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Article title: State and trait anger predicting creative process engagement – the role of emotion regulation

Abstract

Drawing on the specific emotion approach, and based on the emotional regulation theory and cognitive and activation perspectives on emotions, this study examined the differentiated impact of state and trait anger on creative process engagement (CPE) and the moderating influences of emotion reappraisal and suppression. Data were obtained from daily surveys (N = 422) of 98 employees from three consultancy companies. Hierarchical linear modelling analysis revealed that trait anger has a stronger impact on CPE than state anger does. Furthermore, the relationship between state anger and CPE is stronger when emotion reappraisal is lower, rather than higher, and the relationship between trait anger and CPE is also stronger when emotion suppression is lower, rather than higher.

Keywords: state anger; trait anger; creative process engagement; emotion regulation; daily surveys

Introduction

Currently, the survival of organisations is deeply connected to the creative

competencies of their human resources (Hennesey & Amabile, 2010). Given its power to

foster or hinder creativity, affect plays a significant role in work contexts (Amabile, Barsade,

Mueller, & Staw, 2005; Zhou & Hoever, 2014). The valence-based approach, in which

researchers study two generalised groups of affect, such as positive and negative moods, has

hitherto been the dominant research perspective (Baas, De Dreu, & Nijtad, 2008). Despite

extensive research, the relationship between negative affect and creativity has unexpectedly

generated multiple and even contradictory conclusions (Amabile et al., 2005; Hennessey &

Amabile, 2010). The relationship between negative affect and creativity has proven to be

weaker when compared to positive affect, and this relationship is mainly context dependent

due to the role of moderators (Baas et al., 2008; George & Zhou, 2007).

In the case of creativity studies, the approach to creativity as an outcome has been the

dominant research interest (Zhang & Bartol, 2010a). However, a deeper understanding of

creative processes may improve empirical knowledge about enhancing creative results (Tan,

Lau, & Lee, 2017). From the literature review, there is evidence that creative process

engagement (CPE) is an important antecedent of job performance, and that this relationship is

partially mediated by creative performance (Zhang & Bartol, 2010a). Thus, this present study

focused on CPE, which is related to how employees engage in problem identification,

information search and solution generation activities as antecedent processes leading to

creative outcomes (Gilson & Shalley, 2004; Zhang & Bartol, 2010a). In contrast to other

studies that include cross sectional design with measures of creative fluency and flexibility

(e.g., Van Kleef, Anastasopoulou, & Nijtad, 2010), the current study aims to understand (i.e.,

through longitudinal methodologies) how a particular emotion relates to employees' creative

process engagement (i.e., CPE), which is a predictor of creative performance (Zhang &

Bartol, 2010a). In spite of diary studies are increasing in the study of creativity, the main research interest has been the effects of positive emotions (Conner, DeYoung &Silvia, 2018; Karwowski, Lebuda, Szumski & Firkowska-Mankiewicz, 2017; Silvia, 2017).

In response to these research challenges and to broaden the understanding of the role of negative emotions with regard to creativity, this study sought to examine a particular negative emotion, in this case anger. Since anger has particular characteristics that make it different from other negative emotions, such as persistence and promotion focus (De Dreu, Baas, & Nijtad, 2008), and that lead to performance enhancement (Hanin, 2004), it is worthwhile studying anger in relation to creativity. Thus far, however, the findings have been inconclusive with regard to the positive or detrimental impacts of anger on creativity (e.g., James, Brodersen, & Eisenberg, 2004; Van Kleef et al., 2010), and scant research has been done in organisational settings (Brief & Weiss, 2002). In the specific case of a positive impact of anger on creativity, Baas et al. (2011) identified a significant influence on the first stages of creative processes in an experimental setting. This positive impact is due to the cognitively unstructured processing of information caused by anger (Baas, De Dreu, & Nijtad, 2012).

Differences have been noted between state and trait anger, according to state-trait anger theory (Deffenbacher et al., 1996; Forgays, Forgays, & Spielberger, 1997), as state anger is a transitory emotional condition and trait anger is a personality trait. However, to the best of our knowledge, little evidence has been found for the different contributions state and trait anger make to organisational outcomes such as creativity. The existing literature emphasises the role of trait anger in negative (e.g., Ilie, Penney, Ispas, & Iliescu, 2012) or positive (e.g., Pietroska & Armony, 2013) outcomes but neglects the role of state anger. As anger influences cognitive processes leading to creativity (Baas et al., 2011), the impact of anger as a state—including variations of intensity and duration—or as a trait (i.e., a stable

characteristic) may have different consequences in creative processes. Therefore, the present study sought to analyse the impact of both state and trait anger on CPE.

In organisational settings, anger expression is socially regulated, and involves sanctions for those who do not respect the rules (Geddes & Callister, 2007). Based on emotional regulation theory (Gross, 2014), this study examined the role played by two emotion regulation strategies (i.e., reappraisal and suppression) as moderators of the relationship between anger and CPE. Reappraisal is a strategy that occurs before the impact of an emotion starts. In contrast, suppression is a strategy activated when an emotion is occurring, and has little impact on its reduction. Thus, this study constitutes a first attempt to understand how different emotion regulation strategies affect the strength and/or direction of the relationship between state and trait anger and employees' CPE.

Taking into consideration individual emotional variations from a within-person perspective, and anger in cognitive functioning (Baas et al., 2011) as these relate to idea generation processes, it may be relevant to ask to what extent emotion regulation can increase or decrease the impact of state and trait anger on creativity—and specifically on CPE (see Figure 1).

*** INSERT FIGURE 1 HERE ***

The present study thus contributes to the existing literature in several ways. It appears to be the first attempt to examine the differences between state anger and trait anger in predicting CPE, in the organisational context using a within-person approach. Moreover, this study of the role of emotion regulation in the relationship between anger and CPE answers the need for more research on the impact of affect processes on performance (Brief & Weiss, 2002). In addition, CPE is worthwhile studying as it is related to a new understanding of creativity (To et al., 2012) that is in contrast with a more traditional concept which depends on stable individual characteristics, such as cognitive strategies and motivation (Amabile,

1983). Therefore, this study's approach contributes to understanding creative processes as an unstable condition that may vary depending on individuals' emotional states and traits and contextual factors.

Theoretical Background and Hypotheses

Creativity is defined as the product or the outcome of bringing up new and useful ideas through work procedures, which could add value to products, services delivered, or employee performance (Amabile, 1983; Zhou & Hoever, 2014). While the dominant research focus has been an approach to creativity as an outcome, there is much less research interest in studying the process responsible for creative outcomes, despite the the worth of this approach being widely recognised among scholars (Zhang & Bartol, 2010a). The creative process has been understood as a necessary antecedent and a process that leads to creativity (Binnewies, Ohly & Sonnentag, 2007; Gilson & Shalley, 2004; Zhang & Bartol, 2010a, 2010b). Engagement in the creative process is considered relevant to enhancing creativity performance on a daily basis (Jiang & Yang, 2015; Zhang & Bartol, 2010a; 2010b). There has been a tradition of studying and operationalising creativity as a function of fluency and flexibility (Zhou & Shalley, 2014). The increasing research on the relationship between moods/emotions and creativity has highlighted different forms of information processing (Kaufman, 2003). In the case of negative activated emotions, the relationship with creativity is achieved through persistency rather than flexibility (De Dreu et al., 2008).

CPE comprises employee engagement with problem identification, information search and encoding processes, as well as idea generation (Zhang & Bartol, 2010a, 2010b). The research on CPE has highlighted individual characteristics such as activating and deactivating positive and negative moods as antecedents of CPE (To et al., 2012). Most notably, the focus of CPE studies has been on individual characteristics such as moods (To et al., 2012), with individuals' unstable emotional conditions discussed as affective states. This extends

previous research based exclusively on individuals' stable emotional conditions leading to creativity (Amabile, 1983). Moreover, studying discrete emotions such as anger and the differences between state and trait anger becomes quite important since this research may reveal how a specific emotion behaves by comparing unstable and stable individual characteristics.

Anger is an emotion frequently experienced in daily life and in the workplace (Averill, 1983), and it is conceptually defined as a discrete emotion and different from other negative emotions (e.g., aggression and annoyance). Anger has been found in research to have positive consequences for creativity from two perspectives: a motivational perspective stressing persistence and activating greater focus (De Dreu et al., 2008), and a cognitive process perspective leading to an unstructured information search that encourages more widespread information processing (Baas et al., 2011, 2012).

To understand the specific relationship between anger and CPE, the distinction between state and trait anger needs to be clarified. This approach, however, has been neglected as a research topic (Brief & Weiss, 2002). According to state-trait anger theory (Forgays et al., 1997), the differences between state and trait anger should be taken into consideration. State anger means feeling anger at a specific moment in time, whereas trait anger is a personality trait or a disposition to feel anger more intensely, more often, and for longer periods of time, as well as exhibiting aggressive behaviour only when provoked (Bettencourt et al., 2006).

Many positive outcomes arise from anger expression on several levels (Gibson & Callister, 2010). However, the positive impact of anger on creativity has rarely been studied on an individual level (e.g., Baas et al., 2011; De Dreu et al., 2008) and on an interpersonal level in conflicts and negotiations (e.g., Van Kleef et al., 2010).

State Anger and CPE

To further our empirical understanding of the anger-creativity relationship, some specific explanations, such as the hedonic tone, activation, and regulatory focus hypotheses (Baas et al., 2008), have been put forward to try to explain what characterises it. The level of activation created by anger has been related to positive affect, and the level of deactivation to negative affect. De Dreu et al. (2008) propose a dual-pathway model highlighting the importance of both hedonic tone and the level of activation to explaining creativity. Thus, in the case of anger as a negative activating emotion, this emotion's relationship with creativity is due to perseverance, whereas activating positive emotions leads to creativity through higher levels of cognitive flexibility. Several studies have shown (Carver & Harmon-Jones, 2009) that anger is related to the systems' approach, traditionally connected with positive affect.

In addition to these hypotheses that seek to understand the relationship between negative affect and creativity, Baas et al. (2008) concluded through meta-analysis that it is relevant to take into account the fact that specific types of affect can influence some facets of creativity in different ways. Therefore, the specific emotion approach (Lerner & Tiedens, 2006) could bring some additional and conclusive information to previous research explanations about the relationship between affect and creativity. From this perspective, the idiosyncratic characteristics of anger are considered as having an impact on creativity. As Amabile (1983, 1996) noted in the componential model, the creative process is characterised by component features – the cognitive component that is due to the information and knowledge an individual has about the specific domain, as well as to the creative skills they possess, and the motivation target that fuels the creative process. To take a step forward in the creative process, research needs to include other variables that may concur with the explanation of the specific creative cognitive process and, as well, the improvement of motivation regarding the task appraised. The study of the creative process related to affect is

challenged by the specificities of each emotion/mood that genuinely influences the correlation between the level of energy that may activate or inhibit the cognitive process of creativity.

The relationship between negative moods or emotions and creativity is a question yet to be answered, which is why more research is needed. Explanations regarding this relationship have been developed mainly within the hedonic perspective, which stresses the dependence on context (Davis, 2009, for a review). While it has been proved that negative moods (and emotions) may be related to creativity in serious and important tasks, and are performance oriented (Baas et al., 2008), other scholars have proposed additional explanations based on motivational features known as activation perspectives (Baas et. al, 2008; De Dreu et al., 2008). Activated negative moods are related to creative fluency and originality through persistence, leading to information combination and generation of alternatives (De Dreu et al., 2008).

Moreover, anger has specific characteristics that might also be related to creativity by cognitive aspects. Considering mood as the information model, negative emotions lead to creativity by recognising that there is a problem to be solved or through being aware that the current situation must be changed (Zhou and George, 2007). According to Bass et al. (2011, 2012), the relationship between anger and creativity can be explained as a particular cognitive function related to unstructured information processing that activates wider associative networks. Thus, promoting access to more semantic categories in idea generation. There are also some cognitive aspects that characterise anger, such as cognitive readiness tendencies related to cognition, attention, memory and judgment, and optimistic beliefs that are due to a sense of self-powerfulness and capacity, which give the perception that it is possible to overcome obstacles and achieve goals (Lerner & Tiedens, 2006).

All the impact of anger on motivation and cognitive information processing in creativity can lead anger to play a special role in promoting creativity, which is in contrasts to regarding negative affect as exclusively context dependent (George & Zhou, 2007). However, this does not invalidate the fact that context is always important with regard to explaining how emotions are regulated and expressed.

Based on the understanding provided by these recent studies of anger and information processing, state anger is expected to have a positive impact on CPE. Testing this hypothesis may be a way to elaborate on the role anger can play with regard to employees' creative processes in the organisational context.

Hypothesis 1a: *State anger is positively related to CPE.*

Trait Anger and CPE

Researchers have tended to study personality traits, such as the big five related to contextual factors, rather than the main impacts of personality traits on creativity (Anderson et al., 2014). The study of trait anger's impact on creative processes needs to consider the particular characteristics of anger as a stable disposition. State anger and trait anger differ in their frequency, intensity, duration of cognitive information processing, and emotion regulation process (Deffenbacher et al., 1996; Forgays et al. 1997). Dispositional emotions have a greater impact on judgment and choices than momentary state emotions do since the former, being influenced by biological and socialisation processes, function as emotional biases that are present in individuals' information processing and behaviour (Malatesta, 1990). The anger-related motivational and cognitive functioning identified in the section above (Baas et al., 2011, 2012; De Dreu et al., 2008; Lerner & Tiedens, 2006) is expected to be present more frequently in individuals with trait anger.

As explained by Wilkowski and Robinson (2010), trait anger has three cognitive-based processes, namely: automatic cognitive interpretations characterised by hostile situation

interpretations; selective attention processes related to ruminative attention; and effortful emotion regulation, expected to be present more often in individuals with low levels of trait anger. Therefore, when compared to the state anger individuals may feel in specific situations, the cognitive functioning of individuals with trait anger is expected to be most likely related to more creative ideas. Individuals with trait anger are more prone to automatic negative information interpretation and, consequently, feel anger more frequently and intensely (Bauer & Spector, 2015).

It is, therefore, relevant to study the different contributions trait anger and state anger make to creative processes, considering that trait anger individuals are expected to show cognitive biases about anger elicitation more frequently.

> **Hypothesis 1b**: *The relationship between trait anger and CPE is stronger than is the relationship between state anger and CPE.*

Relevance of Emotion Regulation as a Moderator of the Anger-CPE Relationship

Despite the existence of biologically-based emotions comprising innate expressions, according to Ekman (2004), a sociocultural dimension designated ~~as~~ "display rules" imposes socially acquired cultural rules about managing the public expression of emotions. Therefore, emotions comprise a repertoire of cognitions and behaviours learnt in specific social environments as social syndromes (Averill, 2005).

Organisational affect research, carried out from the late 80s onward (see Ashkanasy, Härtel, and Daus [2002] for a review), was responsible for generalising ideas about the relationship between positive moods and positive outcomes such as performance, as compared to the impact of negative affect. As a result of all these influences, a generalised idea has developed, among both top management and employees, that negative emotions are correlated with bad outcomes, and that these emotions need, therefore, to be prevented and regulated (Diefendorff & Richard, 2003). Emotion regulation is generally considered to have

positive consequences as an ability related to a better quality of social relationships. At the same time, ~~the~~ individuals who possess this ability are viewed more favourably by peers (Lopes, Salovey, Côte, & Beers, 2005). There are even organisational display rules about what can and cannot be accepted as an expression or suppression of anger (Geddes & Callister, 2007; Harelli & Rafaeli, 2008).

Emotion regulation theory asserts a process model of emotion regulation during which particular strategies have idiosyncratic impacts on emotional processes. There are two forms of emotion regulation (Gross, 1998; Gross & Thompson, 2007): 'antecedent-focused regulation' relates to what can be done before emotions appear and 'response-focused regulation' employs strategies to intensify, diminish, prolong, or curtail emotional experiences that are already occurring. This study included one strategy from each form of emotion regulation mentioned, reappraisal and suppression, respectively. The main reasons for studying these strategies are that they are commonly used by people in everyday life, and also because they reveal individual differences in dealing with emotions (Gross & John, 2003).

An instrumental approach to emotion regulation (Ford & Tamir, 2012) asserts that experiencing positive or negative emotions, depending on specific situations, may be useful and related to emotional intelligence. However, anger regulation in the organisational context is still widely expected, as discussed below.

Moderating Role of Emotion Regulation: Reappraisal Strategies

Bearing in mind that a particular emotion, such as anger, in the organisational context is seen as having negative consequences—mainly in relationships—employees are expected to know how to regulate themselves so as not to show anger (Averill, 1983, 2005). Regardless of the social pressure to activate a reappraisal strategy in the case of anger, this strategy

reveals an individual's ability related to individual differences, such as feeling more positive emotions than negative ones (Gross & John, 2003).

Emotions have the social function of indicating to individuals how to behave in a group (Keltner & Haidt, 1999). The existing positive display rules in the organisational context facilitate emotional contagion, and highlight the values that are to be transmitted in customer service. There are also social functioning guidelines related to job roles, status, and goals (Elfenbein, 2007), and reciprocal influences among individuals in groups connected with mutual emotion inferences and their consequences in interactions (Harelli & Rafaeli, 2008). Therefore, emotion attributions have a direct impact on social interactions, including expressing anger, reducing employee credibility, and showing positive emotions such as pride and happiness connected to success (Harelli, Rafaelli, & Parkinson, 2008). Social status has been shown to be negatively related to anger expression (Park et al., 2013).

The above studies highlight how employees influence each other through emotion display rules related to organisational culture. With regard to consultants, not only social norms but also role expectations according to emotional competence—involving awareness and regulation of individuals' own and others' emotion—are expected to be associated with employees' positive affect and consequently positive evaluations of service encounters, thus leading to greater customer satisfaction (Giandini & Frese, 2008). Generally speaking, since feeling negative emotions, especially anger, can be seen as a handicap, employees are expected to have reappraisal strategies as an emotional competence, in order not to allow anger to surface. The kind of workers focused on in the present study (i.e., consultants) are mainly expected to show autonomy, make decisions, manage deadlines, engage in team-based work, and manage meetings with clients.

Anger expression in the organisational context has social consequences, and is, therefore, related to behavioural sanctions imposed on those showing poor self-regulation

abilities. In the case of consultants, given their specific professional characteristics, they are expected to use reappraisal strategies. Studies have shown that reappraisal strategies lead to a decrease in experiential, behavioural, and physiological responses to emotions (Gross, 1998; Gross & John, 2003). Reappraisal occurring early in emotion-related processes implies a cognitive revaluation of which responses are elicited by situations, decreasing their emotional impact.

Taking into account the cognitive processes involving anger, and this emotion's eventual positive impact on CPE, as confirmed by Baas et al. (2011), it can be inferred that a reappraisal strategy used to regulate anger could have a detrimental impact as a moderator of the anger-creativity processes relationship. As a result, when reappraisal is higher, the relationship between state anger and CPE will likely be weaker because people who tend to employ reappraisal strategies do not experience negative emotions in the way that those who do not have this ability do. An ability to reappraise implies information processing of responses elicited by situations, leading to changes in internal and external environments, specifically altering their emotional significance. As stated above, there are social and organisational display rules that prevent feeling and expressing anger, (Averill, 1983, 2005; Keltner & Haidt, 19991). This is mainly in particular professional groups dealing with customer service (Elfenbein, 2007; Giandini & Frese, 2008; Park et al., 2013). Workers, suffering the influence of an emotional socialisation in the professional context, are expected to be able to use their emotion regulation skills, as in the case of reappraisal strategy. Besides social factors that influence workers' emotion regulation strategies, there is also an understanding of emotion regulation strategies as personal traits. According to the literature review, reappraisal strategy is a relatively stable trait related to feeling less anger and negative emotion in general, and is associated with adaptive responses in different contexts (Gross & Levenson, 1997; Gross & John, 2003; Mauss, Cook, Cheng & Gross, 2007).

Thus, in order to examine rules regulating anger display in creative processes, and to measure the expected adverse effect on the relationship between anger and creative processes, the following hypothesis was developed:

> **Hypothesis 2**: *A reappraisal strategy moderates the relationship between SA and CPE so that the positive impact state anger has on CPE will be weaker when reappraisal is high than when this strategy is low.*

Moderating Role of Emotion Regulation: Suppression Strategies

In the organisational context, the regulation of emotions based on display rules plays a crucial role in the way it leads workers to act as expected in order not to affect clients' expectations and organisational performance (Barsade & Gilson, 2007). The regulation of negative emotions is expected to have positive effects on performance. In the case of reappraisal strategy, there are changes in the different response systems – physiological, experiential and behavioural – which are effective in inhibiting emotion (Gross & John, 2003). This effect is not revealed in the case of suppression, as shown by Gross and Levenson (1997), suppressing emotions can have a mixture of impacts on an individual's arousal system. According to previous studies, although suppression diminishes expressive behaviour, it has no impact on subjective experiences and leads to increased activation of the sympathetic nervous system (Gross, 1998; Gross & John, 2003). Additionally, there are cognitive consequences in the use of suppression, such as attention and memory (Richards, 2004). These cognitive depletion resources may have a negative impact on the creative process engagement regarding the implications of cognitive functions in each stage of the process.

Employees with trait anger are expected not to use reappraisal strategies due to dispositional tendencies to hostile interpretations of social situations (Wilkowski & Robinson, 2010). Trait anger individuals are more likely to use suppression strategies rather

than other types of emotion-regulation strategies (Deffenbacher et al., 1996). While trait anger individuals have more difficulty in engaging in emotion regulation strategies, these individuals are used to experiencing anger feelings most of the time and are expected to suppress anger expression—especially in work contexts. Individuals with stronger trait anger have also been found to have more cognitive biases related to the need for anger appraisals compared to individuals with lower trait anger (Hazebroek, Howells, & Day, 2001).

Nonetheless, the intensity of emotion determines creative outcomes, which means that low or extremely high intensity of emotions has a negative impact on creativity (James et al., 2004). Therefore, suppression strategies that regulate anger could appear to be adapting the level of emotions to what is needed in particular tasks and to what is socially accepted (Diefendorff & Richard, 2003).

From the above findings, suppression strategies are expected to hinder positive impacts of trait anger on CPE. Therefore, it is most likely that the relationship between trait anger and CPE is stronger when employees' use of suppression strategy is lower. In order to examine the impact of suppression on the anger-creativity relationship, the following hypotheses were developed:

Hypothesis 3: *Suppression moderates the impact of trait anger on CPE so that the impact of trait anger will be weaker on CPE when suppression is high than when this strategy is low*.

Method

Participants and Procedure

The participants in this study worked at three multinational consultancy companies belonging to the list of Great Place to Work[®] in order to avoid inconsistencies between companies' human resources practices. These companies provided consultancy services in the areas of information technology, finance and human resource management, respectively.

Managers from the three companies were informed of the study's objective and asked to encourage their employees to participate. Participants were informed of the study's goal, as well as the questions related to confidentiality and methodology, before data collection. The study used Qualtrics, a web survey tool in which participants answered two questionnaires. A general online questionnaire that appraised personal variables such as emotion regulation (i.e., reappraisal and suppression), trait anger, and demographics was sent first, on a Friday. Two days later, on Monday, participants began filling out a daily questionnaire to assess the perceived impact that state anger has on CPE. The daily questionnaire was sent at the end of every work day for a work week—from Monday until the following Friday.

The total number of participants who filled in the general questionnaire was 188, corresponding to a response rate of 48.2%, one percentage above the expected average rate for online surveys (Nulty, 2008). Participants were full-time workers whose functions involved creativity and who, therefore, had been appraised as being creative. From this total number of participants at the beginning of the study, the final sample included 98 participants who were selected based on the criteria of inclusion. To be part of the final sample, participants had to complete the daily questionnaire for at least three days, which is the completion average for daily diary studies (Ohly et al., 2010), out of the five work days. The final sample (i.e., 98 participants) included a total of 422 daily responses, with a mean of 4.3 days per person. The sociodemographic characteristics considered were gender (71.4% were males), age (the average age was 31.3 years old, ranging from 23 to 53 years old, with a standard deviation of 5.9), tenure (the mean was 4.2 years, with a standard deviation of 2.7 years), and education (92.9% had a university degree).

This dataset has been used in another study developed by Da Costa, Zhou ,and Ferreira (2017) including other moderators of co-worker support for creativity and individual perceptions of relationship conflict. The current study has a completely different aim, with

the emphasis being on the differences trait and state anger have on CPE considering the

moderators of suppression and reappraisal strategies [1].

Measures

      State anger. State anger was measured using 10 items from the state anger sub-scale of

the state-trait anger expression inventory (STAXI) (Forgays et al., 1997). The lead question

was "Please indicate your feelings today." Answer options were 1 = "Not at all," 2 =

"Somewhat," 3 = "Moderately so," and 4 = "Very much so." Examples of items were "I was

furious" and "I felt irritated." This sub-scale measures the intensity of angry feelings at a

selected time. The alpha coefficient was 0.95.

      Trait anger temperament. Four items measuring trait anger temperament were used

from the trait anger sub-scale of the STAXI (Forgays et al., 1997). The lead question was

"Please indicate how you generally feel or react." Answer options were 1 = "Almost never," 2

= "Sometimes," 3 = "Often," and 4 = "Almost always." Examples of items were "I am quick

tempered" and "I have a fiery temper." The alpha coefficient was 0.66.

      Emotion regulation strategies. Two scales—reappraisal and suppression—were

used from the emotion regulation questionnaire developed by Gross and John (2003). The

lead question was "What do you generally do?" Answer options were 1 = "Not at all," 2 =

"Very little," 3 = "Somewhat," 4 = "Much," and 5 = "Very much."

      Examples of items from the reappraisal sub-scale with six items were "I control my

emotions by changing the way I think about the situation I'm in" and "When I want to feel

fewer negative emotions, I change the way I'm thinking about the situation." The alpha

coefficient was 0.76.

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[1] Although the present study has used the same dataset as the study cited (Da Costa, Zhou & Ferreira, 2017), the research problem is related to studying the existing differences between stable and unstable individual conditions, i.e, trait anger and state anger affecting CPE, instead of the social contexts related to perceived social conflict and co-worker support. The structure of data in HLM in the present study was treated as longitudinal and the previous study as cross-sectional.

Examples of items from the suppression sub-scale with four items were "I control my emotions by not expressing them" and "When I'm feeling negative emotions, I make sure I don't express them." The alpha coefficient was 0.83.

CPE. This was measured using the 11-item scale developed by Zhang and Bartol (2010a). The lead question was "Today, in your job, to what extent did you engage in the follow actions when seeking to accomplish an assignment or solve a problem?" Answer options were 1 = "Not at all", 2 = "Somewhat", 3 = "Moderately so", and 4 = "Very much so." Examples of items were "I have spent considerable time trying to understand the nature of the problem" and "I have thought about the problem from multiple perspectives." The alpha coefficient was 0.95.

Analytic Strategy

Hypotheses were tested using a multilevel model, more specifically, a hierarchical linear regression model (Aguinis, Gottfredson, & Culpepper, 2013), by using HLM software. In this study, two levels were considered, including days (Level 1) nested in persons (Level 2). Level 1 (the day level) included state anger and CPE. Level 2 (the person level) included variables that varied among participants, including trait anger, suppression, and reappraisal. Full maximum likelihood was considered to estimate the parameters.

According to the nature of the hypothesis, a centring strategy was employed (Hofmann & Gavin, 1998). State anger and trait anger in Hypotheses 1a and 1b were grand-mean centred to test their most significant impacts on CPE. For cross-level interaction (i.e., Hypotheses 2 and 3), the method of group-mean centring was used on Level 1, eliminating between-individual variance in the predictor variable and thus estimating only within-individual associations. On Level 2, grand-mean centring was used with the predictor variable to reduce any nonessential multicollinearity (Raudenbush & Bryk, 2002).

Results

Descriptive Statistics and Correlations

The results from the descriptive statistics and correlations among variables studied on the two levels—day and person—are shown in Table 1. On the person level (Level 2), trait anger was positively correlated with CPE ($r = 0.27$, $p < 0.01$) and with state anger ($r = 0.23$, $p < 0.05$). Reappraisal was positively correlated with CPE ($r = 0.20$, $p < 0.05$).

*** INSERT TABLE 1 HERE ***

Testing of Hypotheses

The main effects and cross-level moderation effects on the day and person levels are shown in Table 2. To test the hypotheses and resulting model, a first step was done by estimating a one-way analysis of variance to confirm the outcome variable's variability and, more specifically, whether the day level variance over five days of CPE was significant (i.e., the null model), thereby justifying hierarchical linear modelling analysis. The variance on Level 1 was 0.43 and, on Level 2, 0.34, with an intraclass correlation coefficient of 0.44. This suggests that 44% of the variance is due to the person level and 56% of the variance is due to the day level, which indicates the pertinence of hierarchical linear modelling analysis.

*** INSERT TABLE 2 HERE ***

Main effects (H1a and H1b). Regarding Hypothesis 1a—state anger was expected to be positively related to CPE—and Hypothesis 1b—the relationship between trait anger and CPE was expected to be stronger than the relationship between state anger and CPE. Accordingly, state anger was entered in Model 1, and trait anger in Model 2 in order to test the direct effect of state anger and trait anger on CPE. Hypothesis 1a was not supported ($b = 0.13$, $p < 0.10$). Moreover, as expected, trait anger revealed a stronger significant effect on CPE ($b = 0.26$, $p < 0.01$) as compared to state anger's effect on CPE ($b = 0.13$, $p < 0.10$). In contrast to state anger in Model 1, trait anger in Model 2 showed a significant improvement over the null model (Δ -2log = 4.58, $df = 4$, $p < 0.05$). Model 3 duplicates the results of the

fixed effects by constraining both paths to equality (i.e, by including a "1") to test whether they are the same. The contrast tests the hypothesis that the two effects are of equal size. Therefore, based on the results, we can conclude the effects are not the same size ($F_{(2,97.71)}$= 4.121, p = .019) and that, as expected, trait anger has a higher significant value than state anger. Therefore, the results provide support for Hypothesis 1b.

Moderation effects (H2 and H3). To test Hypotheses 2 and 3, which refer to two emotion regulation strategies—reappraisal and suppression—the two-way interaction terms were entered in Model 4, 4a, 5, 6, 6a and 7. Accordingly, the hypotheses were tested considering the most parsimonious model (Heck, Thomas, & Tabata, 2014), with only one interaction term. In accordance with Hypothesis 2 (A reappraisal strategy moderated the relationship between state anger and CPE, so that the positive relationship between state anger and CPE would be weaker when reappraisal was high rather than low), the moderating effect as shown in Model 4a was shown to be significant (b = -0.47, $p < 0.05$). Despite the significant improvement over the null model (Δ -2log = 10.48, $p < 0.05$), we found no evidence that the interaction terms fit better than a parsimonious model (Model 4) where the level two variable was entered (Δ -2log = 3.98, $p = n.s.$). Although H1a was not supported, the moderation effect of RE on the relationship SA-CPE was tested due to the negative impact that RE might have on this relationship. Moreover, from the literature (Mathieu, Aguinis, Culpepper, & Chen, 2012), there is evidence that in situations of reduced Level 1 and Level 2 sample sizes (which is the case of the current study), researchers should adopt more lenient levels such as alphas of 0.10. Thus, considering the significant interaction term, we found that the effect of SA becomes even weaker in the presence of RE. Figure 2 shows that the effect of state anger on CPE was stronger for those individuals who were lower in reappraisal than for those who were higher in reappraisal.

*** INSERT FIGURE 2 HERE ***

Related to Hypothesis 3 (Suppression would moderate the relationship between trait anger and CPE, so that the relationship between trait anger and CPE would be weaker when suppression was high rather than when it was low) - in line with model 6a, the moderating effect was significantly negative ($b = -0.09$, $p < 0.05$). This model did not show further improvement over a model where only the predictors were included (Model 6). However, the improvement over the null model (Δ -2log = 3.11, *n.s*) and the pseudo *r* square of 36% validates the studied interaction effect. Figure 3 shows that the effect of trait anger on CPE was stronger for those who were lower in suppression than for those with higher suppression. Therefore, as expected, Hypothesis 3 was confirmed.

*** INSERT FIGURE 3 HERE ***

Discussion

Affect has been considered one of the most relevant factors when seeking to increase employees' creativity (Hennesey & Amabile, 2010). Although often contradictory, previous findings have helped to characterise this relationship, in general, and, more specifically, the role of negative affect (Baas et al., 2008) and the influence of anger on creativity (James et al., 2004; Van Kleef et al., 2010). To contribute towards meeting this research challenge, this study sought to add to the literature about the role played by discrete emotions related to creativity in the organisational context.

Furthermore, most studies on the relationship between anger and creativity neglect the role of daily fluctuations in state anger. Therefore, this study addressed this gap in the literature and employed a daily survey methodology. Through this methodology, the current study overcame the limitations of previous studies, which impacted the interpretation of results due to common method variance (i.e., cross-sectional studies) and the possibility of inferring cause-effect relationships (Podsakoff, MacKenzie, Lee, & Podsakoff, 2013). In addition, the current study extends previous findings (e.g., James et al., 2004; Van Kleef et

al., 2010) and reinforces the findings on the role of emotion regulation strategies, suggesting

that reappraisal and suppression strategies moderate the relationship between trait and state

anger and CPE.

Theoretical Implications

Several theoretical implications can be understood from the results of this study,

including its contribution to several research areas, such as creativity, emotions, and

personality. First, in contrast to the majority of previous studies that considered negative

affect as a generalised group (Baas et al., 2008; Bauer & Spector, 2015), one discrete

emotion—anger—was studied for its idiosyncratic characteristics as an individualised and

sociocultural phenomenon. Moreover, specific types of anger were considered in this study

based on the specific emotion approach. The latter approach revealed that anger has a

positive impact on creative processes, confirming previous research that explains the creative

processes that emerge from particular anger-related cognitive information processing (Baas et

al., 2011, 2012).

The differences found between state anger and trait anger (i.e. positive impact of trait

anger on creativity, as opposed to a non-significant relationship between SA and CPE), made

it necessary to consider both unstable and stable conditions to explain creativity (Amabile,

1983; To et al., 2012). Although research has tested the relationship between anger and

creativity in experimental settings (Baas et al., 2011), the present study did not find any

statistical significance between SA and CPE, but rather, a significant relationship between

TAT and CPE (*n.s.* and $p < 0.01$, respectively). In spite of the non-significant results related

to SA-CPE, these results might be carefully interpreted essentially due to the marginally

significant correlation obtained ($p < 0.10$). This fact could be explained by the reduced

sample size for Level 1 and Level 2 variables and consequent possible Type II error (Mathieu

et al., 2012). Additionally, the generalised idea that negative emotions (especially anger)

bring negative outcomes, justifies the need for anger to be prevented and regulated (Diefendorff & Richard, 2003). Accordingly, it is difficult for an employee to admit feeling angry in the organisational context due to anger display rules (Geddes & Callister, 2007).

Henceforth, a more specific approach to understanding the relationship of negative emotions to creativity should be thoroughly considered, as opposed to the general idea that the relationship between negative emotions and creativity needs to be context dependent (George & Zhou, 2007). The need to improve our knowledge about the specific impact of anger on creativity does not imply neglecting the significant influence of context on negative emotions and even on positive emotions in creative processes, rather it questions the validity of an exclusively context dependent view.

Given that anger expression is a critical issue in organisational contexts, in which anger is limited by strict social norms (Geddes & Callister, 2007), the anger regulation process studied in the present research revealed that reappraisal and suppression strategies have a negative influence as moderators of a positive and significant relationship between trait anger and creative processes. These results, although in line with organisations' expectations that employees regulate their anger to avoid expressing negative emotions (Averill, 1983, 2005), reveal the need to discuss the limits of emotion regulation when positive outcomes such as creativity need to be improved.

Practical Implications

Apart from the significance of positive emotions, managers need to be informed about the relevance of considering the positive impact of trait anger on positive outcomes such as CPE. Broad emotional competence, including the ability to be aware of negative emotions and, in particular, the impact of trait anger on creative processes, becomes a significant skill to improve in employees. Therefore, it is quite important to develop more specific emotional human resources management (EHRM), promoting a deeper awareness of each emotion and

its connection with organisational outcomes. This would allow employees, in the case of anger, to make decisions about anger expression rather than automatically regulate anger through conventional display rules. This approach, thus implies that employees understand about when and how to regulate anger, to augment or diminish this emotion to an optimal level that could enhance positive creative outcomes.

EHRM should promote the understanding of negative emotions—particularly anger as a trait—as complex and specific entities, as an alternative to a limited view of negative emotions as valence groups with expected negative outcomes. This broader understanding of the positive impact of trait anger on creativity could stimulate discussion about current practices in human resources development and management. Employee training needs to consider a wider understanding of emotional intelligence through an instrumental approach of emotional regulation (Ford & Tamir, 2012), which can develop an ability to adapt the level of anger to a useful level. Moreover, focusing on the negative consequences of trait anger in organisations (Gibson & Callister, 2010) may prevent an understanding of its positive impacts on creativity and, therefore, hinder the development of a new perspective on employee selection and career management related to current organisational demands for creativity.

Limitations, Future Research, and Conclusions

In spite of its contributions, this study is not without limitations. Studying only one specific emotion, no matter how relevant, does not allow for comparisons with other specific emotions. Therefore, to understand anger-related CPE specificities more broadly, it would be interesting to compare anger with other positive and negative discrete emotions (e.g., happiness and sadness [Lerner & Tiedens, 2006]). Controlling for anger more than once a day could be significant with regard to determining accurately the direction of causality. Based on the findings of previous longitudinal studies (e.g., Amabile et al., 2005; To et al.,

2012) and experimental studies (e.g., Baas et al., 2011; De Dreu et al., 2008), moods and/or emotions can explain creativity, rather than the opposite causality. Moreover, the 98 participants considered for Hypothesis 3 (interaction between trait anger and suppression) is a small sample for testing a level 2 interaction (Mathieu et al., 2012). Future studies should use larger samples for this type of interaction. Taking into account the small effect sizes and knowing that there are differences in the three factors of CPE, it would be relevant for future research to use larger samples to study the differences between SA and TAT in each phase of CPE. Moreover, despite RE and SU being considered ~~as~~ general strategies to regulate emotions, when studying a specific negative emotions, it would be worth appraising RE and SU exclusively related to that emotion.

As this study analysed differences in state and trait anger as predictors of CPE in a sample of consultants, it may be interesting for future research to test the present results with different samples. Taking into account that diversity can enable and inhibit creativity (Hawlina, Gillespie, & Zittoun, 2017), cross cultural studies considering different socio-cultural aspects are highly recommend. It could also be interesting in future research, to analyse trait anger related to other individual differences (e.g., stability versus neuroticism) when predicting creativity.

Moreover, future research needs to include other types of strategies related to antecedent-focused and response-focused regulation (Gross, 1998) as moderators of the anger-CPE relationship. To examine the moderating role of emotion regulation's impact on creativity, the way in which some strategies have little effect on anger reduction should be considered, including distraction and rumination (Denson, Moulds, & Grisham, 2012).

In addition to regarding only the positive impacts of anger on CPE, it may be relevant to compare process implications in organisational creative outcomes. In fact, including comparisons of subjective versus objective measures of creativity is a challenge that has

already been mentioned by the authors (Zhou & Hoever, 2014). Future studies may also consider comparisons of employees' perception of what their creativity level is, and supervisors' appraisal of what their creativity level should be (Tan & Ong, 2017). Studying state and trait anger differences in each phase of CPE and creative outcomes could also be a future line of research.

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Table 1.

Means, standard deviations and correlations among variables considered at level 1and level 2

	Mean	SD	1 (CPE)	2 (SA)	3 (TAT)	4 (SU)	5 (RE)
Level 1 variables – Day-level (N = 422)							
1. CPE	3.01	.87	*(.95)*				
2. SA	1.23	.51	.06	*(.95)*			
Level 2 variables – Person-level (N = 98)							
3. TAT	1.73	.70	.27**	.23*	*(.66)*		
4. SU	2.88	.78	-.18	.04	-.03	*(.83)*	
5. RE	3.24	.73	.20*	.07	.01	.12	*(.76)*

Notes: The Internal Consistency Reliabilities (Cronbach's Alphas) are in bold italic and on the diagonal parentheses; CPE – creative process engagement, SA – state anger, TAT- trait anger temperament, SU – suppression, RE – reappraisal.

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

Table 2.
Multilevel modelling analysis predicting CPE

	Null Model	Model 1	Model 2	Model 3	Model 4	Model 4a	Model 5	Model 6	Model 6a	Model 7
Level 1										
Intercept	2.99**(.06)	3.01**(.07)	2.99** (.06)	2.99** (.06)	2.02**(.33)	2.99**(.06)	2.55**(.15)	2.96** (.29)	2.99** (.06)	1.99**(.33)
SA		0.13†(.07)		0.05(.16)	0.03(.16)	0.10(.16)	0.04(.16)	0.04(.16)		
Level 2										
TAT			0.26**(.07)	0.26**(.07)**	0.26**(0.07)	0.26**(.08)	0.25** (.07)	0.26**(.07)	0.29** (.07)	0.26** (.08)
SU							-0.15†(.08)	-0.14†(.08)	-0.13(.08)	
RE					0.16†(.09)	0.17†(.09)				0.17†(.09)
Cross-level Interaction										
SU X SA							0.15(.28)			
RE X SA						-0.47*(.22)				
SU X TAT									-0.09*(.04)	
RE X TAT										0.02(.06)
Variance Components										
L1 (within person variance)	0.43	0.43	0.43	0.40	0.41	0.41	0.41	0.41	0.43	0.43
L2(Intercept variance)	0.34**	0.32**	0.31**	0.31**	0.30**	0.30**	0.30**	0.30**	0.29**	0.30
Additional Information										
ICC	0.44	—	—	—	—	—	—	—	—	—
Effect size	-	0.06	0.09	0.09	0.05	0.05	0.05	0.05	0.15	0.05
-2log likelihood (Deviance)	987.584	986.689	984.838	981.279	982.926	978.943	981.985	983.282	986.317	987.662
Δ -2log likelihood (Deviance)	—	2.733†	4.584*	11.485	6.496*	10.479*	7.437	6.140*	3.105	1.76
Number of estimated parameters	2	4	2	4	4	4	4	4	4	2
Pseudo R2	0	0	0.04	1.04	0.08	0.08	0.08	0.08	0.06	0.11

Note: † $p < .10$ * $p < .05$ ** $p < .01$; L1 N = 422, L2 N = 98; CPE – creative process engagement; SA – state anger; TAT- trait anger temperament; SU – suppression; RE – reappraisal.