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## Temporal Dependency of Emotional States at Work and Its Relationship With Dynamic Performance

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### Abstract

Emotion dynamics, how people's emotions fluctuate across time, represent a key source of information about people's psychological functioning and well-being. Investigating emotion dynamics in the workplace is particularly relevant, as affective experiences are intimately connected to organizational behavior and effectiveness. In this study, we examined the moderating role of emotional inertia in the dynamic association between both positive and negative emotions and self-rated job performance among a sample of 120 Italian workers (average age 41.4, SD = 14), which were prompted six times per day, for five working days. Emotional inertia refers to the extent that emotional states are self-predictive or carry on over time and is measured in terms of the autocorrelation of emotional states across time. Although inertia has been linked to several indicators of maladjustment, little is known about its correlates in terms of organizational behavior. Findings revealed that workers reporting high levels of positive emotions and high inertia rated their performance lower than workers high in positive emotions, but low in inertia. In contrast, the relation between negative emotions and performance was not significant for either high levels of inertia or low levels of inertia. Taken together, these results suggest the relevance of investigating the temporal dependency of emotional states at work.

### Keywords

emotion dynamics, emotional inertia, job performance, positive emotions, negative emotions

Most scholars agree that emotions can be defined as affective experiences elicited by significant events that influence individuals' inclination to act (Barsade & Gibson, 2007;



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Frijda, 2006). A key aspect of emotions is that they are dynamic phenomena (Ashkanasy, 2003). Indeed, emotions are, by definition, highly variable over time (e.g., moments, days; see Barsade & Gibson, 2007; Frijda, 2006). Given the dynamic nature of emotional experiences, a growing body of organizational literature has recently started to investigate them by adopting a within-person approach (e.g., Dalal, Lam, Weiss, Welch, & Hulin, 2009; Miner & Glomb, 2010). This allows the study of time-dynamic patterns of emotions, which reflects people's psychological well-being and adjustment (Gross & John, 2003). Furthermore, recent studies indicate that how people's emotions fluctuate across time does not just reflect characteristics of psychological well-being, but may build up over time to create vulnerability or resilience for the onset, maintenance, and recovery of mood disorders (Kuppens, 2015; Wichers, Wigman, & Myin-Germeys, 2015).

The term *emotion dynamics* is used to refer to "the trajectories, patterns, and regularities with which emotions, or one or more of their subcomponents (such as experiential, physiological, or behavioral components) fluctuate across time, their underlying processes, and downstream consequences" (Kuppens & Verduyn, 2015, p. 71). Emotion dynamics are generally studied by using experience sampling methods (ESM), in which participants reports their emotional experience in real time, while being involved in their daily activities. This study design involves intensive repeated assessments during the same day, and it usually has a duration of one or two weeks. This allows the collection of many measurements over time, or intensive longitudinal data, which enable the researchers to measure different features of emotion dynamics. In this study, we focus on emotional inertia at work, a construct that has been linked to emotion regulation capacities, which captures the temporal dynamics of emotional states (Kuppens, Allen, & Sheeber, 2010). So far, several studies have indicated that emotional inertia is a major determinant of psychological maladjustment in the general population (Houben, Van Den Noortgate, & Kuppens, 2015; Koval, Sütterlin, & Kuppens, 2016; Kuppens et al., 2010), but little is known about its correlates in the work setting. The current study examined the dynamic association between emotional inertia, computed through repeated assessment of emotional states over time, and workers' self-evaluated job performance.

## Emotional Inertia

Emotional inertia is a key component of emotional dynamics and it describes the tendency of emotional experiences to be resistant to change and to be self-predictable over time (Kuppens et al., 2010). Low emotional inertia indicates a high tendency to change in affective experiences, while high levels of inertia suggest high resistance to change (Kuppens et al., 2010).

Generally, emotional inertia is considered as a marker of psychological inflexibility, which has been linked to several forms of psychopathology (Kashdan & Rottenberg, 2010; Koval, Kuppens, Allen, & Sheeber, 2012). Individuals high in emotional inertia are no longer able to continually adapt emotional responses and to regulate emotions

to fluctuating changes in the environment (Kashdan & Rottenberg, 2010; Koval et al., 2016). Stated differently, they are “affectively stuck” (Koval et al., 2012), mostly due to their poor regulation abilities; therefore, they may struggle to move on from a negative state even after the environmental circumstances have changed. For those individuals, emotions may have become dysfunctional and may have lost their adaptive function (Hollenstein, Lichtwarck-Aschoff, & Potworowski, 2013; Kuppens et al., 2010).

As emotional inertia refers to the extent to which the intensity of a current emotional state is predicted by the intensity of that same emotional state at a previous moment (Koval et al., 2016; Wang, Hamaker, & Bergeman, 2012), it is usually operationalized as an autocorrelation or an autoregressive slope and it typically ranges between -1 to 1 (Hamaker, 2012; Kuppens et al., 2010). Its construct validity and psychometric reliability has been well documented (e.g., Wang et al., 2012). In addition, inertia has been investigated at different time-scales, such as seconds, hours and days (e.g., Brose, Schmiedek, & Kuppens, 2015; Koval et al., 2012; Kuppens et al., 2010, 2012; Thompson et al., 2012).

Several studies suggest a link of emotional inertia with several indicators of maladjustment, including low self-esteem (Kuppens et al., 2010), neuroticism (Suls, Green, & Hillis, 1998), impaired social functioning (Fairbairn & Sayette, 2013), rumination (Brose et al., 2015; Koval et al., 2012), depressive symptoms (e.g., Brose et al., 2015; Koval & Kuppens, 2012; Koval et al., 2012; Koval, Pe, Meers, & Kuppens, 2013), and increased risk of major depressive disorder (Kuppens et al., 2012; van de Leemput et al., 2014). Interestingly, recent evidence suggests that emotional inertia is related to both current and future health. In this regard, the meta-analytic study conducted by Houben and colleagues (2015) indicated that emotional inertia can uniquely and robustly predict long-term outcomes, such as depression or health problems, above and beyond other characteristics, such as rumination.

With regard to the evidence in organizational literature, two previous studies (De Longis, Alessandri, Sonnentag, & Kuppens, 2020), found that (1) exhaustion significantly predicted inertia of negative emotions; (2) inertia of negative emotions aggravated the association between negative emotions and counterproductive work behavior. These results attested the relevance of emotional inertia in the work setting, suggesting that prolonged states of work-related stress are associated with a reduced ability to adapt emotional states to the occurrence and the nature of work events: This inability, in turn, impacts organizational behavior.

Although previous studies have reported an association of high emotional inertia of both positive and negative emotions with lower psychological well-being, stronger evidence is available with regard to the noxious effects of inertia of negative emotions (Houben et al., 2015). Studies investigating inertia of positive emotions, have, in fact, produced less consistent results (Höhn et al., 2013; Koval et al., 2013; Kuppens et al., 2010). For example, Höhn and colleagues (2013) found an association between high levels of inertia of positive emotions and positive well-being outcomes such as better recovery

for participants with recurring depression. Theoretically, as emotional inertia reflects a lack of emotional flexibility and difficulties in emotion regulation, it should be maladaptive, independent of the valence of the emotions involved (Hollenstein et al., 2013; Kashdan & Rottenberg, 2010; Koval, Butler, Hollenstein, Lanteigne, & Kuppens, 2015). Nonetheless, under the theoretical framework of broaden-and-build theory of positive emotions, inertia could be theorized as a reflection of the resource building process that may buffer negative experiences (Diener, Thapa, & Tay, 2020). All that said, it is clear that further research is needed to elucidate if inertia of positive emotions may be tied to positive or negative functioning (Diener et al., 2020).

## The Present Study

The current study aims at expanding the existing literature on emotional inertia at work by exploring its association with organizational behavior. To the best of our knowledge, very few studies have investigated emotional inertia in the work setting (e.g., De Longis, Alessandri, & Ottaviani, 2020; De Longis, Alessandri, G., Sonnentag, S., & Kuppens, 2020) and even fewer, if any at all, have focused on inertia of positive emotions. In doing so, we answer the call issued by Diener and colleagues (2020) for organizational scholars to investigate how specific temporal dynamic features of emotional states are associated with workplace outcomes. Research on temporal dynamics of emotions thus holds substantial promise. However, most of the work has been conducted in social and clinical psychology and less attention has been paid to workplace correlates (Diener et al., 2020).

In this study, we used experience sampling to examine the association between inertia of both positive and negative emotions (henceforth, PE inertia and NE inertia) with a key organizational outcome, namely dynamic job performance (Dalal, Bhawe, & Fiset, 2014). In line with previous findings on emotional inertia at work, which have linked inertia to high levels of exhaustion and high tendency to enact counterproductive work behavior (De Longis et al., 2020), it is likely that inertia may also be related to job performance.

## Emotional Inertia and Job Performance

Emotions play a pivotal role in forming human attitudes and motivating behaviors (Cosmides & Tooby, 2000; Judge & Larsen, 2001). In the organizational literature, many studies have demonstrated a link between affect and performance (Barsade, Brief, & Spataro, 2003; Brief & Weiss, 2002). The meta-analytic study conducted by Shockley, Ispas, Rossi, and Levine (2012), indicates (1) a positive association between positive emotions and in-role performance as well as (2) a negative association between negative emotions and in-role performance. According to the affective events theory (AET; Weiss & Cropanzano, 1996), at the within-person level, behavior is the result of temporally

volatile emotional experiences at work, which consist of a dynamic baseline level of affect that is then subjected to further disruptions.

Therefore, in line with previous organizational literature, we expect a positive *lagged* association between positive emotions and self-rated global job performance, and a negative *lagged* association between negative emotions and self-rated global job performance. Our first hypothesis is formulated at the within-person level (Level 1).

*H<sub>1a</sub> Within-person positive emotions positively predict self-rated job performance;*

*H<sub>1b</sub> Within-person negative emotions negatively predict self-rated job performance.*

As for the role of emotional inertia in the relationship between emotions and job performance, we expect it to act as a moderator, so that (1) the relationship between positive emotions and job performance will be weaker for those individuals who show higher levels of inertia of positive emotions and (b) the relationship between negative emotions and job performance will be stronger for those individuals who show higher levels of inertia of negative emotions. Stated differently, we propose that emotional inertia represents an important mechanism able to shape the dynamic association between emotional states and job performance. Specifically, as emotional inertia signals a condition of impaired emotional regulation abilities, and thus represents a marker of psychological maladjustment (Kuppens et al., 2010), we expect it to have a detrimental effect on job performance. We predict that for those individuals with high levels of inertia, even the experience of positive emotions may be maladaptive as they may not be able to efficiently regulate their emotional states (Kuppens et al., 2010). Positive emotion dynamics, in fact, derive from how individuals react to and recover from positive events in their daily life (Kuppens & Verduyn, 2017). High inertia of positive emotions suggests a longer duration of positive emotional states and less homeostatic recovery (Houben et al., 2015).

On the other hand, with regard to negative emotions, inertia reflects an increased duration of negative emotional states at work (Kuppens et al., 2010). Workers characterized by high levels of emotional inertia are thus expected to be less efficient in managing, controlling and reducing their general negative emotional experiences. Given the strict association postulated by the AET between emotional reactivity and job performance, it is reasonable to expect that emotional inertia reduces workers' potential to effectively perform at work. Stated more formally, inertia is expected to act as a moderator of the postulated association of emotions with global task-performance. Our predictions are in line with the results from the meta-analytic study conducted by Houben and colleagues (2015), which attested a link between inert emotions (both negative and positive) and psychological maladjustment.

As a result, we hypothesized the following:

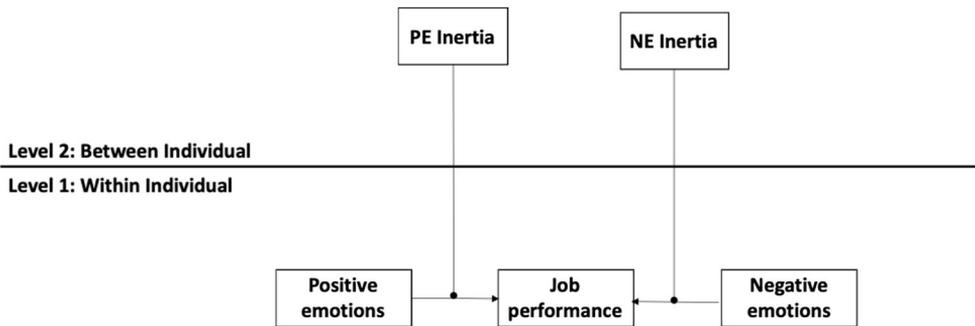
$H_{2a}$  PE inertia moderates the relationship between positive emotions and job performance.

$H_{2b}$  NE inertia moderates the relationship between negative emotions and job performance.

Figure 1 provides a representation of the hypothesized model.

**Figure 1**

*The Hypothesized Model*



Note that our hypotheses do not differentiate between single discrete emotions, but addresses the behavior of composite indexes of positive and negative emotions (Bagozzi, 1993).

Finally, as we were mainly interested in the dynamic association between emotional states and job performance, we used a self-reported measure of job performance that allowed us to collect multiple assessments per day, which are necessary to study its dynamic nature (Dalal et al., 2009). Indeed, previous studies showed that the relationship between state affect and performance may be highly dependent upon the temporal calibration of the performance measure (Wright, Cropanzano, & Meyer, 2004; Wright & Staw, 1999).

In testing these hypotheses, we controlled for those variables that may also have an impact on emotional inertia and job performance: gender, age, neuroticism, conscientiousness, and time interval between prompts (e.g., Barrick & Mount, 2005; Koval et al., 2012; Ng & Feldman, 2008; Suls et al., 1998). Finally, we controlled for concurrent levels of job performance.

## Method

### Sample

The sample was composed of 122 workers who worked directly with the public (i.e., who interact with the recipients of their service). Most of our participants (54.5%) were male. Average age was 41.23 years ( $SD = 14$ ) and average job tenure was 14.9 years ( $SD = 12.46$ ). Participants worked in a broad range of different professions and occupational fields: 25.8% of participants worked in the sales sector, 10.8% of participants worked in the health sector, 7.5% of participants worked in the education sector, 10.8% were entrepreneurs, 9.3% of participants were managers, and the remaining 35.8% were employees in various fields.

### Procedure

Participants were recruited via an advertisement posted online, as well as via word of mouth. People were considered eligible for this study if they worked for at least five consecutive hours per day. Socio-demographic characteristics, as well as measure of neuroticism and conscientiousness were assessed one week before the ESM surveys (T0). At T0, participants provided informed consent and were also asked to provide their work schedule for the week of the study, indicating, for each working day, their start/end times and breaks at work.

Starting from the following Monday, participants were prompted (via an email alert containing a link to each survey) six times per day during working hours. Participants were prompted randomly for five working days, making a total of 30 prompts. The time interval between two prompts varied depending on the length of the work-day (e.g., for a six hour work-day, prompts occurred about 60 minutes apart). After each prompt, participants had 10 or 20 minutes to respond to the initial question, depending on the length of the work-day (e.g., for a six hour work-day, participants had 10 minutes to complete a questionnaire; for an eight hour work-day, participants had 20 minutes to complete a questionnaire).

### Measures

#### Personality Traits

Conscientiousness (e.g., "I'm willing to apply myself to the very end just to excel"), and neuroticism (e.g., "I'm subject to frequent mood changes") levels were assessed at T0 using 12 items for each trait drawn by the Big Five Questionnaire-2 (BFQ-2; Caprara, Barbaranelli, Borgogni, & Perugini, 1993). Participants indicated agreement with the extent to which each item described them on a 5-point scale ranging from 1 (*Very false for me*) to 5 (*Very true for me*). The alpha coefficients were .73 for Conscientiousness, and .81 for Neuroticism.

## Job Performance

Six times per day, participants rated their global job performance since the previous prompt via a single item by moving a slider along a continuum anchored with the numbers 0 (*Very low*) and 100 (*Very high*).

## Emotions

Six times per day, participants were asked to report their current levels of positive and negative emotions. Participants were asked to indicate the extent to which they were currently feeling each of four positive emotions (happy, alert, excited, active) and nine negative emotions (sad, anxious, angry, frustrated, ashamed, disgusted, guilty, irritable, restless) by moving a slider along a continuum anchored with the numbers 0 and 100. Answers were coded as a number from 0 to 100. The above affect words were drawn from various sources, including the Positive Affect Negative Affect Scale (Watson, Clark, & Tellegen, 1988) and Ekman's basic emotions (e.g., Ekman, Friesen, & Ellsworth, 1972). We calculated the between- and within-person reliability using MIXED methods (Bonito, Ruppel, & Keyton, 2012). For negative emotions, between person reliability was .98 and the within person reliability was .84. For positive emotions, between person reliability was .94 and the within person reliability was .76. Following the procedure discussed in previous studies (e.g., Koval et al., 2016; Kuppens et al., 2010), inertia of both negative and positive emotions was calculated by running two-level autoregressive models (these models are described in the statistical analyses section).

## Time-Lag

The time-lag was calculated as the interval (in minutes) between two prompts (i.e., time at which the current survey was filled minus time at which the previous one was filled).

## Statistical Analyses

Because of the nested data structure (prompts nested within individuals), we tested our hypotheses using multilevel modeling (Snijders & Bosker, 1999), in order to simultaneously estimate within- and between-person effects (Krull & MacKinnon, 2001) while handling varying time intervals between prompts and missing data (Snijders & Bosker, 1999).

As a first step, PE inertia and NE inertia were computed as the within-individual estimate of positive and negative emotions autocorrelation obtained by using hierarchical linear modelling and implementing the analytical procedures described by Raudenbush and Bryk (2002). We ran two-level autoregressive (AR1) models (i.e., one for positive and another for negative emotions). Each model included both a random intercept and a random (autoregressive) slope. We calculated and extracted the autoregressive parameters estimated for each single individual within the overall multilevel model. These two

parameters (one for positive emotions, and one for negative emotions) were then used as Level 2 variables representing PE inertia and NE inertia in all subsequent multilevel analyses. Essentially, these parameters reflect the individual differences in autocorrelation, or inertia, and indicate how much emotions are predicted by the same emotions at a previous time point (Kuppens et al., 2012).

Then, we proceeded to test our hypotheses by comparing several nested models. We began with a null model, including only the intercept, and then moved to a series of nested multilevel models. First of all, we specified a model in which job performance was predicted by previous positive emotions<sub>t-1</sub>, negative emotions<sub>t-1</sub>, PE inertia, NE inertia, along with the covariates (Model 1-3). Note that the prediction of job performance<sub>ti</sub> by (1) positive emotions<sub>t-1</sub> and (2) negative emotions<sub>t-1</sub> each represents the main effects (1) of positive emotions on job performance over time and (2) of negative emotions on job performance over time.

Again, the variances of random terms and the covariance between all random terms were tested and fixed to zero, unless they were statistically significant. In Model 2, we tested if the strength of the association between job performance<sub>ti</sub> and negative emotions<sub>t-1</sub> varied randomly across individuals. Finally, in Model 3 we tested H2. The Level-1 part of this model was identical to Model 2. However, we included, at Level-2, the cross-level interaction between positive and negative emotion inertia and the absolute levels of negative and positive emotions in predicting momentary job performance.

All Level-1 predictors were person-mean centered to remove between-person differences from Level-1 parameter estimates, and all Level-2 predictors were grand-mean centered (Enders & Tofighi, 2007; Hamaker & Grasman, 2015).

Given that some variables slightly deviated from normality (i.e., skewness or kurtosis > 1.00), we decided to square root transform all variables.

Finally, based on recent recommendations, the significance threshold was set at  $p = .005$  (Benjamin et al., 2018).

## Results

Compliance was high: the average number of observations per participants was 28.29 ( $SD = 2.20$ ). On average, participants were prompted every 75.77 minutes ( $SD = 40.93$ ). Before testing our hypotheses, we examined whether positive emotions, negative emotions, and job performance fluctuated within persons. ICC(1), representing a measure of group homogeneity (i.e., the average correlation among observations reported by the same individual) and ICC(2), which represents an estimate of the reliability of the individual means, are presented in Table 1 (LeBreton & Senter, 2008). ICC(1) values indicate that a substantial portion of the variance in positive and negative emotions, as well as self-rated job performance can be attributed to within-person variation. ICC(2)

values were above the threshold of .70, showing that the between-person variance is also substantial (LeBreton & Senter, 2008).

**Table 1**

*Means, Standard Deviations, and Correlations Among Variables at Level 1 and Level 2*

Variable	<i>M</i>	<i>L1 SD</i>	<i>L2 SD</i>	ICC(1)	ICC(2)	1	2	3	4	5
1. Job performance	8.09	1.40	1.83	.67	.98		.56**	-.01	–	–
2. Positive emotions	6.99	1.27	1.55	.76	.99	.66**		-.13**	–	–
3. Negative emotions	2.08	1.66	1.90	.77	.99	-.01	-.17		–	–
4. PE inertia	0	–	.14	–	–	-.24**	-.22**	-.03		–
5. NE inertia	0	–	.09	–	–	.03	.02	.42**	.14	–

*Note.* Level-1 (or “prompt level”) correlations are presented above the diagonal; Level-2 (or “individual level”) correlations are presented below the diagonal.

\*\* $p < .05$ .

## Descriptive Statistics and Correlations

Means, standard deviations, and correlations are presented in Table 1. At Level 1, job performance was significantly and positively correlated with positive emotions, which were significantly and negatively related with negative emotions. At Level 2, job performance was significantly and positively correlated with positive emotions, and it was negatively related to PE inertia. Positive emotions were negatively related with PE inertia, while negative emotions were significantly positively related to NE inertia.

## Testing H1: The Association Between Emotions and Job Performance

We investigated if the experience of positive and negative emotions was related to self-rated job performance. As displayed in Table 2, findings from Model 1 showed that the Level-1 slope linking positive emotional states to lagged self-rated global job performance was statistically significant. The slope linking negative emotional states to lagged self-rated global job performance, instead, was not significant. Accordingly, on one hand, workers reporting a higher level of overall positive emotions reported an increase in job performance at the next measurement. On the other hand, the intensity of negative emotional states was not related to the level of job performance reported at the next measurement. Thus, only  $H_{1a}$  was supported. Importantly, the size of this slope varied randomly across participants, as shown by the better fit of Model 2 compared to Model 1 (Table 2).

**Table 2**  
*Multilevel Estimates for Models Testing the Association Between Inertia, Emotions and Dynamic Job Performance*

Variable	Null Model 3				Model 1				Model 2				Model 3			
	Estimate (SE)	p	CI		Estimate (SE)	p	CI		Estimate (SE)	p	CI		Estimate (SE)	p	CI	
<b>Level 2</b>																
Intercept ( $\gamma_{00}$ )	8.09 (0.13)	.000	8.53, 7.84		8.17 (0.18)	.000	8.53, 7.81		8.16 (0.18)	.000	8.52, 7.80		8.17 (0.18)	.000	8.53, 7.81	
PE inertia ( $\gamma_{01}$ )	-	-	-		-2.66 (0.86)	.002	-0.96, -4.36		-2.86 (0.86)	.001	-1.17, -4.56		-2.76 (0.86)	.002	-1.06, -4.46	
NE inertia ( $\gamma_{02}$ )	-	-	-		1.47 (1.39)	.296	4.23, -1.30		1.82 (1.39)	.193	4.57, -.93		1.47 (1.39)	.293	4.23, -1.29	
Neuroticism ( $\gamma_{03}$ )	-	-	-		-0.41 (0.56)	.464	0.70, -1.52		-0.42 (0.56)	.457	0.69, -1.52		-0.41 (0.56)	.464	0.70, -1.52	
Conscientiousness ( $\gamma_{04}$ )	-	-	-		1.63 (1.02)	.113	3.65, -0.39		1.52 (1.02)	.136	3.54, -0.49		1.52 (1.02)	.138	1.05, -0.05	
Gender ( $\gamma_{05}$ )	-	-	-		-0.19 (0.25)	.446	0.30, -0.68		-0.17 (0.25)	.493	0.32, -0.65		-0.18 (0.25)	.456	0.30, -0.67	
Age ( $\gamma_{06}$ )	-	-	-		0.17 (0.11)	.121	0.38, -0.04		0.16 (0.11)	.124	0.38, -0.05		0.17 (0.11)	.115	0.39, -0.04	
<b>Level 1</b>																
Job performance ( $\gamma_{10}$ )	-	-	-		0.19 (0.02)	.000	0.23, 0.16		0.17 (0.02)	.000	0.21, 0.14		0.18 (0.02)	.000	0.22, 0.14	
Positive emotions ( $\gamma_{20}$ )	-	-	-		0.10 (0.02)	.000	0.14, 0.05		0.11 (0.03)	.002	0.17, 0.04		0.11 (0.03)	.001	0.17, 0.05	
Negative emotions ( $\gamma_{30}$ )	-	-	-		0.02 (0.02)	.310	0.06, -0.02		0.02 (0.02)	.311	0.07, -0.02		0.03 (0.02)	.196	0.07, -0.02	
Time Lag ( $\gamma_{40}$ )	-	-	-		-0.00 (0.00)	.872	0.00, -0.00		-0.00 (0.00)	.911	0.00, -0.00		-0.00 (0.00)	.976	0.00, -0.00	
<b>Cross level interaction</b>																
Pos. emotions* PE inertia ( $\gamma_{11}$ )	-	-	-		-	-	-		-	-	-		0.58 (0.18)	.002	0.95, 0.21	
Neg. emotions* NE inertia ( $\gamma_{22}$ )	-	-	-		-	-	-		-	-	-		-0.46 (0.20)	.028	-0.05, -0.74	
L-1 Residual( $\epsilon_{it}$ )	1.42 (0.04)	.000	1.49, 1.35		1.34 (0.03)	.000	1.41, 1.28		1.30 (0.03)	.000	1.36, 1.23		1.30 (0.03)	.000	1.37, 1.23	
Intercept variance ( $\tau_{90}$ )	1.94 (0.25)	.000	2.50, 1.50		1.75 (0.23)	.000	2.26, 1.35		1.75 (0.23)	.000	2.26, 1.36		1.75 (0.23)	.000	2.26, 1.36	
Slope variance ( $\tau_{11}$ )	-	-	-		-	-	-		0.01 (0.01)	.119	0.04, 0.00		0.01 (0.01)	.357	0.05, 0.00	
Slope variance ( $\tau_{22}$ )	-	-	-		-	-	-		0.04 (0.01)	.002	0.08, 0.02		0.03 (0.01)	.005	0.08, 0.02	
-2 Log (lh)	11153.32				10926.28				10893.69				10879.66			
df	3				13				18				21			
Difference of -2 Log					227.04				32.59				14.03			
Difference in df					10				5				2			

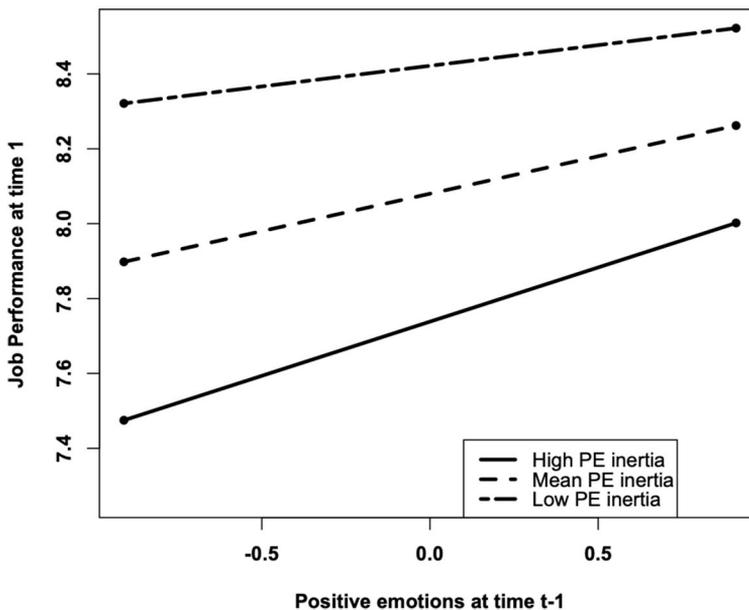
## Testing H2: Inertia Moderates the Relationship Between Emotions and Job Performance

Inertia of positive emotions was associated to lower job performance. Inertia of negative emotions, on the contrary, was not associated to job performance. Adding the interactions between (1) positive emotions and PE inertia; (2) negative emotions and NE inertia to the previous model improved the fit of the model, as demonstrated by the significant difference in the  $-2 \times \text{Log}$  reported in Table 2.

In line with H2<sub>a</sub>, workers characterized by high levels of inertia of positive emotions reported lower levels of job performance when experiencing positive emotions. Results showed that the relation (i.e., the slope) between positive emotions and job performance was significant and positive both for individuals high (i.e., +1 *SD*) in PE inertia (simple slope  $B = 0.29$ ,  $z = 49.15$ ,  $p < .001$ ), and for individuals low (i.e., -1 *SD*) in PE inertia (simple slope  $B = 0.11$ ,  $z = 4.9$ ,  $p < .001$ ). Figure 2 displays the observed relationship between positive emotions and job performance as a function of inertia of positive emotions.

Figure 2

Prediction of Momentary Performance by Positive Emotions as a Function of PE Inertia



As can be seen, workers reporting high levels of positive emotions and high inertia rated their performance lower than workers high in positive emotions, but low in PE

inertia. Workers reporting low levels of positive emotions and high level of PE inertia reported lower levels of job performance than workers reporting low levels of positive emotions and low PE inertia. However, the relationship between positive emotions and job performance was stronger (i.e., steeper slope) when PE inertia was high, compared to when it was low.

As for  $H_{2b}$ , the interaction term was not statistically significant. Thus, this hypothesis was not supported.

We also ran all analyses removing control variables and all results remained unchanged: PE inertia significantly moderated the relationship between positive emotions and job performance ( $p = .002$ ).

## Discussion

In this study, we investigated emotional inertia of both positive and negative emotions at work and their relationship with workers' evaluation of their job performance. Although these results need to be replicated in other independent studies, we believe that our findings contribute to the current literature on emotional inertia by examining its association to organizational behavior.

A first finding of the current study concerns the association between positive and negative emotions with workers' momentary perception of their global performance level. In line with previous literature (e.g., Fisher & Noble, 2004), we found a positive lagged association between positive emotions and job performance. On the contrary, our hypothesis that negative emotions negatively predicted job performance at the next time point was not supported. This result, contrary to the findings of Shockley and colleagues (2012), is more consistent with the results of Zelenski, Murphy, and Jenkins (2008), Wright and Cropanzano (1998), and Wright and Staw (1999).

With regard to the moderating role of emotional inertia, PE inertia significantly moderated the relationship between positive emotions and dynamic job performance. Specifically, our results indicate that workers who show high levels of PE inertia rate their performance as lower compared to workers with low levels of PE inertia, regardless of the level of their positive emotions. This finding suggests that PE inertia may act as a mechanism that reduces the benefit of positive emotions at work, as it contributes negatively to workers' evaluations of their job performance level. This result fits well with those studies suggesting that inertia reflects a form of psychological maladjustment due to lack of emotional reactivity (e.g., Kuppens et al., 2010; Koval et al., 2016; for a meta-analysis see Houben et al., 2015). Indeed, it suggests that even positive emotions, if prolonged and not appropriately regulated, may lose their adaptive value. On the other hand, despite our predictions, these results also indicate that when PE inertia is high, the relationship between positive emotions and job performance is stronger. This suggests that a prolonged and intense experience of positive emotions at work has a stronger

impact on job performance, compared to a short-lived experience of positive emotions. In sum, more inert positive emotions seem to have a stronger impact on job performance, which, in turn, appears to be evaluated as lower by workers high in PE inertia than workers low in PE inertia.

Finally, with regard to NE inertia, results were not in line with our predictions. NE inertia, in fact, did not moderate the relationship between negative emotions and job performance. We note that these results are at odds with previous research, which highlighted the maladaptive nature of high NE inertia (e.g., [Houben et al., 2015](#)) and suggested a positive association between negative emotions and deviant behaviors at work ([De Longis et al., 2020](#)). It may be possible that these contrasting results reflect differences in study design and methodology. For example, in most studies behavior and emotions were assessed and associated concurrently, and different study designs were used ([Fisher & Noble, 2004](#); [Miner, Glomb, & Hulin, 2005](#)).

In any case, we believe that further research is needed to explicate the contexts where PE inertia may be tied to positive or negative outcomes ([Diener et al., 2020](#)). Given the lack of a consistent literature on temporal dynamics of affect at work, our results should be interpreted with caution. Under the conservation of resources theory ([Hobfoll, 1989](#)), inertia may be viewed as a strategy for replenishing resources, which may be maladaptive in the short-term, but may lead to different outcomes in the long run. Indeed, inertia may represent an attempt to minimize resource loss and counteract the negative effects of stress ([Alessandri, De Longis, Eisenberg, & Hobfoll, 2020](#); [De Longis & Alessandri, 2018](#)). Alternatively, in line with the broaden-and-build theory ([Fredrickson, 1998](#)), inertia may be the result of a resource building strategy, thus leading, under certain circumstances, to positive outcomes. When interpreting indices of inertia, it is crucial to take into account the timescale at which emotional experiences have been assessed ([Koval et al., 2016](#)). Higher persistence of positive emotions across hours, for example, may reflect an impaired adjustment to the environment and indicate an affective system that has become disconnected from internal or external contingencies ([Koval et al., 2016](#)). Finally, in interpreting these findings, it is also important to consider the dimension of arousal, other than the valence, of the measured emotional states. For instance, most of the positive emotions we assessed can be labeled as energetic. Highly activated positive emotional states are more likely to be related to employee engagement and positive work behavior ([Macey & Schneider, 2008](#); [Shirom, 2003](#)). An interesting question for future research would be whether emotional inertia correlates would vary with arousal level.

The current study is not without limitations. As all constructs were measured via self-reports, one potential limitation is same source bias – and, consequently, the potential for inflated relationships. Despite all their shortcomings, self-reports are currently the most valid way of measuring subjective emotional experiences ([Koval & Kuppens, 2012](#)). Self-rated measures of job performance can be considered more valid with EMA/ESM

than with other methods (Beal, Weiss, Barros, & MacDermid, 2005). Another possible limitation of this study may be the temporal frame under consideration and the number of assessments per working day. Increasing the number of time-points per day may be beneficial for computing autocorrelation of emotional states over time. In addition, little is known about whether differences in time frames may affect the relation between temporal features of emotions and their outcomes.

## Conclusions

The focus of the present study was on the association between inertia of both positive and negative emotions with workers' judgments of their job performance. As maintained by several scholars, developing predictions about the association between emotions and behavior may be quite difficult as the target, the judge and the situation can all influence this process (Brief, 2001; Forgas, 1995; Miner & Glomb, 2010). By considering temporal parameters of emotions as vital to a theoretical understanding of organizational phenomena (Shipp & Cole, 2015), this study was among the first to investigate the role of PE and NE inertia in the workplace. The current study suggests that these parameters may offer new insights into the nature of emotions at work and how they may affect organizational behavior. Although this study is just a first step, we hope that future studies may build on these findings to develop a better understanding of the temporal dynamic features of emotions at work.

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**Data Availability:** Data from this study are not publicly available as informed consent and ethical approval for public data sharing were not obtained from participants. The data are readily available upon request by qualified scientists.

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