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# Inertia of negative emotions at work: Correlates of inflexible emotion dynamics in the workplace*

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**Abstract**

Emotional inertia is a central feature of emotion dynamics and it refers to the degree to which emotional states are self-predictive and linger over time, describing their resistance to change. It is related to several indicators of maladjustment, yet there is limited research on its correlates in the workplace, where it may be particularly relevant as emotional experiences deeply influence organizational life. In two experience-sampling studies, we studied temporal dependency of negative emotional states at work in terms of emotional inertia. In a first study ($n = 128$), we investigated the association between exhaustion, the core dimension of burnout, with inertia of negative emotions. In a second study ($n = 116$), we aimed to replicate findings from the first study and additionally examined the moderating role of inertia of negative emotions in the relationship between negative emotions at work and counterproductive work behaviour. The findings show that exhaustion is consistently associated with inertia of negative emotions, and that inertia of negative emotions aggravates the relation between negative emotions and workers' counterproductive work behaviour.

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**KEYWORDS**
counterproductive work behaviour, emotion dynamics, emotional inertia, exhaustion, negative emotions

## INTRODUCTION

Emotions refer to affective reaction to significant events that are linked to individuals' behaviour tendencies (Barsade & Gibson, 2007; Frijda, 2006). A key characteristic of emotions is their dynamic nature (Ashkanasy, 2003), as they are, by definition, intra-individual and dynamic phenomena that are relatively short-lived (e.g. Barsade & Gibson, 2007; Frijda, 2006). Whereas the pervasive role of emotions in organizational life has been neglected for a long time, in recent years, an increasing number of studies have investigated emotion dynamics at work, suggesting the value of understanding predictors and outcomes of fluctuations in emotional states (e.g. Clark et al., 2018; Dalal et al., 2009; Judge et al., 2006; Miner & Glomb, 2010; Rothbard & Wilk, 2011). A large number of studies, in fact, have underlined the relevance of investigating if and how feelings change in order to better evaluate and understand individuals' psychological wellbeing (see Houben et al., 2015).

In this paper, we focus on a core component of emotion dynamics, namely emotional inertia (Kuppens et al., 2010). Emotional inertia indicates the extent to which affective experiences are slow to change, or the likelihood of remaining in a particular emotional state, with low levels reflecting higher tendency to change and high levels reflecting higher self-predictability (Kuppens et al., 2010). Changing in response to events and regulatory efforts represents a key function of emotion dynamics (e.g. Frijda, 2006; Kuppens et al., 2010): High levels of inertia may suggest that emotions have become disconnected from internal (e.g. emotion regulation efforts) and/or external contingencies (e.g. events or environmental changes; Kuppens et al., 2010) therefore becoming dysfunctional (Koval et al., 2016; Kuppens et al., 2010). For example, an individual high in emotional inertia may get stuck in feeling angry or anxious at work due to impaired emotion regulation abilities. An individual low in emotional inertia, instead, will easily recover from negative emotions. So far, a large body of literature has posited inertia of negative emotions among major determinants of psychological maladjustment in the general population (Houben et al., 2015; Koval et al., 2016; Kuppens et al., 2010), however, despite repeated calls to investigate temporal dynamic features of emotional states and their association with workplace outcomes (Dalal et al., 2020; Diener et al., 2020), little is known if and how it matters in the work setting.

Building on extensive research in affect literature, this paper thus aims at contributing to the organizational literature by taking a within-person perspective to investigate how (a) exhaustion—the core component of burnout syndrome—may affect the temporal dynamics of negative emotions at work, making them more persistent over time and resistant to change (i.e. high emotional inertia) and how (b) inertia of negative emotions may be related to organizational behaviour, by contributing to create the conditions for engaging in counterproductive work behaviour. Specifically, we apply principles of Conservation of Resources theory (COR; Hobfoll, 1989) to propose that exhaustion moderates the association between adjacent measures of negative emotions, so that it will be stronger for workers high in exhaustion. Furthermore, moving from Spector and Fox's (2002) emotion centered model, we test the moderating role of emotional inertia in the dynamic association between negative emotions and extra-role behaviours. In the following paragraphs, we develop and provide theoretical evidence for our hypotheses.

## Emotional inertia

The DynAffect model developed by Kuppens and colleagues (2010b) proposes that each individual affective system is characterized by an affective home base (i.e. a baseline), the variability around the affective home base, and the attractor strength. Individual differences in these processes explain differences in temporal patterns and trajectories that can been observed in individual's emotional experiences. The attractor strength, in particular, is largely responsible for the duration of emotional states or their inertia. Emotional episodes, in fact, can show striking variations: Evidence indicates that emotions may last for minutes, hours, or even longer (for a review, see Verduyn et al., 2015).

*Emotional inertia* reflects the degree to which the intensity of a current emotion is predicted by the intensity of that same emotion at a previous measurement occasion (Kuppens et al., 2010; Wang et al., 2012). High emotional inertia thus implies that one's current emotion is very much a function of one's emotion at a previous time point. Accordingly, inertia is a synonym for rigidity, as it reflects a lack of emotional flexibility, which impair the individuals' ability to flexibly adapt emotional reactions and regulate emotional states to ongoing changes in the environment (Kashdan & Rottenberg, 2010; Koval et al., 2016). In other words, people showing high emotional inertia are "affectively stuck" (Koval et al., 2012, p. 1413), meaning that their emotional states are highly predictable over time. The assessment of emotional inertia requires intensive longitudinal data as it is operationalized as an autocorrelation coefficient or an autoregressive slope, expressing the time it takes to an individual to return to an equilibrium and to recover from a perturbation (Hamaker & Grasman, 2015; Kuppens et al., 2010, 2012).

Emotional inertia is conceptually distinct, but not independent, from germane constructs, like emotional variability and emotional instability (Koval et al., 2013). *Emotional variability*, for instance, refers to within-individual variation of emotions over time (e.g. Eid & Diener, 1999). It is usually operationalized as the standard deviation of emotions, and thus it indicates the amplitude or the general dispersion of an individual's emotional scores. High emotional variability suggests that emotions reach relatively extreme levels and show large deviations from the average emotional level (Houben et al., 2015). *Emotional instability*, instead, reflects how rapidly emotions fluctuate between consecutive measurement occasions (Jahng et al., 2008) or the magnitude changes from one time point to the next (Houben et al., 2015). Usually, it is operationalized as the average of the squared difference between affective states assessed at adjacent observations (Jahng et al., 2008, Equation 3). In contrast, emotional inertia expresses the interdependence among measurements of the same emotion at consecutive time points. As such, it is considered to reflect the degree of flexibility of emotional states (Koval & Kuppens, 2012). Compared to trait affectivity, which captures a stable disposition to experience certain emotions and refers to the intensity of emotions (i.e. how people feel on average), and compared to mood, which refers to a diffuse and long lasting positive or negative feeling (i.e. feeling good or bad), emotional inertia captures the temporal dependency of emotions regardless of their level and it refers to a low dynamism of state emotions (Houben et al., 2015; Koval & Kuppens, 2012). The operationalization of emotional inertia as the autocorrelation of emotions over time is an adequate index of inertia because it captures the within-individual temporal stability of emotions being almost insensitive to emotional level (Kenny, 1979). This parameter is particularly informative because it is associated to the recovery time from a disturbance so that it can represent a good measure of "regulatory weakness" (Hamaker & Grasman, 2015, p. 1). Importantly, high emotional inertia as captured by the autoregressive effect does not necessarily imply that the person is in a stable state of high, mean or low negative emotions: the autoregressive effect simply reveals to what extent it is possible to predict current intensity of emotions by using levels of emotions observed at the previous time point. In

this sense, emotional inertia reflects the rate of change in emotional states or temporal dependency of emotions and thus provides different information compared to negative mood or emotion intensity.

A large body of literature documented the construct validity of emotional inertia (e.g. Brose et al., 2015; Houben et al., 2015; Wang et al., 2012), suggesting that it represents a meaningful characteristic that reflects maladaptive regulatory strategies. Specifically, empirical findings show that high inertia of negative emotions is associated with high neuroticism (Suls et al., 1998) and low self-esteem (Kuppens et al., 2010), as well as forms of psychopathology such as depression (Brose et al., 2015; Koval et al., 2016), borderline personality disorder and bipolar disorder (Houben et al., 2015). Of interest, some studies suggest that inertia of negative emotions is negatively associated to both current and future health. Indeed, high levels of emotional inertia may be an early warning signal of depression (Kuppens et al., 2012; van de Leemput et al., 2014) and health problems (Wang et al., 2012). Regarding inertia of positive emotions, the findings are less consistent (e.g. Höhn et al., 2013; Koval et al., 2013). All in all, although inertia of both positive and negative emotions is theorized to be maladaptive, stronger evidence is available on the detrimental effects of inertia of negative emotional states (henceforth, NE inertia; Houben et al., 2015; Koval et al., 2016).

Finally, as for the process underlying emotional inertia, strong evidence supports its association with rumination (Brose et al., 2015; Koval et al., 2012), expressive suppression (Koval et al., 2015), and reactivity to events (Koval et al., 2015; Kuppens et al., 2010). All in all, it seems well acknowledged that emotional inertia mostly reflects endogenously driven emotional inflexibility and that it indicates low emotion regulation abilities or alterations in emotional responding (Koval et al., 2016). Conversely, it is also assumed that all emotional experiences (independently from the context in which they happen) are regulated at least in some way (Frijda, 2006) and that emotion regulation deeply influences the time course and dynamic fluctuation of emotions (Kuppens et al., 2010). Therefore, the study of emotional inertia also pertains to emotion regulation.

## Inertia of negative emotions at work

The above results fit well with the organizational literature suggesting that negative emotions have a stronger influence on attitudes and behaviour than positive emotions (Weiss & Cropanzano, 1996). NE inertia may be particularly relevant for organizational researchers for several reasons. First of all, high NE inertia may result from a condition of resource depletion (for instance as the consequence of prolonged exposure to job stressors). Following Bakker and Costa (2014), chronic exhaustion may represent a possible antecedent of NE inertia in the workplace. Specifically, NE inertia may follow from a state of chronic emotional exhaustion and thus contribute to strengthen the workers' loss cycle. According to COR (Hobfoll, 1989), workers who deal with emotions that persist for long time and that are not much amenable to change, may be further depleted by the resources necessary to successfully fulfil the requests of their role. Interestingly, recent evidence suggests that NE inertia at work is associated with low heart rate variability, a physiological marker of work-related stress and psychological flexibility (De Longis et al., 2020; Togo & Takahashi, 2009). With regard to NE inertia possible outcomes in the workplace, at the group and organizational levels the persistence of negative emotions determined by NE inertia may increase the likelihood that they are shared or transferred to other people at work (Hatfield et al., 1994), and thus have an impact on group climate and group performance (see Ashkanasy & Humphrey, 2011 for a review). This way, individual levels of NE inertia may have a more general impact on organizational functioning. At the individual level, on the other hand, workers might be hard hit by negative events such as interpersonal conflicts, provocations, or frustrations, as the experience of a momentary increase in negative emotions elicited by these events

may take more time to dissipate, and in fact become persistent, for individuals high in NE inertia. Differently stated, workers high in NE inertia tend to get stuck in feelings of sadness or angriness and have to struggle in order to move on even after circumstances have changed. Nonetheless, following Spector and Fox (2002), one may expect that such a prolonged experience of negative emotions may lead individuals to enact counterproductive work behaviours (CWB). These behaviours have indeed been linked to the experience of negative emotions (Neuman & Baron, 2005; Spector & Fox, 2005).

## The present studies

Motivated by the above considerations, we conducted two studies aimed at investigating NE inertia at work and its correlates in the workplace. The first study was devoted at exploring the relation between exhaustion—the core component of burnout syndrome (Maslach et al., 2001)—and NE inertia. Moving within the theoretical framework of COR theory, we examined if a condition of resources depletion (i.e. chronic exhaustion) may be related to impaired emotion regulation in terms of NE inertia. The second study aimed at replicating findings from the first study as well as examining and clarifying the organizational correlates of NE inertia. To this end, we focused on the association between NE inertia, negative emotions, and important extra-role behaviours, namely Counterproductive Work Behaviour (CWB). As we explain below, we hypothesized that NE inertia may act as a moderator in the relationship between negative emotions and CWB, so that the relationship will be stronger for those workers with high levels of NE inertia. In the following paragraphs, we develop our hypotheses.

## Study 1: Exhaustion is an antecedent of emotional inertia

Exhaustion consists in the feeling that one's emotional, cognitive and physical resources are depleted, and it reflects a core component of job burnout, a psychological syndrome that results from chronic job stressors (Maslach & Jackson, 1981; Maslach et al., 2001). A large body of research indicates that exhaustion is associated with a number of negative individual and organizational outcomes (see Bakker & Costa, 2014). According to Bakker and Costa (2014), employees experiencing consistently highly demanding working environments may, over time, see their experience of fatigue transforming into chronic exhaustion. Therefore, they may show self-undermining behaviours, impaired job performance, and a reduced ability to manage emotions (Bakker & Costa, 2014). At present, however, the mechanisms linking chronic exhaustion to daily experiences and behaviours at work are poorly understood (Bakker & Costa, 2014).

COR theory (Hobfoll, 1989) postulates that chronic exhaustion occurs when individuals face a net loss of physical, cognitive or emotional resources, following a prolonged experience of work-related stress (Hobfoll & Shirom, 2001). COR theory also states that because individuals strive to protect and maintain their resources, resource losses are more salient than resource gains, thus having a powerful impact which affects individuals more rapidly and at a growing speed over time (Hobfoll et al., 2018; Hobfoll & Shirom, 2001). Of special interest for the present study is a key COR theory principle, namely that individuals confronted with resource loss rather than resorting to active coping, often tend to take a defensive posture with the aim of protecting their resource reserve, limit the loss and to keep left resources available to cope with future loss threats (Hobfoll, 2001). This defensive mode can either lead to a successful adjustment and acquisition of new resources (i.e. secondary gain), or, on the contrary, to maladjustment and eventually to negative functional and emotional outcomes (i.e. secondary losses; Hobfoll, 2001). This principle of COR can therefore explain why chronic exhaustion may

have consequences in terms of emotional dynamics: A limited resource availability naturally reduces emotional adaptability to the environment. Individuals who experience high levels of exhaustion may in fact be too drained to allocate resources toward emotion regulation efforts. Stated differently, it is likely that exhausted employees, being depleted by the resources they need to dynamically adapt their emotional states to external changes, may attempt to protect their remaining resources by not investing in emotion regulation and thus "getting affectively stuck" (Koval et al., 2012, p. 1413), as reflected in emotions that are resistant to change (i.e. emotional inertia). As a defensive withdrawal generally occurs when resources are outstretched or exhausted, it seems reasonable that chronic exhaustion may represent an antecedent of NE inertia (Hobfoll et al., 2018). Indeed, a defensive mode may imply the reduced use of active emotion regulation (e.g. NE inertia) and increase the vulnerability to future losses, and this typically occurs when individuals' resource pool is too depleted to allow them to act otherwise (Hobfoll, 2001).

Following this reasoning, it is likely that initial levels of chronic exhaustion may predict an emotional slowing down, reflected in high levels of NE inertia, regardless of the negative emotion's intensity. Accordingly, because emotions are not actively regulated, chronic exhaustion as a typical strain symptom may be related to high levels of NE inertia. In this way, negative emotions experienced by workers with high levels of exhaustion may be less tuned and thus less affected by external or internal changes and, for this reason, slow to dissipate (Kuppens et al., 2010). Moreover, according to COR, the risk for these workers would be the occurrence of loss cycles derived from their reduced emotional flexibility (Hobfoll, 2001). Thus, our first hypothesis is that initial levels of chronic exhaustion positively predict high levels of NE inertia.

**Hypothesis 1** *Exhaustion predicts high NE inertia.*

### Controlling for potential confounders

Previous research has reported an association of NE inertia with several person-level and processual factors. For instance, evidence indicates an association of NE inertia with self-esteem and neuroticism (e.g. Heimpel et al., 2002; Hemenover, 2003). In addition, the effect of gender has been also usually controlled in these studies. Moreover, Koval et al. (2016) suggested that to reliably determine if NE inertia is attributable to endogenous (e.g. chronic exhaustion) rather than exogenous (e.g. differential exposure to events) factors, it is important to control for the exposure to negative events. Therefore, in this study we controlled for gender, neuroticism, and self-esteem at the person level, and negative work events at the within-person level.

## METHOD

### Sample

Participants were 128 workers (61.7% female) who work with the public (i.e. who directly interact with the recipients of their service). The average age was 35.8 years ($SD = 12.9$), and the average job tenure was 10.5 years ($SD = 11.2$). Participants worked in different professions and occupational sectors: 19 per cent worked in the sales sector, 13.2 per cent worked in the health sector, 12.2 per cent worked in the education sector, 11.6 per cent were technical professional, 2.6 per cent were police officers, and the remaining 41.4 per cent were employees in various fields.

## Procedure

A first group of participants was recruited by the first authors and a research assistant, then participants were recruited mostly via online advertisement, but also via word of mouth. Eligibility criteria were (a) interacting with the recipients of their work (in person or by phone) and (b) working shifts of at least five consecutive hours. One week before the ESM study began (T0), socio-demographic data were collected, as well as exhaustion, self-esteem and neuroticism. Participants also provided their work schedule for the week of the ESM study, including their daily start and end times as well as breaks from work. All participants provided informed consent. Starting from the following Monday, participants were prompted by a tone signal on their mobile phone six times per day during working hours for five working days, making a total of 30 prompts. Participants were prompted at random times with a time interval between two prompts that varied depending on the number of hours per shift (e.g. for a six-hour workday, participants were prompted at intervals of about 50 min). After they were prompted, participants had 10 or 20 min to fill in the survey, depending on the length of the work shift (e.g. for a five-hour shift, participants had 10 min to fill a questionnaire, for an eight hours' shift, participants had 20 min to fill a questionnaire).

## Measures

**Exhaustion ($\alpha = .84$).** Exhaustion was measured at T0 by using the five items (e.g. "I feel used up at the end of the workday") of the Maslach Burnout Inventory—General Survey (Schaufeli et al., 1996). Response scale: 1 = "Never"; 5 = "Daily".

**Self-esteem ($\alpha = .77$).** At T0, we measured self-esteem with the ten items of the Rosenberg Self-Esteem scale (Rosenberg, 1965; e.g. "On the whole, I am satisfied with myself") scored on a 4-point scale (1 = "Strongly disagree"; 4 = "Strongly agree").

**Neuroticism ($\alpha = .81$).** At T0, neuroticism was measured by means of 12 items (e.g. "Usually I don't lose my calm") drawn by the Big Five Questionnaire-2 (BFQ-2; Caprara et al., 1993). Participants used a 5-point scale (1 = "Very false for me" to 5 = "Very true for me") to rate their agreement with the degree to which each item described them by using.

**NE inertia.** Six times per workday, participants rated their *current* levels of negative emotions. Participants reported the degree to which they were feeling each of nine negative emotions (angry, anxious, ashamed, disgusted, frustrated, guilty, irritable, restless, sad) by using a slider scale from 0 to 100. The nine negative emotions were drawn from various sources (e.g. Ekman et al., 1972; Watson et al., 1988) and were selected to represent different levels of activation (Russell, 2003). The between- and within-person reliability was calculated by following the procedure indicated by Bonito et al. (2012), in which the variance components from the unconditional model are used to estimate the intraclass correlation for the outcome variable (formulae 5 and 6). The between-person reliability was .83 and the within-person reliability was .78. These values can be considered substantial (Shrout, 1998). In line with previous research (e.g. Koval et al., 2016; Kuppens et al., 2010), we computed NE inertia by estimating two-level autoregressive models (these models are detailed in the statistical analyses section).

**Negative work events.** Negative work events were assessed at each prompt with a 4-item checklist ("Had a conflict with a co-worker", "Had a heavy workload", "Had to work fast", "I felt unwell") adapted from Gable et al. (2000). The checklist contained relatively frequent work events (see also Basch & Fisher, 2000). Each item was scored on a 6-point scale (0 = "It did not happen", 5 = "It happened and it was extremely important"). The four events were averaged to compute a composite

(formative) index. Given that events are potentially independent among them, the alpha coefficient is not an adequate index of reliability for this checklist (i.e. it refers to a formative construct).

## Statistical analyses

All statistical analyses were performed with SPSS 25.0. To test our hypotheses, we used multilevel modelling in order to take into account the nested data structure (prompts nested within individuals) and to estimate within- and between-person effects while handling time intervals between measurements and missing data (Snijders & Bosker, 1999). Statistical significance of parameters estimates was investigated using the bias-corrected bootstrap procedure with 10,000 resamples. We computed critical values for the upper and lower 95 per cent bias-corrected confidence limits for all parameter estimates and considered statistically significant ($p < .05$) all estimates with a confidence interval that did not comprise zero. All variables were square root transformed prior to analyses because some of them slightly deviated from normal distribution. Square root transforming all variables was, however, necessary in order to reduce deviations from multivariate (not only univariate) normality that resulted not negligible. Moreover, the transformation had benefit on standard errors (less wide) and ensured faster convergence times than for all models.

We compared several nested models: (a) a null model with only the intercept, and (b) following previous studies on emotional inertia (e.g. Koval et al., 2016; Kuppens et al., 2010), a two-level autoregressive (AR1) model with both a random intercept and a random autoregressive slope. In this model (i.e. Model 2), the Level 1 first order autoregressive slope of negative emotions (which represents NE inertia) was specified as follow:

$$NegativeEmotions_{ti} = \beta_{0i} + \beta_{1i}\left(NegativeEmotions_{t-1i}\right) + \beta_{2i}\left(NegativeWorkEvents_{t-1i}\right) + \varepsilon_{ti}. \quad (1)$$

In the above equation, Level-1 ($NegativeEmotions_{t-1}$) represents an individual $i$'s level of negative emotions at time $t-1$. $\beta_{1i}$ is a random slope that indicates the strength of the longitudinal association between negative emotions at adjacent time points, or the degree of emotional inertia and typically ranges from −1 to 1. Negative work events at $t-1$ are a control variable at Level-1.

Following recommendations by Enders and Tofighi (2007) and Hamaker and Grasman (2015), all Level 1 lagged predictors (i.e. Negative Emotions$_{t-1}$ and Negative Work Events$_{t-1}$) were person-mean centred in order to estimate a within person slope and to remove between person differences from Level-1 parameter estimates (see Judge et al., 2006). Under this parametrization, $\beta_{01}$ (i.e. the Level-1 intercept), represents each individual $i$'s level of negative emotions across all assessments. $\beta_{01}$ (i.e. the intercept), and $\beta_{1i}$ (i.e. the slope) varied randomly across individuals. At Level-2, exhaustion, neuroticism, and self-esteem were entered as grand-mean centred control variables, and sex was coded as 0 = females, 1 = males:

$$\beta_{0i} = \gamma_{00} + \gamma_{01}\left(\text{Exhaustion}_i\right) + \gamma_{02}\left(\text{Neuroticism}_i\right) + \gamma_{03}\left(\text{Self}-\text{esteem}_i\right) + \gamma_{04}\left(\text{Sex}_i\right) + r_{0i}, \quad (2)$$

$$\beta_{1i} = \gamma_{10} + r_{1i}; \quad (3)$$

$$\beta_{2i} = \gamma_{20} + r_{2i}. \quad (4)$$

To be parsimonious and keep the model simple, we tested for statistical significance the variances of random terms $r_{1i}$ to $r_{3i}$ and eventually removed them from the model. Similarly, we tested for

significance the covariance between all random terms and eventually fixed it to zero. In Model 3, we tested Hypothesis 1 by entering individual exhaustion (grand mean centred, see Hamaker & Grasman, 2015) as a Level-2 variable as a predictor of the autoregressive slope (i.e. NE inertia). This allows us to test if the association between consecutive measures of negative emotions is contingent upon different levels (high vs. low) of exhaustion. Our final model is presented in the following equations:

$$\beta_{0i} = \gamma_{00} + \gamma_{01}\left(\text{Exhaustion}_i\right) + \gamma_{02}\left(\text{Neuroticism}_i\right) + \gamma_{03}\left(\text{Self}-\text{esteem}_i\right) + \gamma_{04}\left(\text{Sex}\right) + r_{0i}, \quad (5)$$

$$\beta_{1i} = \gamma_{10} + \gamma_{11}\left(\text{Exhaustion}_i\right) + r_{1i}. \quad (6)$$

The Level-2 equations for $\beta_{2i}$ remained unaltered. In the above equation, $\beta_{0i}$ represents the intercept or the average level of negative emotions and $\beta_{1i}$ is the slope, or the average association between previous and current negative emotions (i.e. average NE inertia) across the sample. $\gamma_{10}$ indicates the average level of NE inertia across the sample, and $\gamma_{11}$ represents the standardized regression weight between NE inertia and exhaustion. Hence, if we consider the case of a participant reporting a score on exhaustion higher than one standard deviation above the sample mean, and assuming an estimated $\gamma_{11}$ value of .40, it is predicted to have a NE inertia level higher of .40 units above the score reported by the average individual in the sample. To test the improvement of each model over the previous one, we used the difference between the respective likelihoods and degrees of freedom associated with the models presented above.

# RESULTS

## Descriptive statistics and correlations of level 2 variables

On average, prompts occurred at an interval of 59.90 min ($SD = 21.43$). The completion rate was 98 per cent. The average time required to complete a survey was 2 min and 33 s. As shown in Table 1, all correlations were significant and in the expected direction, except for those of negative events with (a) neuroticism, and (b) and self-esteem, and (c) negative emotions with self-esteem.

**TABLE 1** Means, standard deviations, and correlations among Study 1 variables at Level-1 and Level-2

| | Mean | *SD* | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|---|
| 1. Neuroticism | 3.01 | .78 | | – | – | – | – | – |
| 2. Self-esteem | 1.93 | .38 | −.37** | | – | – | – | – |
| 3. Exhaustion | 2.20 | .92 | .38** | −.19* | | – | – | – |
| 4. Negative work-events | 1.68 | .49 | .08 | −.06 | .29** | | .23** | – |
| 5. Negative emotions | 10.09 | 10.35 | .43** | .13 | .39** | .29** | | .77** |
| 6. Negative emotions$_{t-1}$ | 10.09 | 10.37 | – | – | – | – | – | – |

*Note:* Level-1 (or "prompt level") correlations are presented above the diagonal; Level-2 (or "individual level") correlations are presented below the diagonal. Correlations for negative emotions$_{t-1}$ are not reported as they are the same as those presented for the non-lagged variable (negative emotions).

L1 observations = 3791; L2 observations = 128.

*$p < .05$;**$p < .01$.

## Preliminary analyses

Before conducting our analyses, we examined if negative emotions and negative work events fluctuated within individuals. Partitioning of the total variance into within-person and between-person variance indicated that 65 per cent of the variance of negative emotions and 29 per cent of the variance of negative work events was within persons. These analyses suggest that a substantial percentage of the variance in these variables can be attributed to within-person variation.

Then, we estimated average levels of NE inertia by including in the above model at Level-1 only the uncentred lagged Negative Emotionst-1 (see Hamaker & Grasman, 2015) with no Level-2 predictors. This allow to obtain an unbiased estimate of NE inertia and it is the recommended procedure for multilevel autoregressive models in which the level 1 predictor is the lagged outcome variable (see Hamaker & Grasman, 2015). In this model, the autoregressive parameter ($\gamma_{10}$) which represents NE inertia was positive and significant and moderately high in size (i.e. 0.42, $SE = 0.02$, $p < .001$, 95% BCB [0.38, 0.46]).

## Multilevel analyses

Table 2 displays the results from multilevel analyses. Model 1, including negative work events as Level 1 control variable, as well as exhaustion, gender, neuroticism, and self-esteem as Level 2 control variables fitted the data better compared to the null model. NE inertia estimates were similar to those reported above. All covariates (except self-esteem and negative work events) significantly predicted mean levels of negative emotions. Model 2, in which the association between current and previous intensity of negative emotions was specified as random, fitted the data better than Model 1. In Model 3, we examined if the strength of this association (i.e. NE inertia) was moderated by individuals' average levels of chronic exhaustion. Indeed, chronic exhaustion predicted how strong the relationship was, supporting *Hypothesis 1*. Moreover, Model 3 showed a better fit than Model 2 (see Table 2). In line with Hypothesis 1, the association between previous levels of negative emotions and current levels of negative emotions was stronger when exhaustion was high (+ 1 *SD*: $B = .40$; $SE = .08$; $p < .001$) than when it was low (− 1 *SD*: $B = .33$; $SE = .03$; $p < .001$). The relationship between previous negative emotions and current negative emotions as a function of chronic exhaustion is displayed in Figure 1.

Finally, we performed all analyses without control variables and the results did not change.

## Robustness check

Given that participants worked a different number of hours per day, we conducted additional analyses to check if the length of the lag between prompts affected the strength of the time-lagged relationship between previous negative emotions and concurrent negative emotions. Although multilevel models are able to control for different spacing among successive assessments (Snijders & Bosker, 1999), we repeated the analyses including the interaction between the length of the lag (computed as the minutes between two consecutive measurements) and the time-lagged effect of negative emotions. Although the term representing this interaction turned out to be significant ($B = -.00$, $SE = 0.00$, $p = .002$), this did not affect the significance of the relationship between chronic exhaustion and NE inertia. We also tested a three-way interaction involving negative emotions at the previous time point, time lag and exhaustion. However, this term did not turn out statistically significant ($B = .000$, $SE = 0.00$, $p = .056$).

**TABLE 2** Multilevel models examining the relation between chronic exhaustion and NE inertia (Study 1)

| | Null model | | | Model 1 | | | Model 2 | | | Model 3 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Estimate (*SE*) | *p* | CI | Estimate (*SE*) | *p* | CI | Estimate (*SE*) | *p* | CI | Estimate (*SE*) | *p* | CI |
| *Variables* | | | | | | | | | | | | |
| **Level 2** | | | | | | | | | | | | |
| Intercept ($\gamma_{00}$) | 2.536 (.137) | .000 | 2.57, 2.50 | 2.548 (.022) | .000 | 2.58, 2.50 | 2.544 (.021) | .000 | 2.57, 2.51 | 2.544 (.021) | .000 | 2.41, 2.329 |
| Exhaustion ($\gamma_{01}$) | – | – | – | 1.611 (.067) | .000 | 1.73, 1.49 | 1.611 (.064) | .000 | 1.73, 1.49 | 1.611 (.064) | .000 | 1.73, 1.49 |
| Neuroticism ($\gamma_{02}$) | – | – | – | 2.38 (.082) | .000 | 2.53, 2.23 | 2.38 (.079) | .000 | 2.52, 2.23 | 2.38 (.080) | .000 | 2.52, 2.24 |
| Self-esteem ($\gamma_{03}$) | – | – | – | −.219 (.164) | .176 | .07, −.52 | −.221 (.159) | .158 | .072, −.51 | −.221 (.159) | .161 | .066, −.50 |
| Gender ($\gamma_{04}$) | – | – | – | −.121 (.039) | .002 | −.051, −.193 | −.121 (.038) | .001 | .06, .19 | −.121 (.038) | .001 | −.058, −.189 |
| **Level 1** | | | | | | | | | | | | |
| Negative emotions$_{t-1}$ ($\gamma_{10}$) | – | – | – | .370 (.025) | .000 | .42, .32 | .364 (.018) | .000 | .39, .33 | .363 (.019) | .000 | .391, .331 |
| Negative work events$_{t-1}$ ($\gamma_{20}$) | – | – | – | .045 (.085) | .601 | .20, −.11 | .026 (.085) | .758 | .127, −.159 | .026 (.085) | .761 | .14, −.11 |
| **Cross level interaction** | | | | | | | | | | | | |
| Exhaustion*NE$_{t-1}$ ($\gamma_{11}$) | – | – | – | – | – | – | – | – | – | .103 (.056) | .033 | .14, .02 |
| L−1 Residual($\varepsilon_{ti}$) | 1.26 (.030) | .000 | 1.32, 1.20 | 1.028 (.024) | .000 | 1.08, .98 | .987 (.024) | .000 | 1.04, .94 | .988 (.024) | .000 | 2.23, 1.35 |
| Intercept variance ($\tau_{00}$) | 2.36 (.300) | .000 | 3.03, 1.84 | 1.736 (.222) | .000 | 2.23, 1.35 | 1.738 (.223) | .000 | 2.23, 1.35 | 1.738 (.222) | .000 | 2.23, 1.35 |
| Slope variance ($\tau_{11}$) | – | – | – | | | | .025 (.006) | .000 | .04, .02 | .024 (.006) | .000 | .040, .014 |
| −2 Log (lh) | 11,888.40 | | | 10,584.19 | | | 10,516.80 | | | 10,514.96 | | |
| *df* | 3 | | | 9 | | | 10 | | | 11 | | |
| Difference of −2 Log | – | | | 1304.21 | | | 67.39 | | | 1.84 | | |
| Difference in *df* | – | | | 6 | | | 1 | | | 1 | | |

*Note:* All variables (but gender) were square root transformed. The random effect associated with "Negative work events" was tested and found to be statistically not significant. Therefore, it was removed from the model. Likewise, the covariance between the intercept and the random slope was tested and (being not statistically significant) was removed from the model. Number of observations: 3791.

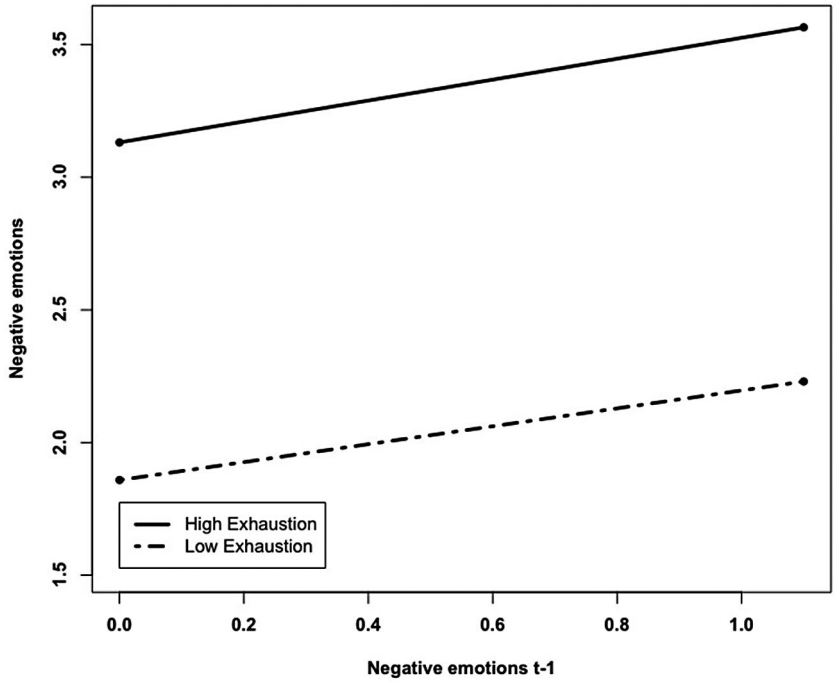


**FIGURE 1** Prediction of concurrent negative emotions by previous negative emotions as a function of chronic exhaustion (Study 1)

## Discussion of Study 1 findings

Although previous studies showed that NE inertia is associated with a number of indicators of maladjustment and psychological wellbeing (e.g. Houben et al., 2015; Koval et al., 2016; Kuppens et al., 2010), its correlates in the work setting remained mostly unexplored. Accordingly, this first study aimed to expand previous research by investigating the association of chronic exhaustion at work with NE inertia.

Following COR theory tenets (Hobfoll, 2001) and moving from the assumption that individuals experiencing chronic exhaustion may not possess the resources necessary to continually adapt emotional responding to ongoing events, we found support for the hypothesis that initial levels of chronic exhaustion—representing a condition of resources depletion (Hobfoll & Shirom, 2001)—may be associated to emotional dysfunctions mostly represented by emotional inflexibility (Koval et al., 2012; Kuppens et al., 2012). All in all, these findings are in line with recent evidence of an association between NE inertia and low HRV at work (De Longis et al., 2020), and suggest that chronic exhaustion may represent an antecedent of NE inertia at work, as it is associated with an impaired ability to adapt negative emotional states to environmental or psychological demands. At the individual level, this reduced ability results in negative emotional states that change slowly and persist over time during the workday.

From a theoretical point of view, the present study extends the current literature on the least researched principle of COR theory (Hobfoll et al., 2018), by examining how exhausted employees may manage their emotional resources at work. The link between chronic exhaustion and NE inertia sheds light on the impact of initial levels of chronic exhaustion on subsequent (lack of) emotion dynamics at work. This means that the functional capacity to regulate one's emotional states may be impeded,

manifesting itself in a slowing down of emotional experiences. Furthermore, the capacity to fine-tune emotional states in accordance with external contingencies is a key aspect of the coping process (Eisenberg et al., 1997). Workers who lack the ability to self-regulate their negative emotions are at higher risk to respond inappropriately to stressful conditions. In addition, by lacking the flexibility to emotionally adapt to ongoing events, they may be particularly vulnerable to stressors and thus show a reduced ability to recover from stress. Overall, these findings provide a picture of everyday emotional experiences of workers experiencing chronic exhaustion, by examining for the first time the temporal dynamics of their negative emotions.

We further tested the robustness of these results in Study 2, in which we also examined in deeper detail the association of NE inertia with organizational behaviour.

## Study 2: The role of NE inertia in the prediction of counterproductive work behaviour

The aims of this second study were twofold. The first aim was to replicate results from Study 1 in a different sample of workers. The second aim was to further investigate the correlates of workers' NE inertia in terms of organizational behaviour. We focused on a specific class of organizational behaviours, namely counterproductive work behaviours (CWB). CWB consist of employees' intentional acts that harm organizations or their stakeholders (Spector & Fox, 2005). We decided to focus on CWB because according to the Spector and Fox (2002) model, negative emotions play a central role in eliciting this form of voluntary behaviour at work. Moreover, CWB represent a frequent and costly phenomenon for organizations, as they lead to reduced productivity, increased turnover and absenteeism, as well as reduced wellbeing (e.g. Einarsen et al., 2003; LeBlanc & Kellowey, 2002). While previous research provides evidence on the association between negative events or stressors, negative emotions, and CWB (e.g. Penney & Spector, 2005; Rodell & Judge, 2009), this study focuses on the relationship between negative emotions and CWB and extends the current literature by taking into account the role of time, in terms of duration of negative emotional experiences at work (i.e. NE inertia). As maintained by Dalal and Hughes (2020), NE inertia, as a key feature of emotion dynamics and being strictly related to emotion regulation may be highly relevant to the understanding of CWB.

The emotion-centered model of voluntary work behaviour views CWB as the result of their interaction with work environment (Spector & Fox, 2005). Being the source of several needs' fulfilment, the workplace represents an environment that can elicit strong emotional reactions (Spector & Fox, 2002). Workers tend to monitor the environment and to emotionally react to those situations that are considered relevant for their wellbeing. Their emotional experiences in turn, may affect workers' behaviour and action tendencies either immediately, or at a later time (Spector & Fox, 2002). Specifically, CWB are associated with workers' action tendencies deriving from general states of physiological arousal induced by specific affective states. As argued above, workers are expected to change their affective state as a consequence of events happening over time. Notably, perceiving stressors or frustrating conditions lead workers to experience negative emotional feelings at work, which are then expected to contribute to the formulation of behavioural intentions and thus to specific behavioural reactions. Thus, emotional experiences play a crucial role in this process, as they represent an immediate reaction to stress. More precisely, Spector and Fox (2002) maintained that the behavioural response prompted by the experience of negative emotions may result in openly destructive action (corresponding to CWB). CWB, in fact, is often conceptualized as a form of behavioural strain that can be enacted to cope with or show negative emotions (Hunter & Penney, 2014). Accordingly, we posited the following hypothesis.

**Hypothesis 2** *The experience of negative emotions has a positive lagged relationship with CWB.*

Where does NE inertia enter in this relation? Emotional inertia reflects an increased likelihood of a negative emotional state experienced at one moment being carried over to the next moment (Kuppens et al., 2010). Thus, the impact of experiencing negative emotions is expected to be stronger for those workers displaying high levels of NE inertia and high negative emotions. The reason is that these workers are indeed unable of managing, controlling and modulating their negative emotions, even when the event that caused them has passed. Thus, their negative feelings remain persistently high over time because they are unable to let them dissipate. If so, NE inertia is expected to moderate the postulated lagged association between negative emotions and CWB. High and long-lasting levels of negative emotions should make individuals more susceptible to any environmental cues (i.e. interpersonal conflicts, provocations, frustrations, etc.) that may potentially trigger CWB. On the contrary, workers experiencing low levels of negative emotions, but reporting high NE inertia, are expected to be less susceptible to CWB because they are less reactive to any environmental cue that could trigger CWB. Such reasoning is in line with previous evidence of an association between emotion regulation strain and CWB (see Hunter & Penney, 2014). This should not be surprising, since Spector and Fox (2002) maintained that negative emotions do not necessarily lead to CWB, but they increase the likelihood of engaging in CWB, which can occur under certain condition. Occasional negative emotional experiences, in fact, should not have much impact on behavioural tendencies, while repeated and cumulative negative experiences will be summative and thus enhance the likelihood of CWB (Spector & Fox, 2002). Hence, we hypothesized as follows:

**Hypothesis 3** *NE inertia acts as a moderator in the lagged positive relationship between negative emotions and CWB.*

Of importance, in testing these hypotheses we controlled for all covariates considered in the previous study, including chronic exhaustion, which was a significant predictor of NE inertia in Study 1, and CWB at the previous time. Notably, given that in the emotion-centered model negative work events are considered prime triggers of negative emotions and distal antecedents of CWB, adjusting for them can further refine our understanding of the specific impact of NE inertia on the association between negative emotions and CWB.

# METHOD

## Sample and procedure

Participants were 116 workers who worked directly with the public. Most participants (62.6%) were female. Average age was 43.3 years ($SD = 12.8$). Participants worked in different professions: 21.1 per cent of participants worked in the health sector, 18.8 per cent working in the sales sector, 15.6 per cent working as technical professionals, 6.6 per cent working in the education sector, 2.5 per cent of working as police officers, and the remaining 35.4 per cent working in o fields. The average job tenure was 15.6 years ($SD = 11.9$). The procedure we followed was the same as in Study 1: after providing their work schedule for the study week, participants were asked to complete six brief surveys per day, for five working days (making a total of 30 prompts) during working hours.

## Measures

To measure exhaustion ($\alpha = .84$), self-esteem ($\alpha = .76$), neuroticism ($\alpha = .91$), negative emotions/NE inertia (between person reliability = .86; within person reliability = .76), and negative work events we used the same instruments as in Study 1. Time-lag was computed as in Study 1.

**CWB.** CWB was measured with three items (i.e. "I behaved in an unfriendly manner", "I gossiped about other people at work", and "I spent time on tasks unrelated to work") from the scale created by Dalal et al. (2009). Given the intensive nature of the study and the resulting potential burden on workers, we elected to assess only three behaviours that were likely to occur sufficiently frequently to allow good measurement (see Dalal et al., 2009). At each prompt, participants reported if they had or had not engaged in each behaviour since the previous survey. This resulted in a sum score that ranged from 0 (participant had not engaged in any behaviour) to 3 (participant had engaged in all behaviours).

## Statistical analyses

First, we aimed at a replication of the results from Study 1 by performing a first series of models and using the same statistical approach. Then NE inertia was computed as the autoregressive slope by estimating mixed models parameterized as previous Model 2 in Study 1 and following the analytical strategy described by Raudenbush and Bryk (2002). Essentially, we calculated and extracted the within individual estimate of the autocorrelation of negative emotions for each single participant within the overall mixed model described above. These estimates were then used as indicators of Level 2 NE inertia in all subsequent analyses.

To test Hypothesis 2 and Hypothesis 3, we conducted a distinct series of nested models, similar to the ones performed in Study 1. To test the lagged association between negative emotions and CWB (Hypothesis 2), we estimated a model in which $\mathrm{CWB}_{ti}$ was predicted by previous $\mathrm{CWB}_{t-1}$, Negative $\mathrm{Emotions}_{t-1}$, and by the same set of covariates included in Study 1 (Model 4 to Model 6). Note that the prediction of $\mathrm{CWB}_{ti}$ by Negative $\mathrm{Emotions}_{t-1}$ represents the main lagged relationship of negative emotions with CWB over time. The resulting equations for this model were:

$$\mathrm{CWB}_{ti} = \beta_{0i} + \beta_{1i}(\mathrm{CWB}_{t-1i}) + \beta_{2i}\left(NegativeEmotions_{t-1i}\right) + \beta_{3i}\left(NegativeWorkEvents_{t-1i}\right) + \varepsilon_{ti}. \quad (7)$$

$$\begin{aligned}\beta_{0\mathrm{i}} = {} & \gamma_{00} + \gamma_{01}\left(\mathrm{NE_Inertia}_i\right) + \gamma_{02}\left(\mathrm{Exhaustion}_i\right) \\ & + \gamma_{03}\left(\mathrm{Neuroticism}_i\right) + \gamma_{04}\left(\mathrm{Self-esteem}_i\right) + \gamma_{05}\left(\mathrm{Sex}_i\right) + r_{0i},\end{aligned} \quad (8)$$

$$\beta_{1\mathrm{i}} = \gamma_{10} + r_{1i}; \quad (9)$$

$$\beta_{2\mathrm{i}} = \gamma_{20} + r_{2i}; \quad (10)$$

$$\beta_{3\mathrm{i}} = \gamma_{30} + r_{3i}. \quad (11)$$

As in Study 1, the variances of random terms $r_{1i}$ to $r_{41}$ and the covariance between random terms were tested and, if not statistically significant, were fixed to zero. In Model 5, we examined if the strength of the relationship between $\mathrm{CWB}_{ti}$ and Negative $\mathrm{Emotions}_{t-1}$ varied randomly across participants. Then, in Model 6 we tested if the lagged association between negative emotions and CWB was moderated by NE inertia (Hypothesis 3). The Level-1 part of this model was the same as in Model

5. We expanded the Level-2 equations by entering the cross-level interaction between NE inertia and negative emotions as a predictor of CWB over time, as follows:

$$\beta_{0i} = \gamma_{00} + \gamma_{01}\left(\text{NE_Inertia}_i\right) + \gamma_{02}\left(\text{Neuroticism}_i\right) + \gamma_{03}\left(\text{Self - esteem}_i\right) + \gamma_{04}\left(\text{Sex}_i\right) + \gamma_{05}\left(\text{NegativeEmotions}_i\right) + r_{0i}, \quad (12)$$

$$\beta_{2i} = \gamma_{10} + \gamma_{11}\left(\text{NE_Inertia}_i\right) + r_{1i}. \quad (13)$$

As in Study 1, all Level-2 predictors were grand-mean centred, while all Level-1 predictors were person-mean centred (Enders & Tofighi, 2007; Hamaker & Grasman, 2015). The Level-2 equations for $\beta_{1i}$, and $\beta_{3i}$, remained unaltered. The *Hypothesis 3* is linked to the significance of the coefficient $\gamma_{11}$ that reflects how differences in NE inertia change the relationship between the experienced level of negative emotions and CWB.

# RESULTS

## Descriptive statistics and correlations of Level 2 variables

The average interval between prompts was 60.99 min ($SD$ = 22.22). The completion rate was 97 per cent. The average time required to complete a survey was 2 min and 41 s. Table 3 shows means, standard deviations and correlations among variables. Correlations were significant and in the expected direction, except for those of negative work-events with (a) neuroticism and (b) self-esteem. CWB was significantly and positively related only with negative emotions. NE inertia was significantly and negatively related with neuroticism, but positively with exhaustion and negative emotions.

**TABLE 3** Means, standard deviations, and correlations among Study 2 variables at Level-1 and Level-2

| | Mean | *SD* | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|---|
| 1. Neuroticism | 2.87 | .78 | | – | – | – | – | – |
| 2. Self-esteem | 1.82 | .31 | −.36** | | – | – | – | – |
| 3. Exhaustion | 2.20 | .89 | .30** | −.34** | | – | – | – |
| 4. Negative emotions | 9.83 | 11.04 | .42** | −.35** | .50** | | .27** | .12** |
| 5. Negative work-events | 3.12 | 1.74 | .12 | .01 | .18* | .32** | | – |
| 6. CWB | .35 | .33 | .13 | −.05 | .10 | .22* | .12 | |
| 7. NE inertia | .00 | .09 | .23* | .02 | .18* | .21* | .07 | .01 |

Level-1 (or "prompt level") correlations are presented above the diagonal; Level-2 (or "individual level") correlations are presented below the diagonal.

Note that emotional inertia is computed as a normal standardized variable and thus its mean is equal to 0. L1 observations = 3383; L2 observations = 116.

*$p < .05$; **$p < .01$.

**TABLE 5** Multilevel estimates for models testing the association between NE inertia, negative emotions and CWB.

| | Null Model | | | Model 4 | | | Model 5 | | | Model 6 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Estimate (*SE*) | *p* | CI | Estimate (*SE*) | *p* | CI | Estimate (*SE*) | *p* | CI | Estimate (*SE*) | *p* | CI |
| *Variables* | | | | | | | | | | | | |
| **Level 2** | | | | | | | | | | | | |
| Intercept ($\gamma_{00}$) | .182 (.014) | .000 | .21, .15 | .184 (.006) | .000 | .20, .17 | .184 (.006) | .000 | .20, .17 | .184 (.006) | .000 | .20, .17 |
| NE Inertia ($\gamma_{01}$) | – | – | – | −.106 (.061) | .070 | .02, −.23 | −.135 (.065) | .047 | .09, −.31 | −.105 (.060) | .066 | .02, −.23 |
| Exhaustion ($\gamma_{02}$) | – | – | – | .039 (.019) | .026 | .08, .00 | .037 (.019) | .042 | .08, .00 | .038 (.019) | .036 | .07, .00 |
| Neuroticism ($\gamma_{03}$) | – | – | – | .070 (.024) | .003 | .12, .02 | .070 (.024) | .003 | .12, .02 | .070 (.024) | .003 | .139, .02 |
| Self-esteem ($\gamma_{04}$) | – | – | – | .021 (.045) | .624 | .07, −.044 | .011 (.017) | .505 | .024, −.044 | .015 (.046) | .750 | .06, −.10 |
| Gender ($\gamma_{05}$) | – | – | – | .001 (.010) | .945 | .020, −.11 | .001 (.046) | .835 | .06, −.09 | .001 (.009) | .916 | .02, −.02 |
| **Level 1** | | | | | | | | | | | | |
| $CWB_{t-1}$ ($\gamma_{10}$) | – | – | – | .044 (.014) | .001 | .07, .02 | .042 (.014) | .005 | .06, .02 | .043 (.014) | .003 | .05, .02 |
| Negative $emotions_{t-1}$ ($\gamma_{20}$) | – | – | – | .007 (.005) | .121 | .02, −.00 | .006 (.005) | .102 | .01, −.00 | .004 (.005) | .303 | .01, −.00 |
| Negative $work\ events_{t-1}$ ($\gamma_{30}$) | – | – | – | .017 (.024) | .463 | .06, −.03 | .015 (.025) | .524 | .05, −.03 | .017 (.024) | .482 | .05, −.03 |
| **Cross level interaction** | | | | | | | | | | | | |
| Neg. $emotions_{t-1}$*NE Inertia ($\gamma_{11}$) | – | – | – | – | – | – | – | – | – | .097 (.043) | .000 | .21, .01 |
| L−1 Residual($\varepsilon_{ti}$) | .061 (.002) | .000 | .06, .05 | .061 (.002) | .000 | .061, .056 | .061 (.002) | .000 | .06, .05 | .061 (.002) | .000 | .06, .05 |
| Intercept variance ($\tau_{00}$) | .022 (.003) | .000 | .03, .02 | .022 (.002) | .000 | .030, .017 | .022 (.002) | .000 | .03, .02 | .022 (.002) | .000 | .03, .02 |
| Slope variance ($\tau_{11}$) | – | – | – | | | | .000 (.001) | .994 | .00, .00 | .000 (.002) | .697 | .02, .00 |
| −2 Log (lh) | | 415.93 | | 369.41 | | | 366.37 | | | 360.82 | | |
| *df* | | 3 | | 11 | | | 12 | | | 14 | | |
| Difference of −2 Log | | | | 46.52 | | | 3.04 | | | 5.55 | | |
| Difference in *df* | | | | 8 | | | 1 | | | 1 | | |

*Note:* A model in which CWB, negative work events, and Time-lag were allowed to vary randomly across participants was also tested, but these estimates resulted not statistically significant and overall results were confirmed. Therefore, those were removed from the model. Likewise, the covariance between the intercept and the random slope was tested and (being not statistically significant) was removed from the model. Number of observations: 3383.

## Preliminary analyses

As in Study 1, we first examined if negative emotions, CWB, and negative work events fluctuated within persons. For negative emotions 70 per cent of the total variance of was within persons; for CWB within-person variance was 28 per cent. For negative work events within-person variance was 29 per cent. These values indicate that a substantial amount of the variance in negative emotions, CWB and negative work events is due to within-person fluctuations.

We also examined the frequency of CWB: during 25.3 per cent of total prompts participants reported that they engaged in at least one CWB. Out of 116 participants, 8 of them never reported having engaged in CWB. In terms of specific behaviour, "I spent time on tasks unrelated to work" was the most frequent.

## Replicating results of Study 1

The degree of NE inertia was tested as in Study 1. Results of multilevel models testing the relationship between exhaustion and NE inertia are presented in Table 4. Negative emotions were autocorrelated over time, with a moderately high autoregressive parameter of .44 (Model 1). The pattern of results was essentially identical to that found in Study 1. Model 3 fitted the data better compared to Model 2: Indeed, the hypothesized cross-level interaction of chronic exhaustion at T0 with negative emotions$_{t-1}$ significantly predicted negative emotions at a later time point. Accordingly, as in Study 1, the strength of the association between previous negative emotions and current negative emotions was moderated by chronic exhaustion. Specifically, this relationship was stronger when chronic exhaustion was high (+ 1 *SD*: $B = .46$; $SE = .02$; $p < .001$) than when it was low (− 1 *SD*: $B = .34$; $SE = .02$; $p < .001$). The relationship between current negative emotions and previous negative emotion as a function of chronic exhaustion is represented in Figure 2. This direct replication is important because it brings additional evidence to the robustness of the finding. With respect to covariates, except negative work events, all covariates were significantly associated to mean levels of negative emotions. As in Study 1, we performed all analyses without covariates and all results did not change.

## Testing Hypothesis 2: The experience of negative emotions is positively associated with CWB

We examined if the experience of negative emotions at $t - 1$ predicted CWB. As displayed in Table 5, findings from Model 4 did not support our hypothesis, as the Level-1 slope linking previous negative emotional states to current CWB was not statistically significant. Workers reporting high level of negative emotions did not report an increase in CWB at the following measurement occasion.

## Testing Hypothesis 3: NE inertia increases the relationship between negative emotions and CWB

According with Hypothesis 3, workers characterized by higher levels of overall NE inertia were more likely to report CWB at the next time point when having experienced negative emotions. When entering the interaction between negative emotions and NE inertia, the model fit improved (Table 5). In line with Hypothesis 3, the relationship between previous negative emotions and CWB was stronger

**TABLE 4** Multilevel models examining the relation between chronic exhaustion and NE inertia (Study 2)

| | Null Model | | | Model 1 | | | Model 2 | | | Model 3 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Estimate (*SE*) | *p* | CI | Estimate (*SE*) | *p* | CI | Estimate (*SE*) | *p* | CI | Estimate (*SE*) | *p* | CI |
| *Variables* | | | | | | | | | | | | |
| **Level 2** | | | | | | | | | | | | |
| Intercept ($\gamma_{00}$) | 2.401 (.156) | .000 | 2.71, 2.09 | 2.519 (.021) | .000 | 2.56, 2.48 | 2.520 (.021) | .000 | 2.55, 2.48 | 2.520 (.020) | .000 | 2.55, 2.48 |
| Exhaustion ($\gamma_{01}$) | – | – | - | 2.425 (.066) | .000 | 2.54, 2.31 | 2.426 (.064) | .000 | 2.53, 2.31 | 2.427 (.064) | .000 | 2.53, 2.31 |
| Neuroticism ($\gamma_{02}$) | – | – | – | 1.923 (.081) | .000 | 2.07, 1.78 | 1.924 (.078) | .000 | 2.05, 1.79 | 1.924 (.079) | .000 | 2.06, 1.78 |
| Self-Esteem ($\gamma_{03}$) | – | – | – | −1.955 (.169) | .000 | −2.26, −1.64 | −1.956 (.165) | .000 | −2.05, −1.78 | −1.956 (.163) | .000 | −2.24, −1.67 |
| Gender ($\gamma_{04}$) | – | – | – | −.407 (.034) | .000 | −.34, −.47 | −.408 (.033) | .000 | −.34, −.47 | −.408 (.033) | .000 | −.34, −.47 |
| **Level 1** | | | | | | | | | | | | |
| Negative emotions$_{t-1}$ ($\gamma_{10}$) | – | – | – | .444 (.022) | .000 | .49, .40 | .410 (.019) | .000 | .41, .39 | .404 (.019) | .000 | .404, .381 |
| Negative work events$_{t-1}$ ($\gamma_{20}$) | – | – | – | −.067 (.088) | .444 | .09, −.23 | −.085 (.088) | .332 | .05, −.24 | −.090 (.089) | .311 | .059, −.25 |
| **Cross level interaction** | | | | | | | | | | | | |
| Exhaustion*NE$_{t-1}$ ($\gamma_{11}$) | – | – | – | – | – | – | – | – | – | .209 (.058) | .000 | .23, .13 |
| L−1 Residual($\varepsilon_{ti}$) | 1.21 (.029) | .000 | 1.27, 1.15 | .896 (.033) | .000 | .87, .86 | .870 (.034) | .000 | .87, .75 | .870 (.034) | .000 | .87, .75 |
| Intercept variance ($\tau_{00}$) | 2.80 (.373) | .000 | 3.64, 2.16 | 1.80 (.041) | .000 | 1.98, 1.70 | 1.80 (.041) | .000 | 1.98, 1.69 | 1.80 (.033) | .000 | 1.98, 1.70 |
| Slope variance ($\tau_{11}$) | – | – | – | | | | .019 (.008) | .062 | .04, .01 | .015 (.008) | .448 | .03, .01 |
| −2 Log (lh) | 11,098.61 | | | 9550.25 | | | 9510.45 | | | 9502.35 | | |
| *df* | 3 | | | 9 | | | 10 | | | 10 | | |
| Difference of −2 Log | – | | | 1596.26 | | | 39.80 | | | 8.10 | | |
| Difference in *df* | – | | | 7 | | | 1 | | | 1 | | |

*Note:* All variables (but gender) were square root transformed. The random effect associated with "Negative work events" was tested and found to be statistically not significant. Therefore, it was removed from the model. Likewise, the covariance between the intercept and the random slope was tested and (being not statistically significant) was removed from the model. Number of observations: 3383.

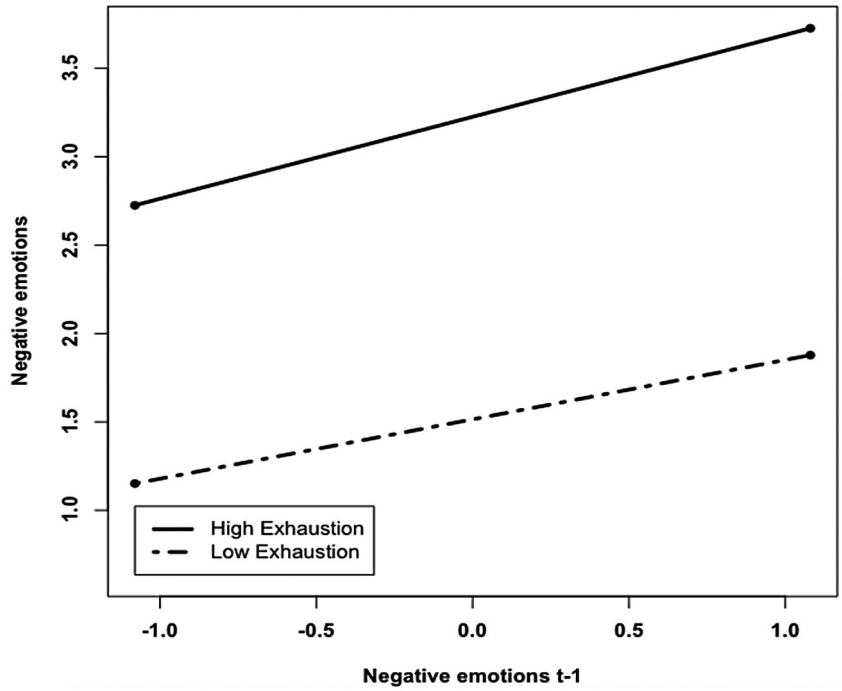


**FIGURE 2** Prediction of concurrent negative emotions by previous negative emotions as a function of chronic exhaustion (Study 2)

when NE inertia was high (+ 1 *SD*: $B = .04$; $SE = .01$; $p < .001$, 95% CI [.06, .02]) than when it was low (− 1 *SD*: $B = .02$; $SE = .01$; $p = .08$, 95% CI [.06, −.01]). The observed relationship between negative emotions and CWB as a function of NE inertia is displayed in Figure 3. As shown, workers reporting high levels of negative emotions and high NE inertia engaged more in CWB than workers high in negative emotions, but low in NE inertia. Workers experiencing low levels of negative emotions and high level of NE inertia reported lower levels of CWB than workers experiencing low level of negative emotions and low NE inertia.

## Ancillary analysis

To further rule out the interpretation that the higher impact of previous negative emotions on CWB was simply attributable to a state of irritability stimulated by a higher level of chronic exhaustion, we also tested, in a different model, the role of chronic exhaustion as a cross-level moderator of the relationship between previous negative emotions and subsequent CWB. This parameter was not significant ($B = .002$, $SE = 0.01$, $p = .589$).

## Discussion of study 2 findings

Using a relatively large and diverse sample of workers, but using the same methodology as in Study 1, results from this second study further demonstrated the significant association between chronic exhaustion and NE inertia at work. Whereas these findings need to be replicated in future studies, we

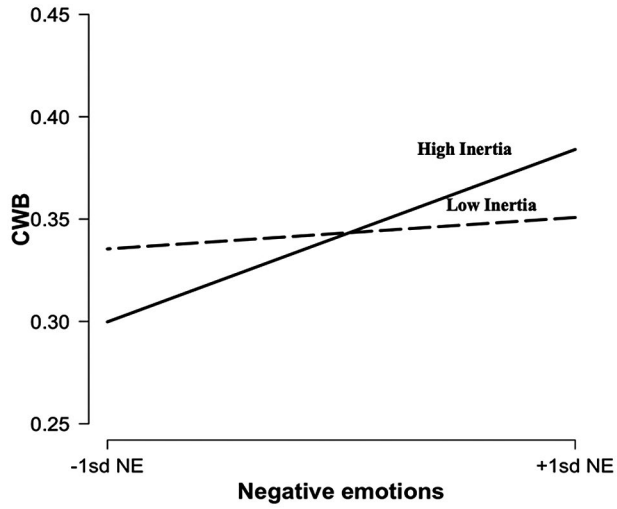


**FIGURE 3** Prediction of CWB by lagged negative emotions as a function of NE inertia. CWB = counterproductive work behaviour; NE= negative emotions.

consider the idea that high levels of chronic exhaustion are related to high levels of NE inertia at work is sufficiently supported. A second important finding of this study refers to the impact of NE inertia on the relationship between the experience of negative emotional states and CWB. In contrast with our prediction, the experience of negative emotions itself did not predict the enactment of CWB. Instead, it was the persistence of negative emotions over time that increased the likelihood that CWB would occur. However, this result is consistent with previous findings by Dalal et al. (2009) that found a significant concurrent association between affect and CWB, but not a lagged one. Our results suggest that the experience of high negative emotions may be related to a higher tendency to enact CWB only for those workers who are unable to let their negative feelings dissipate (i.e. high NE inertia). It is likely that at the within-person level, short-lived emotional episodes do not necessarily predict CWB over time. Although this result needs to be replicated in future studies, it clarifies a boundary condition when negative emotions may promote CWB, namely NE inertia. In our study, those workers reporting high feelings of chronic exhaustion showed high NE inertia over time. These same workers appeared prone to enact CWB over time.

Overall, findings from the present study further emphasize the relevance of temporal dependency of negative emotions at work. On the one hand, they support the idea that NE inertia may derive from a condition of resources depletion (i.e. chronic exhaustion); on the other hand, they offer insights on the mechanisms by which NE inertia may affect organizational behaviour. Thus, this second study (a) contributes to knowledge on job-related exhaustion by testing the robustness of the association between exhaustion and a specific within-individual emotional dynamic; (b) shows how less flexible emotion dynamics may be related to workers' organizational behaviour.

## GENERAL DISCUSSION

As conceptualized by Kuppens and colleagues (2010), emotional inertia represents a relatively stable individual characteristic arising from a dynamic process. Indeed, emotional inertia perfectly instantiates an example of a pathological process (i.e. the chronical slowing down of individual emotional

dynamics) that, once crystallized, emerges as a person-level style of emotional regulation. At the within-individual level, the lack of emotional responsiveness, in the form of persisting and apparently unchangeable emotional states, is likely to signal a state of resource depletion, often related to chronical stress states. At the between-person level, the reduced emotional responsivity and the deriving persistence of specific emotional states are related to differences in observed individuals' organizational behaviour. Loosely speaking, workers' emotional inertia may emerge as a result of their interaction with the organizational environment, and then, once structured, it may be associated to workers' subsequent organizational behaviour. Our studies contribute to knowledge on chronic exhaustion as an indicator of resource depletion by examining an underexplored principle of COR theory (namely the fourth; Hobfoll, 1989, 2001) and demonstrating how exhaustion may lead workers to enter a defensive mode that aims at resource preservation, which is associated with a specific within-individual emotional dynamic. Moreover, our findings add to current research on the emotion-centered model of voluntary work behaviour (Spector & Fox, 2002) by showing how temporal dependency of emotional states may play a crucial role in workers' intentions to act in a counterproductive way.

From a theoretical perspective, our results demonstrate the need for future research to investigate both (a) within-person processes as they unravel as processes of action and reaction within a particular individual's experiences at work, and (b) the differences between workers (at the between-person level), such that ones standing relative to others might affect within-person processes, such as CWB. By considering one of these levels only, no theory of organizational behaviour can aspire to be complete or even comprehensive. Instead, it is by the conjoint consideration of the between-person and the within-person level that the relevance of emotional inertia in the work setting can be fully appreciated.

## Limitations

Our studies have some limitations. One first limitation is the exclusive reliance on self-reports and related concerns of common-method variance (Podsakoff et al., 2003). While person-mean centering partially mitigates this problem (i.e. person-mean centred scores are deprived by response tendencies stemming from individual differences), future studies may consider gathering reports from coworkers or the supervisor. This advice, of course, is of outmost importance for CWB, while it may be more difficult to find reliable other sources for negative emotions and even exhaustion. A second limitation is the use of only three items selected from the scale developed by Dalal and colleagues (2009). Given the intensive nature of our ESM protocol we were concerned of imposing too much burden on study participants, and thus considered three representative items to be sufficient. However, future studies should include broader measures of CWB to further validate these results. Another limitation refers to the temporal frame considered. Although five days may seem reasonable, and similar to the timeframe used in previous similar studies (Sonnentag et al., 2008), it is likely that emotional inertia may behave as a persisting state, and thus that some workers may appear relented and emotionally slow during certain time periods but not in others. Future studies may use different timeframes for testing the generalizability of our results.

Finally, it is of outmost importance to determine the optimal timeframe to assess emotional inertia. Following previous research (e.g. Koval et al., 2013, 2016), we considered one week to be sufficient. However, it is likely that emotional inertia may accumulate and then also dissipate all over a single working day. It is also possible that correlates of emotional inertia may change when observed over such a short time span. To reliably assess such a phenomenon, it would be necessary to prompt workers more than six times per day, as we did over multiple days. Given the cost of conducting similar studies, it is important to determine their optimal characteristics.

## Suggestions for future studies

In these studies, we examined (a) the association between workers' chronic exhaustion and NE inertia (b) the relation between workers' NE inertia and organizational behaviour in terms of CWB. A key question for future research is whether and how the effects of workers' emotional inertia unfold after work, during leisure time for instance. Indeed, it would be interesting to investigate *if* and *in which way* workers' emotional inertia, as assessed at work, "survive" after work, or if and when it fades out. It would be also intriguing to investigate whether emotional inertia is a stable and situationally invariant construct, such that emotional inertia assessed at work is different from emotional inertia assessed at home, or if they refer to two correlated but distinct constructs.

Despite our study design limited many of the pitfalls of cross-sectional studies, we cannot rule out that, for example, the relationship between chronic exhaustion and emotional inertia is dynamical, so that they reinforce each other over time. NE inertia may in fact contribute both to the onset of exhaustion symptoms and their maintenance over time. One opportunity for shading light on this point would be the use of experimental designs to test causality between chronic exhaustion and emotions, long-term intervention studies, or interrupted time series analysis.

In addition, future studies can focus on the role of positive and negative organizational events as determinants of emotional inertia, for example by exploring if this relationship can be mediated by exhaustion or not.

Given the importance of controlling for the time-lag, future studies should investigate the optimal time lag between successive prompts, in order to obtain more reliable estimates of individuals' levels of emotional inertia. Overall, the occurrence of CWB in our sample was relatively low. Therefore, researchers should examine whether our results also hold in work settings characterized by a higher occurrence of CWB. One may expect a stronger moderating effect of emotional inertia in such cases, given that engaging in CWB may be perceived as more common. In the absence of empirical data, more research is necessary on this point. Finally, future research may examine other correlates of NE inertia and exhaustion at work, as it is likely that it may affect a number of different processes, such as judicial decisions (e.g. Danziger et al., 2011), and employee's evaluations of their performance (De Longis & Alessandri, 2020).

To conclude, in two independent samples we found moderate effect sizes associated with (a) the prediction of NE inertia by initial levels of chronic exhaustion and (b) the moderation of the association between negative emotions and CWB by NE inertia. Given that the size of those effects is moderate at best, we recommend that future studies rely on samples of appropriate size, at least of equal size of those used in the present studies (i.e. at least 100 individuals at Level 2, and at least six prompts at Level 1). In all cases in which it is not possible to increase the Level-2 sample size (e.g. with underrepresented populations), researchers should consider sampling more of observations at Level 1 by increasing the number (a) of measurements per day, (b) of study days, or (c) both. In any case, our estimates of these effects can be used as a starting point to conduct adequate power analyses and calculate the necessary sample sizes.

## Implications for practice

Our studies offer some practical implications for managers and organizations. Assuming that chronic exhaustion at least partially predicts NE inertia, organizations could offer stress management interventions as well as interventions aimed at increasing specific resources (e.g. negative emotions management, social support) to improve well-being at work and outside work (Hobfoll et al., 2018). Job design initiatives may also be of help to promote personal and organizational resources. Recent contributions have included emotions within models of work design, suggesting the importance of

combining tasks, activities, and relationships in order to promote meaningful work and positive emotions (Parker, 2014). Further options for interventions include training programs aiming at enhancing employees' emotion regulation skills, as well as programs aiming at increasing the quality of the LMX relationship (see Ashkanasy et al., 2017). Finally, in order to prevent exhaustion, it seems important to help workers to detach and relax from work when being at home in order to increase recovery (Sonnentag et al., 2017). The promotion of healthy lifestyles and sleep quality might also help. Finally, our results indicate that NE inertia is related to workers' organizational behaviours that can impact organizations. Helping workers to manage their work-related emotions may therefore have also relevant benefits on the prevention of CWB.

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## CONFLICT OF INTEREST

The authors declare they have no conflict of interest.

## ETHICS STATEMENT

Data were collected in line with the guidelines of the Ethics Committee of our universities.

## DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available upon request by qualified scientists. The data are not publicly available due to privacy or ethical restrictions.

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## SUPPORTING INFORMATION

Additional Supporting Information may be found online in the Supporting Information section.

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