adaptation in the context of adversity—e.g., an acute stressor (Britt et al., 2016; Luthar et al., 2000)—that unfolds over time and can thus follow different trajectories (Bliese et al., 2017). For instance, well-being may be unaffected by a stressor, there may be a strong initial reaction but a rapid recovery to baseline, or there may be longer lasting effects (Bonanno & Diminich, 2013). Drawing on Conservation of Resources (COR) theory (Hobfoll, 1989), we suggest that burnout could be a driving force behind such differences in individual resilience trajectories (or, dynamic responses to acute stressors) because it represents a state of lower energetic, attentional, and regulatory resources (Schaufeli, de Witte, et al., 2020). According to COR theory, individuals with fewer resources are less well equipped to

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deal with threats and thus likely experience further resource losses when facing them. This idea connects well to previous insights on depression (e.g., Siegle et al., 2003), which shows marked conceptual overlap with burnout and similar impairments of individuals (Bianchi et al., 2019). However, longitudinal field studies with multiple response variables that capture burnout-related differences in the resilience process are still lacking and urgently needed.

To explore burnout-related differences in the resilience process among workers facing acute stressors, the present paper presents unique data from a 30-day daily diary study among 410 workers at the onset of the COVID-19 pandemic to study immediate responses to and the dynamic recovery from acute real-life stressors. Specifically, drawing on conservation of resources theory (COR theory; Halbesleben et al., 2014; Hobfoll, 1989), we theorize that as workers high in burnout have fewer energetic, attentional, and regulatory resources, they demonstrate an impaired resilience process by reacting more strongly to and recovering less easily from acute stressors (Hobfoll & Freedy, 2017; Wright & Hobfoll, 2004). Moreover, drawing on Event Systems Theory (EST) (Morgeson et al., 2015) and recent developments in the resilience literature (Bonanno & Diminich, 2013; Britt et al., 2016), we specifically distinguish immediate and dynamic reactivity to and dynamic recovery from acute stressor exposure to capture resilience. That is, we first test burnout-related differences in *immediate reactivity* (i.e., same-day reactions) to a specific acute stressor (i.e., learning that a close friend or family member is diagnosed with COVID-19 during the early days of the pandemic; hereafter referred to as "COVID-19 event") on four important cognitive, affective, and motivational indicators (i.e., COVID-19-related worrying, positive and negative affect, and work engagement). Second, we consider burnout-related differences in *dynamic reactivity* and *dynamic recovery* (i.e., changes in intra-individual reactivity and recovery trajectories) for these four indicators in the days following a COVID-19 event.

The present study contributes to the literature in four important ways. First, we demonstrate how burnout shapes employees' responses to stressful stimuli in the non-work sphere. By considering multiple important indicators of the resilience process (i.e., worrying, affect, and work engagement) that are relevant to functioning at work, we shed important new light on how burnout impairs the resilience process. In studying those indicators, we follow the recent call for insights into the cognitive mechanisms of burnout (Demerouti et al., 2021) and extend it to general affective and motivational aspects of workplace functioning (Britt et al., 2016). This is especially important as effects of the non-work sphere on burnout remain poorly understood (Hakanen & Bakker, 2017). Second, we answer calls in the resilience literature that "time is and should be intricately tied to the study of resilience" (Britt et al., 2016, p. 394) by incorporating a longitudinal diary design with acute events combined with a discontinuous growth modelling approach. Hereby, our study establishes resilience as a dynamic process and sheds important light on how burnout affects dynamic resilience trajectories. This is crucial in understanding the resilience process and managing burnout in practice. That is, by uncovering how burnout shapes the resilience process of employees facing difficult events in the non-work sphere, organizations can support these employees better and adapt their expectations towards employees on post-event days. Third, the multi-day field-based nature of our study makes a scientifically important contribution to burnout research by overcoming external validity concerns of previous lab studies on stressors and burnout. Our study of dynamic within-person reactivity and recovery processes in response to the same fixed COVID-19 event circumvents the biases of self-selected, artificially scored and incomparable events in previous research. Finally, we extend the application of COR theory which has typically been used as a theoretical framework in research on antecedents of burnout by now focusing on its consequences (Hobfoll & Freedy, 2017). Specifically, by examining burnout as a state of relative low resource possession that affects the resilience process, this study offers an important empirical extension of COR theory.

Theoretical background

Burnout

Burnout has been defined in various ways (for comprehensive reviews, see Bakker, Demerouti, et al., 2014 and Canu et al. (2021)). The most commonly used definition of burnout stems from Maslach and Jackson (1981): "Burnout is a syndrome of emotional exhaustion and cynicism that occurs frequently among individuals who do 'people-work' of some kind" (p. 99). This conceptualization relates to the most cited three-dimensional (i.e., emotional exhaustion, depersonalization, and personal accomplishment) measure of burnout to date, the Maslach Burnout Inventory. Criticisms (e.g., Lee & Ashforth, 1990; Shirom, 2005; Sonnentag, 2005) and corresponding novel conceptualizations (e.g., Demerouti et al., 2003; Kristensen et al., 2005) have emerged, underscoring the complexity of the burnout phenomenon. Attempting to provide an integrative conceptualization of burnout to resolve issues with existing approaches, Schaufeli, de Witte, et al., 2020, p. 28) define burnout as "a work-related state of exhaustion that occurs among employees, which is characterized by extreme tiredness, reduced ability to regulate cognitive and emotional processes, and mental distancing". Importantly, this state-of-the-art definition remains close to original conceptualizations of burnout, but is more specific in its scope and wording. Moreover, this approach avoids the inconclusive discussion on burnout as a clinical disorder (Heineman & Heineman, 2017) by positioning it as a subclinical phenomenon on which individuals score on a continuum. Given its integrative nature, the open availability of a corresponding measure, and its adequacy in capturing subclinical levels of burnout in the working population (de Beer et al., 2020), this paper uses Schaufeli et al.'s (2020) conceptualization of burnout.

Theoretical work on burnout suggests that it manifests itself as a decreased ability to regulate cognitive and emotional processes and thus likely affects the outcomes of such processes. That is, burnout is conceptualized as a lack of energetic, cognitive, and emotional resources to effectively regulate the input and processing of demanding stimuli (e.g., Hobfoll & Freedy, 2017; Schaufeli, de Witte, et al., 2020; ten Brummelhuis et al., 2011). Various scholars have adopted this logic and have argued that burnout shapes various forms of performance at work by impairing regulatory capacities (Kim et al., 2019; Salyers et al., 2017; Swider & Zimmerman, 2010). Yet, surprisingly, the key ingredient of this argumentation, namely that burnout impairs regulatory capacities in response to stress, has—to the best of our knowledge—rarely been tested empirically in field studies. Doing so would require studying how burnout shapes employees' responses to real-life stressful events. That is, as individuals with higher burnout scores are energetically less well equipped to process demanding stressors, such events likely affect them more severely and for longer.

Conservation of resources theory and burnout

The present study draws on conservation of resources theory (COR theory; Hobfoll, 1989) to explain why burnout-related differences in reactivity to and recovery from acute stressor exposure could exist. Although COR theory is a general stress theory, it may also prove useful for explaining higher sensitivity to stressors and lower resilience of employees suffering from burnout (Hobfoll & Freedy, 2017). COR theory proposes that individuals are motivated to protect and restore valued resources (Hobfoll, 1989) which are conceptualized as anything that is valued in the sense that it facilitates individuals in attaining their goals (Halbesleben et al., 2014). Resources can thus be of energetic or personal nature and may include individuals' energy levels, their self-regulatory abilities, their well-being and mood, or their motivation. As burnout is associated with sleep and concentration problems as well as impaired cognitive functioning (e.g., attentional control and working memory) and coping ability (Lemonaki et al., 2021; Schaufeli et al., 2009; van der Linden et al., 2005), employees with higher burnout scores are already in a state of diminished resources. Thus, they are no longer capable to invest any further resources (e.g., effort and energy) into their work tasks (Hobfoll & Freedy, 2017).

Following COR theory, events are considered particularly stressful when they incur or imply resource loss that individuals want to prevent. For example, when a household member is diagnosed with a contagious and serious illness, it implies a threat to multiple potential resources (i.e., losing the person, contracting the disease and losing health, having to spend time on arranging care, etc.). According to COR theory, individuals then aim to invest resources to prevent further resource loss by trying to adequately cope with the threat. However, employees suffering from burnout do not have the appropriate resources in the first place, which is why COR theory predicts that individuals facing resource threat typically lose additional resources when they have few resources initially. Because burnout reflects a state of reduced resources for regulating cognitive and emotional demands (Demerouti, 2015; Hobfoll & Freedy, 2017), individuals with high levels of burnout are likely disproportionally affected by—or less resilient to—stressful events. Supporting this notion, a recent study shows that employees with higher chronic burnout scores show greater increases in weekly burnout scores and self-undermining when exposed to more extreme weekly job demands (Bakker et al., 2022). Thus, the lack of energetic and cognitive resources employees with burnout face may cause them to enter a loss cycle that impairs their resilience further (Hobfoll & Freedy, 2017). For the proposed resilience process, employees with higher burnout scores likely show stronger patterns of initial reactivity to adverse events and less effective recovery processes regarding several situationally relevant domains of functioning.

Resilience

Differences in responses to stressors have been a focal topic in resilience studies. Resilience has been defined in three main different ways (Hu et al., 2015; Southwick et al., 2014). First, some authors predominantly consider resilience as a *trait* that helps individuals handle difficult situations (Ong et al., 2006; Smith et al., 2008). Second, resilience is positioned as an *outcome* that captures the level of adjustment to a situation (Harvey & Delfabbro, 2004; Masten et al., 1990). Third, resilience can be described as the *process* by which individuals respond, adapt to, and recover from stressor exposure (Bonanno & Diminich, 2013; Britt et al., 2016; Fergus & Zimmerman, 2005). Importantly, the trait and outcome approaches to resilience constitute relatively static accounts of resilience, whereas the process approach incorporates a dynamic perspective (Gucciardi et al., 2021). As such, the process approach to resilience allows for studying how individuals with differing starting positions (e.g., high vs. low in burnout) actually respond differentially to stressors as predicted by COR theory. Therefore, the present paper takes the process-based approach by considering burnout-related differences in the resilience process as demonstrated in response to stressor exposure.

In contrast to static approaches to resilience that primarily relied on simple scales (e.g., capturing trait personal resilience), indicators for the resilience process differ greatly across studies. That is, studies focusing on the resilience process typically include situationally appropriate indicators that can be tracked over time. For example, studies among workers in the police force (Galatzer-Levy et al., 2011) and military personnel (Bonanno et al., 2012) used psychological distress and post-traumatic stress disorder symptom trajectories respectively to capture the resilience process. Recently, Britt et al. (2016) have offered a general framework for indicators of the resilience process, suggesting that they should span multiple situationally relevant domains. Specifically, these authors describe relevant indicators covering individuals' functioning at work (e.g., job performance), their general functioning (e.g., well-being), their functioning in the social domain (e.g., healthy relationships), and situation-specific impairments (e.g., symptoms). Drawing on this framework, we first considered the specific stressor of interest (a COVID-19 event) and then selected situationally relevant indicators across multiple domains.

COVID-19 events as daily stressor

Studying burnout-related differences in the resilience process requires careful consideration of the stressor involved. A stressor can be anything that causes stress or strain (e.g., Selye, 1976). However, the inherently subjective nature of stimuli as stressful (e.g., Lazarus, 1990; Pedone et al., 2020) complicates comparisons between peoples' responses to stimuli or events, unless such stimuli or events can "objectively" be characterized as a stressor and they are fixed across people. Consequently, to know if people high vs. low in burnout respond differently to a stimulus or event and recover differentially from their response, the stimulus or event has to be similar across individuals. In field—as opposed to lab—settings such stimuli are rare, unless a stimulus with stress inducing characteristics to which people are generally exposed exists.

The event of learning about a COVID-19 diagnosis of a close friend or family member qualifies well as a stimulus with stress inducing characteristics that allows for studying burnout-related differences in the resilience process. Within Event Systems Theory (EST), events are specific examples of stimuli that can be defined as external to the individual, bounded in time and space, and differing in strength (Morgeson et al., 2015). "Strong" events (i.e., events that are critical and somewhat disruptive) can be considered stress inducing and could thus be considered a relevant stimulus for studying differential stressor–response relationships between individuals high vs. low in burnout. Learning about the COVID-19 diagnosis of close friend of family member may be considered a strong event, and thus, qualifies as a fairly objective stressor. This is particularly true during the early stages of a pandemic when the disease is still threatening (i.e., in our case between April and June 2020, when vaccines or treatments were not generally available and the proportion between confirmed deaths and confirmed cases was about 7% worldwide (Mathieu et al., 2020)). Importantly, the COVID-19 event is—during a pandemic—sufficiently common to allow for meaningful and sizable comparisons. Moreover, the event is not so severe that every individual experiencing it responds so extremely that there is no variation. Finally, the COVID-19 event does not affect the physical integrity and well-being of the individual directly and measuring it does not intrude privacy. In that sense, the COVID-19 pandemic offers a unique opportunity to see burnout-related differences in responses to a common and severe stressor.

Importantly, any effects of the COVID-19 event would likely generalize to other types of stressors with similar characteristics. For example, other forms of stressors (e.g., accidents, injuries, illnesses, job loss, divorce, natural disasters) that close others might be exposed to with an equally threatening nature and uncertain prognosis (i.e., as applies to COVID-19 at the time of data collection) can be expected to elicit similar resilience responses. Similarly, uncertain threats or stressors that affect the focal individual (e.g., job loss, illness, moving, injury) likely elicit similar—but perhaps even more profound—effects as they arguably directly affect multiple resources of the focal individual.

Demonstration of the resilience process: daily cognition, affect, and motivation

The present study includes four indicators of the resilience process (i.e., COVID-19-related worrying, positive and negative affect, and work engagement) as it may unfold following exposure to the stressor (i.e., the COVID-19 event). The included indicators need to be relevant to both the stressor and burnout, span multiple domains of functioning (Britt et al., 2016) and show daily variability (Bakker, 2014; Brans et al., 2013; Verkuil et al., 2012) to be suitable for capturing the resilience process comprehensively in a daily diary study setup. Following these criteria, the first indicator for the resilience process is COVID-19-related worrying. This indicator covers functioning in the cognitive domain (Davey et al., 1992) that is known to be impaired by burnout (Kulikowski, 2021; Lemonaki et al., 2021) and, following Britt et al. (2016)'s suggestion to cover context-relevant symptoms, represents a straightforward symptomatic response to the stressor. Moreover, COVID-19-related worrying can be considered relevant to employee functioning, given its links to vigour at work (Bakker & van Wingerden, 2021), job insecurity (Chen & Eyoun, 2021), worsened impacts of job demands (Eguchi et al., 2021), and depressive complaints among employees (Fleuren et al., 2021). Second, to cover affective functioning, we consider the two complementary constructs of positive and negative affect as indicators (e.g., Russell & Carroll, 1999). Positive and negative affect can be used to represent well-being (Sonnentag, 2015), which has been recommended as indicator for the resilience process by Britt et al. (2016). Moreover, these two forms of affect cover generalized affective responses to a stressor that are known vary between individuals depending on their burnout scores (Buunk et al., 2001). Third, we include work engagement as a work-related motivational state (Schaufeli & de Witte, 2017), as a fourth indicator to capture the resilience process. This indicator covers the workplace functioning domain of resilience as recommended by Britt et al. (2016), it is relevant to job performance (Kim et al., 2013), and it has been included as resilience criterion in prior studies (e.g., Näswall et al., 2019).

The resilience process: immediate and dynamic responses to events

To comprehensively capture the dynamic responses to stressors, immediate and sustained responses should be disentangled. To this end, we propose that the COVID-19 event of interest is first recognized by individuals as an acute (or discrete) event (Bliese et al., 2017). That is, when an individual learns about the COVID-19 diagnosis of a close friend or family member, clear pre- and post-event phases are denotable. These phases can be used to explore three distinct components of individuals' responses to the event. The first component is *immediate reactivity*. This should be reflected by burnout-related differences in the immediate effect of the COVID-19 event on the cognitive, affective, and motivational outcomes on the day of the event itself (i.e., the daily score on the constructs of interest compared to a person's average level on these constructs). Second, burnout-related differences could emerge in the *dynamic reactivity* as reflected by the initial shift in level of the post-event temporal trajectories compared to the pre-event phase trajectory. Finally, the third component is the *dynamic recovery*, which refers to the pattern by which outcome variables return to pre-event levels and is reflected by the difference in slopes between the pre- and post-event phases. While immediate reactivity is relatively straightforward to observe on the day of the event, dynamic reactivity and recovery are inherently connected and must be considered across several post-event days (Bliese et al., 2020).

In sum, following COR theory, we suggest that burnout represents a state of lessened resources that reduces employees' ability to handle stressors. This manifests as employees with higher burnout scores showing a more profound immediate reaction to a stressor (i.e., the COVID-19 event) on the day of stressor exposure itself. This will be reflected in increased COVID-19 worrying and negative affect (i.e., as indicators of a stress response) as well as decreased work engagement and positive affect (i.e., as contra-indicators of a stress response) (see Hypothesis 1). Moreover, we suggest that this lessened ability to handle stressors also translates to an impaired resilience process in face of stressors on days following the stressor exposure. As such, employees with higher burnout scores show an overall increase in COVID-19 worrying and negative affect and an overall decrease in work engagement and positive affect across days following the event. Moreover, the impaired resilience process is further reflected in a less swift return to pre-stressor trajectories among employees with high burnout scores, because their state of lessened resources impairs their ability to recover and bounce back after stressor exposure (see Hypothesis 2).

Hypothesis 1: Employees with higher levels of burnout are more strongly affected by a COVID-19 event, reflected by stronger ***immediate reactivity to*** *such events in terms of cognitive (i.e., (a) increased COVID-19-related worrying), affective (i.e., (b) decreased positive affect and (c) increased negative affect), and motivational (i.e., (d) decreased work engagement) outcomes.*

Hypothesis 2: Employees with higher levels of burnout are more strongly affected by a COVID-19 event, reflected by stronger ***dynamic reactivity to*** *and weaker* ***dynamic recovery from*** *such events in terms of cognitive (i.e., (a) increased and more slowly decreasing COVID-19-related worrying), affective (i.e., (b) decreased and more slowly increasing positive and (c) increased and more slowly decreasing negative affect), and motivational (i.e., (d) decreased and more slowly increasing work engagement) outcomes.*

Method

Sample

Data were collected within a larger data collection effort during an early stage of the COVID-19 pandemic (i.e., between April 21and June 26, 2020) from several organizations and occupations using personal networks of research assistants and snowball sampling. Potential participants were approached via email, in person, with phone calls, text messages, Facebook posts, and via business platforms reaching approximately 588 individuals. Participants were offered the possibility to take part in a lottery. The study was approved by the local ethical review board (protocol number omitted for masked review).

Out of 549 individuals who followed the link to the intake questionnaire, 139 dropped out early, resulting in a final sample size of 410 participants (69.7% of participants that were directly contacted). Participants comprised 59.3% females, had an average age of 38 years (*SD* = 13.3) and an average organizational tenure of 11.5 years (*SD* = 11.7). At the time of filling in the questionnaire, participants lived in 19 different countries including Germany (34.4%), Greece (20.8%), the USA (11%), Belgium (7.8%), the UK (7.6%), Canada (3.7%), the Netherlands (3.7%), Italy (3.2%), and Portugal (2.4%). They held a wide variety of different jobs, such as medical practitioners, teachers, police officers, accountants, bank clerks, consultants, and office clerks.

Procedure

We conducted a diary study using smartphone friendly online questionnaires. The study consisted of an intake questionnaire assessing demographics and burnout and a diary part that spanned 30 days and assessed day-level variables. The daily questionnaire was sent out at 8:00 p.m. (local time) and closed at 3:00 a.m. on the next day to prevent backfilling. Participants were instructed to fill in the survey before going to bed. They could choose to complete either English or German versions of the questionnaires.

Missing-data rates

As recommended in the literature, no participants were excluded due to missingness in the diary part (Hox, 2002; Singer & Willett, 2003). Instead, we retained participants with missings and used maximum likelihood estimation as a missing data technique (Raudenbush & Bryk, 2002; Singer & Willett, 2003; Wang et al., 2017). Taken together, the 410 participants delivered between 7,777 and 6,083 observations for the daily variables (e.g., work engagement was only assessed on working days).

Measures

Burnout was assessed in the intake questionnaire with the Burnout Assessment Tool (BAT; Schaufeli, De Witte, & Desart, 2020). This state-of-the-art burnout measure spans and integrates previous conceptualizations of burnout and consists of 23 items assessing four core symptoms of burnout: exhaustion, mental distance, cognitive impairment, and emotional impairment which together form the overall scale (de Beer et al., 2020). Example items include "At work, I feel mentally exhausted" and "I feel indifferent about my job". Items were assessed on a 5-point frequency scale ranging from 1 (*never*) to 5 (*always*).

The presence of a COVID-19 event was assessed in the diary part with a single item (answer option: *yes*/*no*): "Did you learn today about someone from your family or close circle of friends who has been diagnosed with COVID-19?".

All four outcome variables in the diary survey were assessed on a 5-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). COVID-19-related worrying was assessed with a newly constructed item: "Today, I was worried because of the COVID-19 crisis". Affect was assessed with a short version of the Positive and Negative Affect Schedule (MacKinnon et al., 1999), assessing positive and negative affect with five items, respectively (e.g., "Overall, today I felt inspired", " . . . alert", " . . . afraid", " . . . upset"). Work engagement was assessed with three items adapted from the Utrecht Work Engagement Scale (Schaufeli & Bakker, 2003; Schmitt et al., 2013). An example item is "Today, I was very enthusiastic about my work".

Participants completed surveys in either English or German, such that measurement invariance across these survey versions could be considered of interest. Measurement invariance is particularly relevant when group comparisons are made (e.g., mean differences between groups or different correlational patterns between groups (Putnick & Bornstein, 2016; Vandenberg & Lance, 2000). Although none of our hypotheses related to such group differences, we explored measurement invariance for the sake of transparency. For the daily measures we conducted multigroup multilevel confirmatory factor analyses (CFA) and sequentially tested for configural, metric, and scalar invariance (Putnick & Bornstein, 2016; van de Schoot et al., 2012). Configural invariance was adequate for positive affect (CFI = .95, TLI =.89, RMSEA =.05), and negative affect (CFI = .93, TLI =.86, RMSEA =.10), although TLI values were somewhat lower than typically recommended (van de Schoot et al., 2012). For work engagement, configural invariance could not be tested as its three-indicator measurement model was just identified. Metric invariance was supported for positive (CFI = .94, TLI =.92, RMSEA =.05), negative affect (CFI = .92, TLI =.89, RMSEA =.09), and work engagement (CFI = .98, TLI =.94, RMSEA =.06). That is, model fit did not worsen in any of these models when factor loadings were constrained to be equal across groups, with CFI differences being smaller or equal to −.01 ((Cheung & Rensvold, 2002); positive affect: ΔCFI = −.004; negative affect: ΔCFI = −.012). Similarly, the scalar invariance model constraining intercepts to be equal across groups provided good fit for positive affect (CFI = .93, TLI =.91, RMSEA =.05), negative affect (CFI = .92, TLI =.90, RMSEA =.09), and work engagement (CFI = .98, TLI =.96, RMSEA =.05). Change in CFI compared to the metric invariance model was again lower than or equal to the recommended cut-off criterion of −.01 (positive affect: ΔCFI = −.014; negative affect: ΔCFI = −.004; work engagement: ΔCFI = −.004). For the baseline measure of burnout, the configural model yielded inadequate fit (CFI = .76, TLI =.73, RMSEA =.10). Allowing errors between three item pairs with very similar wording to correlate (Brown & Moore, 2012) improved model fit to an acceptable level when considering an RMSEA of .09 and SRMR of .08 (CFI = .81, TLI =.78) and recommendations from the literature towards model assessment in the common situation of disagreement between fit indices (Lai & Green, 2016; Williams et al., 2020). Metric invariance was confirmed as the metric invariance model yielded a similar fit as the configural model (CFI = .80, TLI =.79, RMSEA =.09; ΔCFI = −.002). Scalar invariance was not confirmed, however (CFI = .78, TLI =.78, RMSEA =.09), as constraining intercepts to be equal led to a decrease of more than −.01 in CFI (ΔCFI = −.02). In sum, at least metric invariance was supported for all our measures. We therefore proceeded with the focal analyses.

Analysis

To test Hypothesis 1, we assessed the *immediate reactivity* (i.e., within-day) effects of COVID-19 events on same-day employee worrying, positive and negative affect, and work engagement and how burnout affects these relationships. To do so, we conducted a series of multilevel analyses in the statistical software environment R using the nonlinear and linear mixed-effects models (NLME) package (Pinheiro & Bates, 2000). We started with a model, in which burnout was entered as a person-level (Level 2) predictor, while COVID-19 event was entered as a day-level (Level 1) predictor of the focal outcome variables. Next, we included a random slope parameter for COVID-19 event and a cross-level interaction between burnout and COVID-19 event. To ease interpretability of the interaction effect, we *z*-standardized burnout prior to analyses.

Next, to test Hypothesis 2 and burnout-related differences in *dynamic reactivity* and *dynamic recovery* effects of the COVID-19 event on our four outcomes, we used discontinuous random coefficient growth modelling (RCGM). This enabled modelling the effects of COVID-19 events on the trajectories of our outcome variables over time (Level 1) as well as between-person differences in these time parameters (Level 2) (French & Allen, 2020; Hale et al., 2016). Notably, this approach differs from the immediate effect approach in several ways. The basic multi-level model assesses the effects on the outcome variables of an event occurring at a - specific day, relative to all other days without an event. The Discontinuous RCGM approach, in contrasts, treats the event as an occurrence at a specific moment in time, which has the possibility to affect the outcome variables over a longer timeframe following its occurrence. This is modelled both in terms of reactivity (the change in level immediately following the event) and in terms of recovery (the change in slope after the event relative to before the event).

We followed recommendations by Bliese et al. (2020) in model building, using chi-square difference tests based on the models' log-likelihood ratios to compare change in fit between models. All models were estimated with an autoregressive error covariance structure, as chi-squared tests indicated these models to appropriately represent temporal dependencies in the data. All models were estimated with the open-source software R and the random effects models were estimated with the NLME package specifically (Pinheiro et al., 2017).

Table 1 presents the scaling of the temporal trajectories. Note that while COVID-19 events could occur on any of the

Table 1. Coding of time variables.

	Measurement occasion															
Variable																
Time	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Quadratic time	0	1	4	9	16	25	36	49	64	81	100	121	144	169	196	225
Reactivity	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1
Recovery	0	0	0	0	0	0	0	0	1	2	3	4	5	6	7	8

For illustration purposes, we only included 15 measurement occasions. The table displays the coding for a COVID-19 event occurring on day 7.

30 days of the study, this table illustrates the coding for an event occurring at time 7. The time variable depicts the overall slope in the outcome variable from the start of the study, whereas the quadratic time variable estimates the curvilinear general trend. The coding of the reactivity parameter indicates that this coefficient estimates the change in slope in the outcome variable after the COVID-19 event compared to people who did not experience an event. When the reactivity parameter is significant and the recovery parameter is not, the reactivity parameter implies a sustained shift in the *level of the outcome* variable after the COVID-19 event relative to before the event. However, when both the reactivity parameter and the recovery parameter are significant, the reactivity parameter reflects the *change in the outcome* variable immediately following the event (e.g., the post-event intercept). The recovery parameter then reflects the *change in the slope of the outcome* variable over time after the event relative to before the event (Bliese et al., 2020). Our analyses focused on the first event an individual experienced, while controlling for the occurrence of additional events. Pseudo R-squared values were estimated by comparing the residual variance between models with the predictor, relative to models without the predictor (Bliese, 2013; Singer & Willett, 2003). We derived Pseudo R-squared for the intercept, reactivity, and recovery parameters.

Results

Before starting with hypothesis testing, we considered several descriptives for our main variables (Table 2). Of special interest is the occurrence of the COVID-19 event; 66 participants (18.1%) reported at least one COVID-19 diagnosis of a close other across the 30-day study period, and of these some participants experienced multiple events, amounting to 105 events.[1] In the multilevel analyses, we used the complete 105 events, whereas in the discontinuous random coefficient growth models we focused on the first event experienced by the participants and controlled for additional events in order to be able to accurately depict the effects individual events on reactivity and recovery. Importantly, the total number of observations was higher as non-event days are also included in the estimation. Furthermore, as positive affect and work engagement were substantially correlated, we conducted a multilevel confirmatory factor analysis (CFA) to confirm the distinctiveness of these constructs. A two-level CFA (positive affect, work engagement) in which items load exclusively on their expected factor yielded acceptable model fit (df = 38; Chi-square = 706.241, $p < .001$; CFI =.96; TLI =.93; RMSEA =.05). This model also showed a significantly better fit than a model in which positive affect and work engagement items loaded on one factor (df = 40; Chi-square = 1046.808, $p < .001$; CFI =.93, TLI =.91, RMSEA =.06; Δ Chi-square = 340.567, $p < .001$).

Multilevel analyses

As shown in Table 3, multilevel analyses revealed that burnout had an overall positive effect on COVID-19-related worrying (estimate = .22, $p < .001$) and negative affect (estimate = .30, $p < .001$) and was negatively related to positive affect (estimate = −.15, $p < .001$) and work engagement (estimate = −.22, $p < .001$). Furthermore, at the day-level significant main effects of the COVID-19 event on COVID-19-related worrying (estimate = .34, $p < .001$), positive affect (estimate = −.18, $p < .01$), and negative affect (estimate = .19, $p < .01$) were found.

Table 2. Descriptive statistics, internal consistencies, and intercorrelations between study variables.

	M	SD	α_b	α_w	Burnout	COVID-19 event	COVID-19-related worrying	Positive affect	Negative affect	Work engagement
Burnout	2.18	.55	.92	-						
COVID-19 event	.02	.08	-	-	.07		.08***	−.04***	.05***	−.03**
COVID-19-related worrying	2.19	.99	-	-	.22***	.10*		−.05***	.48***	−.03**
Positive affect	3.02	.50	.83	.75	−.29***	−.13*	−.04		−.21***	.64***
Negative affect	2.14	.73	.96	.76	.41***	.06	.62***	−.16**		−.22***
Work engagement	2.97	.57	.74	.60	−.38***	−.12*	.00	.66***	−.18***	

N = 394–410 individuals, N = 6082–7777 observations, 105 COVID-19 events. Cronbach's alpha was computed with multilevel confirmatory factor analysis (Geldhof et al., 2014); α_b = multilevel Cronbach's alpha at the between-person level; α_w = multilevel Cronbach's alpha at the within-person level. Between-person level correlations are displayed below the diagonal, (uncentered) day-level correlations above the diagonal.
**$p < .01$; ***$p < .001$.

Table 3. Results of multilevel-analyses.

	COVID-19-related worrying	Positive affect	Negative affect	Work engagement
	Estimate (SE)	Estimate (SE)	Estimate (SE)	Estimate (SE)
Fixed effects				
Intercept	2.17*** (.05)	3.03*** (.02)	2.12*** (.03)	2.97*** (.03)
COVID-19 event	.34*** (.08)	−.18** (.06)	.19** (.06)	−.09 (.07)
Burnout	.22*** (.05)	−.15*** (.02)	.30*** (.03)	−.22*** (.03)
COVID-19 Event*Burnout	.05 (.07)	−.10*a (.05)	.12* (.05)	−.20** (.07)
Variance components				
Intercept	.85	.18	.38	.23
COVID-19 event	.00	.00	.00	.00
Residual	.55	.34	.34	.39
Simple slopes				
+1 SD Burnout	.39*** (.10)	−.28*** (.08)	.31*** (.08)	−.30** (.10)
−1 SD Burnout	.29** (.11)	−.07 (.09)	.07 (.09)	.11 (.10)

N = 393–409 individuals, 6,053–7,742 observations, 105 COVID-19 events.; *$p < .05$; *a $p = .05$; **$p < .01$; ***$p < .001$ (two-tailed).

Hypothesis 1 was tested with a cross-level interaction between COVID-19 event and burnout. This interaction was significant for negative affect, work engagement, and positive affect. Simple slope analyses probing the interaction at 1 *SD* above and 1 *SD* below the mean of burnout revealed that, for individuals high in burnout, a COVID-19 event related negatively to positive affect (estimate = –.28, $p < .001$) and work engagement (estimate = –.30, $p < .01$) and positively to negative affect (estimate = .31, $p < .001$) on the same day. In contrast, there was no significant effect of a COVID-19 event on positive affect (estimate = –.07, $p = .40$), work engagement (estimate = .11, $p = .26$), or negative affect (estimate = .07, $p = .42$) for individuals low in burnout. These findings largely confirmed Hypothesis 1, except that no moderation of the event's effect by burnout on COVID-19-related worrying was found.

Discontinuous random coefficient growth models

Tables 4–7 report the results regarding Hypothesis 2. As shown by the Level 1 model in Table 4, results for COVID-19-related worrying indicate that the time parameter was negative and the quadratic time parameter was positive and both differed significantly from zero (γ = –.03, $p < .001$; γ = .0005, $p < .01$, respectively). In the baseline model, neither the reactivity nor the recovery parameter significantly differed from zero. Adding a random term for the reactivity and recovery parameters did improve model fit (χ^2diff(5) = 115.04, $p < .001$). As shown in the Level 2 model in Table 4, burnout had a positive effect on COVID-19-related worrying at the initial day of the study (γ = .20, $p < .001$) and there was a marginally significant interaction between burnout and reactivity (γ = .13, $p = .08$). Figure 1 depicts a graph of participants with low (1 *SD* below the average) and high (1 *SD* above the average) burnout levels experiencing a COVID-19 event on day 15, demonstrating that individuals with high burnout displayed a stronger sustained reaction to a COVID-19 event than those with low burnout. While pointing towards the hypothesized effects, this marginally significant finding did not provide sufficient grounds to accept Hypothesis 2 for COVID-19-related worrying.

The Level 1 model in Table 5 shows that for positive affect neither the time parameters nor the reactivity and the recovery parameter differed significantly from zero. Adding a random term for the reactivity and recovery parameters did improve model fit (χ^2diff(5) = 34.09, $p < .001$). As shown by the Level 2 model, burnout had a negative effect on positive affect at the initial day of the study (γ = –.15, $p < 0.001$) and there was a significant interaction between burnout and recovery (γ = .01, $p < .05$), whereas the interaction between burnout and reactivity was not significant (γ = –.09, $p = .12$). As shown in Figure 2, individuals with high burnout levels showed a more positive slope in positive affect after a COVID-19 event. This positive recovery effect partially confirmed Hypothesis 2 for positive affect and might be due to the larger but non-significant drop in positive affect due to the event.

The Level 1 model in Table 6 shows that for negative affect neither the time parameters nor the reactivity and the recovery parameters significantly differed from zero. Adding a random term for the reactivity and recovery parameters did improve model fit (χ^2diff(5) = 69.15, $p < .001$). As reported in the Level 2 model, burnout had a positive effect on negative affect at the initial day of the study (γ = .30, $p < .001$) and there was a significant interaction between burnout and recovery (γ = –.01, $p < .05$), whereas the interaction between burnout and reactivity was not significant (γ = .06, $p = .33$). As can be seen in Figure 3, individuals high in burnout showed a steeper negative slope in negative affect after a COVID-19 event. This positive recovery effect partially confirmed Hypothesis 2 for negative affect and might be due to the larger but non-significant increase in negative affect due to the event.

The Level 1 model in Table 7 shows that results for work engagement indicated that the time parameter was positive and significant (γ = .01, $p < .001$) and the quadratic time parameter was negative and marginally significant (γ = –.0002, *p*

Table 4. Parameter estimates for the temporal trajectory of COVID-19-related worrying with and without burnout as a moderator.

	COVID-19-related worrying		COVID-19-related worrying		
	γ	SE	γ	SE	
Fixed Parameters					
Level 1 Model					
Intercept	2.39***	(0.06)	2.39***	(0.05)	
Additional event	0.36**	(0.13)	0.35**	(0.13)	
Day	–0.03***	(0.005)	–0.03***	(0.005)	
Quadratic day	0.0005**	(0.0002)	0.0005**	(0.0002)	
Reactivity	0.12	(0.08)	0.13	(0.08)	
Recovery	–0.01	(0.01)	–0.01	(0.01)	
Level 2 Model					
Burnout			0.20***	(0.05)	
Reactivity × Burnout			0.13†	(0.08)	
Recovery × Burnout			–0.01	(0.01)	
Random Effects	Variance	SD	Variance	SD	Pseudo R^2
Intercept	0.8467	0.9202	0.8032	0.8962	0.05
Reactivity	0.0633	0.2517	0.0475	0.2180	0.25
Recovery	0.0015	0.0385	0.0015	0.0381	0.02
Residual	0.5494	0.7412	0.5492	0.7410	
AIC	18047.28		18032.74		
BIC	18144.64		18157.92		
Log Likelihood	–9009.64		–8998.37		

N = 409 individuals, 7,739 observations, 66 COVID-19 events.
†*p* < .10; * *p* < .05; ***p* < .01; ****p* < .001 (two-tailed).

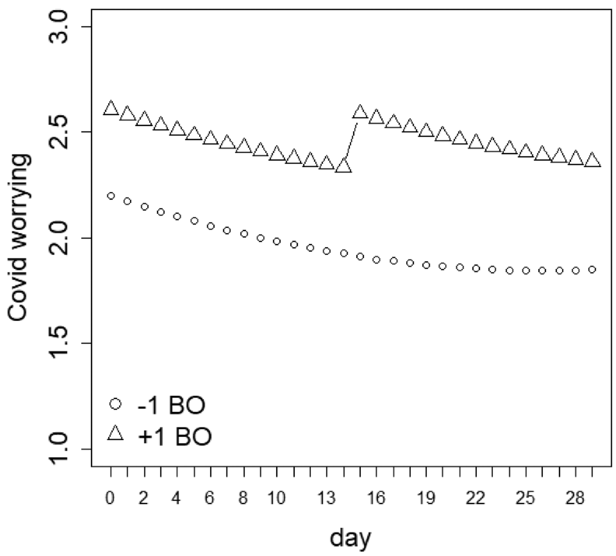

Figure 1. Estimated growth trajectories in COVID-19-related worrying for individuals with low and high burnout with a COVID-19 event occurring on day 15.

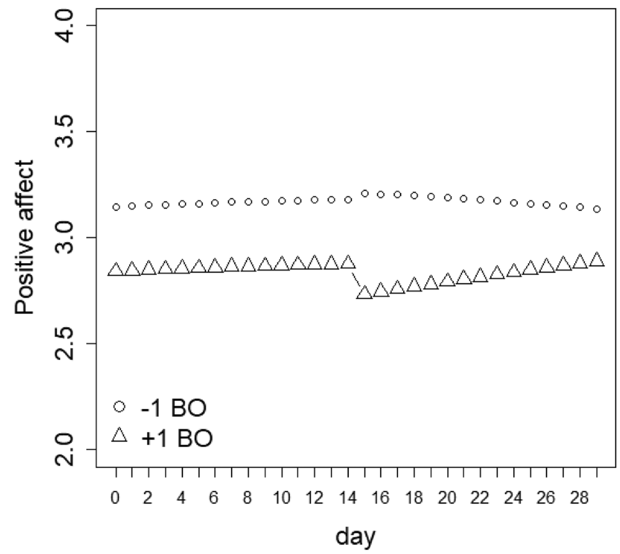

Figure 2. Estimated growth trajectories in positive affect for individuals with low and high burnout with a COVID-19 event occurring on day 15.

= .07). In the baseline model, neither the reactivity nor the recovery parameter differed significantly from zero. Adding a random term for the reactivity and recovery parameters did improve model fit (χ^2diff(5) = 22.15, $p < .001$). As the Level 2 model shows, burnout had a negative effect on work engagement at the initial day of the study ($\gamma = -.21$, $p < .001$), whereas neither the burnout × reactivity nor the burnout × recovery interaction terms significantly differed from zero. Therefore, Hypothesis 2 was rejected for work engagement.

Discussion

The present paper examined how inter-individual differences in burnout moderate the impact of a COVID-19 event on key cognitive, affective and motivational outcomes in a sample of working people during the early stages of the pandemic. In the first set of analyses, we tested burnout-related differences in *immediate reactivity* (i.e., same-day reactions) to a COVID-19 event. Using multilevel modelling, we found that employees with high burnout scores showed stronger immediate reactivity in terms of positive affect, negative affect, and work engagement following the COVID-19 event than those with low burnout scores. However, for COVID-19-related worrying, no immediate reactivity differences relating to burnout were found. The findings confirming immediate reactivity effects for negative and positive affect and work engagement match previous research that shows stronger reactions to daily work stressors among employees with higher burnout scores (Bakker et al., 2022). Moreover, these findings also advance COR theory and burnout research by showing that employees with higher burnout scores who already have fewer resources (e.g., Schaufeli et al., 2009), further lose

Table 5. Parameter estimates for the temporal trajectory of positive affect with and without burnout as a moderator.

	Positive affect		Positive affect		
	γ	SE	γ	SE	
Fixed Parameters					
Level 1 Model					
Intercept	3.00***	(0.03)	3.00***		(0.03)
Additional event	−0.23*	(0.10)	−0.23*		(0.10)
Day	0.00	(0.00)	0.00		(0.00)
Quadratic day	0.00	(0.00)	0.00		(0.00)
Reactivity	−0.07	(0.06)	−0.06		(0.06)
Recovery	0.00	(0.00)	0.00		(0.00)
Level 2 Model					
Burnout			−0.15***		(0.02)
Reactivity × Burnout			−0.09		(0.06)
Recovery × Burnout			0.01*		(0.00)
Random Effects	Variance	SD	Variance	SD	Pseudo R^2
Intercept	0.1947	0.4413	0.1733	0.4163	0.11
Reactivity	0.0469	0.2165	0.0366	0.1913	0.22
Recovery	0.0003	0.0163	0.0002	0.0133	0.34
Residual	0.3434	0.5860	0.3436	0.5862	
AIC	14402.99		14365.10		
BIC	14500.34		14483.32		
Log Likelihood	−7187.49		−7165.55		

N = 409 individuals, 7,739 observations, 66 COVID-19 events.
*$p < .05$; **$p < .01$; ***$p < .001$ (two-tailed).

Table 6. Parameter estimates for the temporal trajectory of negative affect with and without burnout as a moderator.

	Negative affect		Negative affect		
	γ	*SE*	*γ*	*SE*	
Fixed Parameters					
Level 1 Model					
Intercept	2.14***	(0.04)	2.14	(0.04)	
Additional event	0.32**	(0.10)	0.32**	(0.10)	
Day	0.00	(0.00)	0.00	(0.00)	
Quadratic day	0.00	(0.00)	0.00	(0.00)	
Reactivity	0.06	(0.07)	0.06	(0.07)	
Recovery	0.00	(0.00)	0.00	(0.00)	
Level 2 Model					
Burnout			0.30***	(0.03)	
Reactivity × Burnout			0.06	(0.07)	
Recovery × Burnout			−0.01*	(0.00)	
Random Effects	Variance	SD	Variance	SD	*Pseudo* R^2
Intercept	0.4484	0.6696	0.3564	0.5970	0.21
Reactivity	0.0539	0.2322	0.0586	0.2422	−0.09
Recovery	0.0004	0.0198	0.0003	0.0175	0.22
Residual	0.3434	0.5860	0.3434	0.5860	
AIC	14771.41		14308.46		
BIC	14889.63		14426.68		
Log Likelihood	−7368.71		−7137.23		

N = 409 individuals, 7,739 observations, 66 COVID-19 events.
**p* < .05; ***p* < .01; ****p* < .001 (two-tailed).

Table 7. Parameter estimates for the temporal trajectory of work engagement with and without burnout as a moderator.

	Engagement		Engagement		
	γ	SE	γ	SE	
Fixed Parameters					
Level 1 Model					
Intercept	2.90***	(0.04)	2.89***	(0.04)	
Additional event	−0.34*	(0.13)	−0.33*	(0.13)	
Day	0.01**	(0.00)	0.01**	(0.00)	
Quadratic day	−0.0002†	(0.0001)	−0.0002†	(0.00)	
Reactivity	−0.02	(0.08)	−0.01	(0.07)	
Recovery	0.00	(0.00)	0.00	(0.00)	
Level 2 Model					
Burnout			−0.21***	(0.03)	
Reactivity × Burnout			−0.12	(0.07)	
Recovery × Burnout			0.01	(0.00)	
Random Effects	Variance	SD	Variance	SD	*Pseudo* R^2
Intercept	0.2611	0.5110	0.2152	0.4639	0.18
Reactivity	0.1471	0.3835	0.1370	0.3701	0.07
Recovery	0.0004	0.0196	0.0004	0.0189	0.07
Residual	0.3875	0.6225	0.3873	0.6223	
AIC	12221.52		12160.6		
BIC	12315.43		12274.7		
Log Likelihood	−6096.76		−6063.3		

N = 409 individuals, 7,739 observations, 66 COVID-19 events.
†*p* < .10; **p* < .05; ***p* < .01; ****p* < .001 (two-tailed).

affective (i.e., positive and negative affect) and motivational (i.e., work engagement) resources following stressor exposure. Interventions should therefore particularly target the affective and motivational domains,for example, by supporting emotion-focused coping or making work more engaging. In sum, the significant findings from these first analyses indicate that employees with higher burnout scores show an impaired resilience process. The absence of burnout-differentiated effects for the cognitive aspect of COVID-19-related worrying do not align with our predictions. This finding can arguably be explained by the proximity of COVID-19-related worrying to the content of the stressor, such that most employees who have a COVID-19 event would also worry about it more, regardless of their burnout scores. An alternative explanation for this null-finding could be that employees with higher burnout scores generally worry more (REF) could further explain why we did not find an interaction effect.

Our second set of analyses tested possible burnout-related differences in the *temporal unfolding* of our resilience process indicators across days following the event (i.e., as opposed to the same-day effects considered in our first set of analyses). Using discontinuous random coefficient growth modelling, we firstly found a marginally significant effect indicating that employees with higher burnout scores experienced an upward shift in COVID-19-related worrying after a COVID-19 event (i.e., higher *dynamic reactivity*). Importantly, these employees recovered relatively slowly from this increase in worrying (i.e., no differences in *dynamic recovery*), as their post- and pre-event development in worrying were highly similar. Thus, individuals

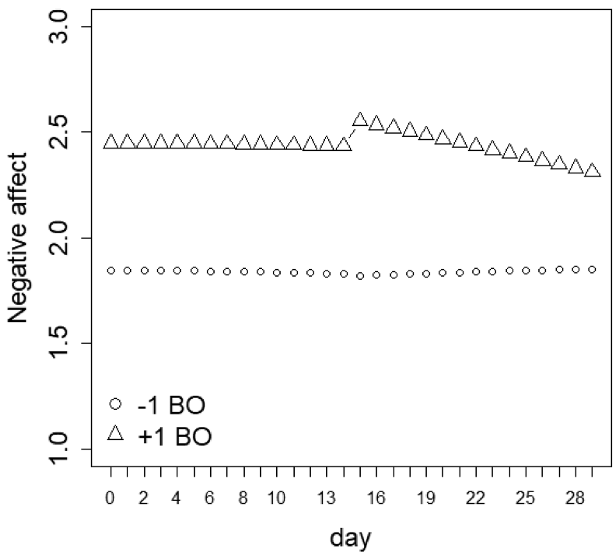

Figure 3. Estimated growth trajectories in negative affect for individuals with low and high burnout with a COVID-19 event occurring on day 15.

with higher burnout scores seem to worry more throughout the days following stressor exposure and this worrying seems to fade out slowly over time. These findings align with research showing that employees suffering from burnout show cognitive impairments such as reduced attentional control (van der Linden et al., 2005) that may reduce their ability to refrain from negative thinking (i.e., in our study COVID-19-related worrying). Arguably, the attentional impairment associated with burnout manifests as a sustained cognitive reaction to a stressful event. This sustained—rather than short-lived—effect of the COVID-19 event on worrying for employees with high burnout scores might further explain why we found no moderation effect of burnout regarding COVID-19-related worrying in the first set of multilevel analyses. Namely, these multilevel analyses only covered effects occurring on the day of the COVID-19 event itself. Contrastingly, the dynamic reactivity effect in the growth model represents an overall change in the level of worrying (i.e., as post-event days are also coded as non-event days in the multilevel models), particularly if the dynamic recovery component is not significant.

The results regarding *dynamic recovery* further indicated that burnout-related differences in the short-lived effects of the COVID-19 event on negative and positive affect exist. Specifically, employees with higher burnout scores showed steeper declines in negative affect and steeper increases in positive affect (i.e., differences in *dynamic recovery*) in the days following the COVID-19 event. This arguably indicates that employees with higher burnout scores had more room for recovery from the daily stressor in the first place. Employees with lower burnout scores, however, did not seem affected by the event (i.e., they did not initially react to it and therefore did not need to recover from it) in these same analyses. Thus, although differential *dynamic reactivity* effects were not statistically significant for positive and negative affect in our discontinuous growth models, the significant burnout-related differences in dynamic recovery effects for these outcomes do seem to be driven by the stronger reactions to the COVID-19 event among employees with higher burnout scores. These findings advance COR theory by showing that although employees with high burnout scores generally have fewer resources (e.g., Schaufeli et al., 2009) and lose further resources following stressor exposure (Bakker et al., 2022), they still manage to recover in the end. Consequently, even employees with higher burnout scores do not experience a full depletion of their affective resources as they eventually do "bounce back". For COR theory, this implies that instead of a simple loss cycle (Hobfoll & Freedy, 2017) responses to daily stressors may follow a sinusoidal pattern. That is, having fewer resources (i.e., represented by higher burnout scores) sets employees up for further resource losses upon stressor exposure, but such losses do not follow indefinite cycles as the effects of the stressor exposure eventually level off. Importantly, future research is needed to investigate how repeated exposure to stressors may affect peoples' ability to bounce back, particularly for those with higher burnout scores.

Finally, regarding work engagement, no significant burnout-related effects were identified in our dynamic resilience process model. That is, neither the dynamic reactivity nor the dynamic recovery component interacted significantly with burnout. These findings might be explained in several ways. First, it is possible that work engagement is insufficiently proximal to the COVID-19 event for prolonged dynamic effects to occur. Although burnout-related reactivity differences were found on the day of the event itself, such differences might simply not span multiple post-event days because learning about someone's COVID-19 diagnosis stops being work-relevant. On the day itself, the event might distract from work and work might be deprioritized, but after these initial reactions employees can return to their pre-event work engagement levels. Second, it is possible that the absence of the expected dynamic effects relates to a strong main effect of burnout on work engagement. Conceptually, burnout and work engagement are often positioned as polar opposites (González-Romá et al., 2006). Although the discussion on their conceptual distinctiveness has not been resolved, burnout and work engagement typically do show a strong negative association (Schaufeli & de Witte, 2017). Despite burnout being measured as trait and work engagement as state, the profoundness of this relationship could have suppressed the expected interaction effects. Consequently, people with high burnout scores might generally have a lower level of state work engagement. Third, it is conceivable that work engagement on days following the events is at normal levels again because engagement with work represents a form of coping. Employees who learn about an event might initially be shocked to some extent (i.e., as indicated by the immediate effect) and engaging with work might be a welcome distraction regardless of their levels of burnout.

Overall, the key conclusion from our findings is that employees high in burnout are exposed to a double risk. Not only are their minds already more troubled, they also demonstrate less resilience to additional troubles (i.e., adverse events) than those with low burnout levels. These burnout-related differences in resilience mainly manifest on the short-term (i.e., on the day of the event when considering affect and work motivation) but occasionally also on the longer run (i.e., across the days that follow the event when considering worrying). These findings align with and advance findings from initial laboratory studies suggesting direct differential physiological and cognitive reactions to stressors of individuals high versus low in burnout (de Vente et al., 2015; Wekenborg et al., 2019). More positively, our findings additionally suggest that employees' high in burnout *can* affectively (although not cognitively; i.e., in terms of worrying) recover from adverse events in subsequent days, thus providing "troubled minds" with some good news. Moreover, our study's dynamic approach illustrates how burnout shapes employees' daily experiences in response to acute stressors, pointing to a potential proximal mechanism for *how* severe distal effects come about (e.g., on absenteeism (Schaufeli et al., 2009) and health impairments (Cox et al., 2017; Salvagioni et al., 2017)). This illustration contributes to the resilience literature by showing how burnout shapes resilience in cognitive, affective, and motivational domains following an acute stressor. Moreover, by drawing on COR theory (Hobfoll, 1989) these findings advance this theory's framework and explanatory power in the context of the current burnout literature that has, to date, chronically suffered from a lack of truly dynamic approaches. Finally, by focusing on the interaction of burnout (typically elicited by work stressors) and a stressor in the private domain, our findings shed further light onto the interplay between work-related and non-work-related strain experiences of employees. Hence, our study improves the understanding of the cognitive, affective, and motivational reaction patterns of already impaired employees to acute stressors. Understanding these patterns provides important direction for supporting vulnerable individuals in handling adverse events during crises.

Limitations and future directions

A first consideration regarding our study pertains to the operationalization of our COVID-19 event. Although we uniquely use the same fixed event for all participants and thereby provide an important methodological contribution, the exact scope of the event is debatable. That is, our COVID-19 event is restricted to learning about a close friend's or family member's COVID-19 diagnosis. Variation might exist in the closeness of the individual who received the diagnosis (e.g., a friend versus a partner) and the expected prognosis for the individual (e.g., a child versus a (grand-)parent). Similarly, individuals with poor health themselves might be more affected by learning that a close other has received a threatening COVID-19 diagnosis. As such, weighing the closeness to that individual with the diagnosis and an individual's own health status when predicting the effect of the event on the cognitive, affective, and motivational outcomes we studied could be useful. Moreover, the international sample included in our study might imply additional differences in the severity of the situation regarding COVID-19 as well as its cultural significance. These aspects could arguably have introduced additional noise in our effects. Nonetheless, the operationalization of our COVID-19 event can be considered highly suitable despite the aforementioned concerns. That is, the potential noise in our operationalization enables the detection of burnout-related differences in responses to an event in the first place. Future studies could further explore ways of handling these considerations regarding the standardization of a stressor.

A second potential limitation of our study is the scope of resilience indicators we consider. Although we include important cognitive, affective, and motivational variables that can fluctuate daily and for which immediate responses are observable, effects on, for example, behavioural outcomes are not considered. Future studies could test, for example, whether burnout is also associated with different work behaviours on days following a stressful event. Moreover, it is well known that burnout may fluctuate with daily job demands and stressors at work (e.g., Bakker, Costa, 2014; Xanthopoulou & Meier, 2014), but these aspects are not included in our study. However, it is likely that on post-event days where demands at work are particularly high, further impairments would be observed. Future research might therefore include daily job demands to paint a more fine-grained picture of the resilience process in relation to burnout and thereby uncover additional mechanisms.

Third, despite our large sample size on the person (410), and day-level (7777), COVID-19 events occurred 105 times and at least once for only 66 participants in our sample, which limits the effective power of our tests, particularly for cross-level moderation effects. The fact that we obtained significant findings despite this limited power suggests relatively strong effect sizes but non-significant findings should be interpreted with caution. Future research should seek to sample a greater number and variety of events in order to replicate and extend our findings.

A fourth potential limitation might reside in the suboptimal measurement invariance test results surrounding our burnout measure. Although this study uses a state-of-the-art burnout measure (Schaufeli, Desart, et al., 2020) that has been validated in several countries and languages (de Beer et al., 2020), the measurement invariance tests showed suboptimal results. We performed these tests for transparency as we included two different language versions of the burnout measure in our study even though no structural comparisons between the two language versions or countries are made. Nonetheless, the lack of convincing measurement invariance results might suggest that our findings should be interpreted with caution. However, fit indices in the measurement invariance tests are relatively close to the typical cut-off scores and thus do not indicate severe misfit. Moreover, we do not make any group comparisons that would particularly incur risks of biased findings in face of lacking measurement invariance. Therefore, it is unlikely that the suboptimal measurement invariance test results have strong implications on the validity of our findings.

A final consideration regarding our findings is that in our presented models we do not include a random effect for our time parameters. The reasons for not including such a random effect is to avoid increasing model complexity even further and because we did not have theoretical grounds to assume a random time effect in our models. While our approach is in perfect agreement with the procedures for discontinuous random coefficient growth modelling recommended by Bliese et al. (2020), it should be noted that the time effects we model might show some variation between individuals. That is, some people might normally have a positive and others a negative development in the included resilience indicators over time. To account for such variation, future studies aiming to explore resilience trajectories could include random time effects in the estimated models.

Practical implications

Our study shows that employees high in burnout are at greater risk to suffer from adverse events in terms of cognitive, affective, and motivational reactions, in both an immediate and a more sustained fashion. However, these employees still do affectively recover from these stressors in the succeeding days. Overall, this suggests that organizations should support these employees through job design and prevention programmes (e.g., to shield these employees from demanding working conditions and monitor their well-being in conversations more frequently). Additionally, managers should be more sensitive regarding employees with higher burnout scores, adjust their expectations towards them and provide them with support more effectively when these employees face stressful events in the non-work sphere. Namely, it is clear from our study that the effects of such events can span multiple days and given their cognitive, affective, and motivational impact on employees with higher burnout scores, these employees might benefit from being exposed to lower demands and/or receiving more support.

Conclusion

This paper shows that burnout can affect employees' immediate and dynamic responses to stressors in various domains. The same-day increase in negative affect and decreases in positive affect and work engagement among employees with higher burnout scores show that burnout may make people more sensitive to stressors. Additionally, the dynamic recovery effects for positive and negative affect as well as worrying show that it takes employees with higher burnout scores some time to recover from stressor exposure. Importantly, however, these employees do return to pre-exposure levels of affect and worrying in the end. In sum, laying troubles on an already troubled mind is associated with a heavier impact, but the extent to which the resilience process is impaired by burnout depends on the specific response indicators considered and even a troubled mind can bounce back in the end.

Note

1. One person indicated a COVID-19 event on every day from day 21 until the end of the study. As it was likely that this person had misinterpreted the item we omitted him/her from further analyses. Rerunning the analyses including this person yielded the same pattern of results.

Disclosure statement

No potential conflict of interest was reported by the author(s).

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