

The Influence of Affects on Creativity: What Do We Know by Now?

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Abstract

Research and practice have proved the importance of creativity in innovation management. Thereby, individual creativity can be influenced by many determinants. Affective states seem to be a decisive aspect in this context, influencing individual behaviour and thinking. The aim of the present paper is therefore to investigate the influence of affective states on creativity. For this purpose, a systematic literature review was conducted to explore the current state of research in this field. We identified 16 articles in peer-reviewed academic journals that were published from 2005-2015. Objects of interest of this review are positive and negative affective states that comprise moods as well as emotions. We examine the underlying theories, methodology, study design, and research findings of the relevant articles. Moreover, we identify inconsistent findings and still-existing research gaps. Our review shows that research found an influence of both negative and positive affective states on individual creativity. While the influence of positive affective states on creativity is still the most prominent aspect in this field of research, theories incorporating interaction effects have raised attraction. However, studies regarding the influence of negative affect on creativity are underrepresented and ambiguous. Lastly, this systematic literature review provides a useful synopsis to distribute research efforts appropriately within the next decade.

Keywords: Creativity, individual creativity, affect, affective states, moods, emotions, literature review

Introduction

Nowadays, the global business environment is characterized by fierce competition, rapidly changing market conditions and individualized customer demands. Thus, for companies to be able to react to these complex conditions, it is imperative to operate innovatively in order to uphold their performance and ensure long-term survival (Anderson, De Dreu, & Nijstad, 2004; Anderson, Potočnik, & Zhou, 2014). As the generation of creative ideas is the necessary, basic building block of innovation (Amabile, Conti, Coon, Lazenby, & Herron, 1996), creativity plays a crucial role for organizations in achieving a competitive advantage. In other words, "[C]reativity is the seed of all innovation" (Amabile et al., 1996, p. 1155). Hence, managers in real business practice need to be aware of levers to enhance an organizations' creativity (Bledow, Rosing, & Frese, 2013).

In fact, various determinants influence creative idea production at the individual level (Shalley, Zhou, & Oldham, 2004). Among those, affective states stand out as increasingly popular predictors of creativity and are often

highlighted as pivotal aspects in reinforcing, but equally inhibiting creativity in the workplace (Fong, 2006; George & Zhou, 2002). Amabile et al. (2005), as well as Barsade and Gibson (2007), underscore the significance of examining affective states in organizational contexts due to their omnipresence in workplace settings. However, around a decade ago there seemed to be a dearth of research that offered multiple options for future studies, e.g. (Amabile et al., 2005; George and Zhou, 2002; Shalley et al., 2004), on the consequences of positive and negative affective states on creativity.

Now, around ten years after, it seems promising to investigate whether this area of research has been advanced, and if there are new insights into the affective states-creativity link., It is worth identifying still-existing research gaps and inconsistent findings as they might hint at directions for future research. Therefore, we address the following research question by a systematic literature review: “What have we learned so far about the influence of affective states on creativity, especially in the last decade?”

Theoretical foundations

Affectivity and affective states

Affect can be conceived as an umbrella term encompassing both dispositional traits and affective states (Barsade & Gibson, 2007). *Dispositional traits* are stable individual differences regarding the probability that a person experiences distinct emotions (Davis, 2009). Accordingly, some people have the disposition to experience more positive moods, while others show the stable tendency to regularly experience negative moods and emotions, meaning that they are often distressed and have a negatively distorted self-image (Watson & Clark, 1984). These stable individual differences prevail over time, irrespective of the situation (Watson & Clark, 1984). To describe these dispositional traits, the technical terms of “positive” and “negative” affectivity are commonly used.

This consistency, however, is not inherent in *affective states*. Affective states are conceptualized as being more short-term and transient, as they refer to how a person is feeling within a limited time frame (Watson & Clark, 1984) and a specific situation (Kumar, 1997). Instead of being determined by an individual’s personality, they are situation-dependent. Generally, affective states can be described as a superordinate concept since they include the two categories of emotion and mood (Barsade & Gibson, 2007). Although these two terms may seem interchangeable and synonymous, they deviate from each other on several dimensions.

Emotions are elicited by a specific event or cause, which directs attention and promotes action (Davis, 2009; Fredrickson, 2001). Therefore, emotions can be conceptualized as response tendencies following an initial stimulus (Fredrickson, 2001). *Moods* are relatively diffuse and generalized affective states (Davis, 2009). They are not tied to a specific stimulus or resulting action and are likewise perceived as lower-intensity affective states, being characterized by a longer duration than emotions (Kumar, 1997).

Creativity

Creativity, as an outcome variable, is commonly defined as the ability to generate novel and useful ideas (Amabile et al., 1996; Oldham & Cummings, 1996). Creativity emerges at the individual level, whereas innovation describes the successful implementation of these ideas at the wider organizational level (Oldham & Cummings, 1996). Thus, creativity is commonly seen as the first, necessary step for innovations to come into existence (Amabile et al., 1996). Furthermore, the development of creative ideas is not tied to specific management levels, certain occupations or industries, nor is it a knack of a few. As a logical consequence, any employee can engage in the creative process, suggest novel and useful ideas and become more creative (Madjar et al., 2002).

Creativity is usually conceptualized by three different but interrelated facets: creative fluency, flexibility and originality (Guilford, 1967). Fluency counts the number of unique ideas that are generated. Flexibility instead refers to the number of different categories a person accesses during the idea generation process. For instance, someone who creates ideas within a sole category will be regarded as less cognitively flexible than someone whose ideas can be assigned to multiple distinct categories. Originality refers to the uncommonness of ideas by reflecting a person's ability to free oneself of habitual thoughts (Baas et al., 2008). In laboratory studies, these three facets of creativity are frequently used to evaluate the creative performance of subjects on divergent thinking and ideation tasks (Mumford & Gustafson, 1988). In field studies, other measures of creativity are applied. Most frequently, supervisors rate the creative performance of their subordinates (e.g., George & Zhou, 2002). Otherwise, the creative performance of an employee is assessed by coworkers or, when creativity is measured within short time frames, individuals themselves answer questionnaires about their creative generation (e.g., Amabile et al., 2005; Binnewies & Wörnlein, 2011).

Theories reflecting affective states and creativity

To begin with, positive affective states are predominantly theorized as having favorable effects on creativity by enhancing cognitive flexibility. An often-cited body of research that supports this positive link comes from the cognitivist Alice Isen. According to Isen's (1978) mood-congruent retrieval theory, affective states determine which thoughts come to mind. The theory suggests that positive mood enhances the accessibility and recall of positive material in memory, and thus serves as a retrieval cue for positively-toned thoughts. It is argued that positive material in memory is more extensive and varied than other material, which in turn entails that cognitive processes may be more flexible, resulting in greater creativity (De Dreu et al., 2008; Isen, Johnson, Mertz, & Robinson, 1985). In line with this, Isen and colleagues further propose that positive affect does not only enlarge the cognitive context by cueing more positive material, but likewise affects cognitive organization as a result of altering the context. They suggest that positive moods lead people to recognize more connections between

seemingly unrelated materials, which is a central attribute of creativity. (Isen & Daubman, 1984; Isen et al., 1985).

Similarly, Barbara Fredrickson (1998) highlights the facilitative effects of positive emotions on creativity. In her broaden-and-build model of positive emotions the author mainly posits that positive affective states, such as the emotions of joy, interest, contentment and love, all broaden an individual's momentary thought-action repertoire. Therefore, positive emotions expand an individual's scope of attention and cognition, leading to an increased range of thoughts. Thus, much like Isen's theories, Fredrickson's model alludes to the important role cognitive processes, most notably cognitive flexibility, play in being creative. Consequently, the broaden-and-build model also attributes increased creativity to positive affective states resulting from a gain in cognitive variation (Amabile et al., 2005).

The cognitive tuning model, which is often called the feelings-as-information theory (Davis, 2009) offers another theoretical account for the link. Its alternative name stems from one of its basic assumptions: it suggests that affective states have a signaling function, and convey information about the current environment of the individual (Schwarz & Bless, 1991). Positive moods signal that the current state of affairs is safe and satisfactory, whereas negative moods imply that the situation is problematic and that some action might be needed to eliminate the threat of negative outcomes. An important logical consequence inherent in the model is that different affective states lead to different information processing strategies. Positive affective states lead the individual to engage in the use of more simple heuristics. Moreover, given that the environment is considered safe, they increase the willingness to take risks and make novel and unusual associations. Negative affective states, by contrast, are associated with a more effortful and detail-oriented information processing style, since the environment is characterized as ambiguous (Schwarz & Bless, 1991). Accordingly, individuals in a negative mood may perform worse in creative problem solving tasks than their counterparts.

The mood-as-input model (Martin & Stoner, 1996) derived from the above cognitive tuning model explains the link between negative affective states and creativity. A key feature of the model, equivalent to the cognitive tuning model, is that moods convey information content. People use their current mood state as a source of information in order to assess whether they have put forward enough effort to achieve a particular goal and accordingly rate the adequacy of their commitment. Therefore, positive moods imply that enough effort has been made, leading to a more favorable judgement of one's individual performance. Negative moods instead signal that the task is not yet completed, resulting in higher effort of the individual. Thus, in this context, people in positive moods may stop working on a task earlier because they think that their creative performance is sufficient. In contrast, people in negative affective states may persist in working on a task and refining the idea until the optimum level of creativity is achieved. Hence, when goal attainment is used as an evaluation

standard (in the model termed as performance-based stop rule), negative moods seem to have more favorable effects on creativity than positive moods. In other contexts (enjoyment-based stop rule), the reverse holds true (Martin et al., 1993).

A final theoretical approach that must be considered is the hedonic contingency theory (Wegener & Petty, 1994) that is based on a mood management hypothesis: whereas happy individuals try to maintain their positive mood, sad individuals are interested in overcoming their negative affective state. According to the theory, individuals in a good mood are confronted with more mood threatening tasks than individuals in a bad mood. Thus, Wegener and Petty (1994) exemplify that sad individuals would engage in almost any available task neglecting their hedonic consequences. Instead, individuals in a happy mood have fewer alternatives to gain a hedonic reward. Therefore, they must assess the hedonic consequences of a specific action more meticulously and will only engage in tasks that uphold or enhance their mood. With regard to creativity, it is argued that individuals in a positive mood might engage more creatively in order to make a task more fun, and in this way sustain their positive mood.

Method

For the purpose of objectively answering the research question and summarizing the grown body of literature, a systematic literature review was conducted. In comparison to a traditional review, a systematic one excels through a comprehensive search and a methodical analysis (Tranfield et al., 2003). First, the databases were selected on the basis of their covered subject areas. As it was important to include databases with a focus on business and psychology, PsycINFO, PsycARTICLES and Business Source Complete were used. Second, the search terms were derived on the basis of the defined research question and enlarged with synonyms, related concepts and thesaurus searches of the databases. Keywords for the search included *affect/affective states, mood/mood states, emotion/emotional states, creativity/creative ability in business and workplace (employ*, work*)*. The database enquiries were filtered by diverse combinations of the search terms e.g. *"affective states" AND creativity* or *(mood OR emotion OR affect) AND DE "CREATIVE ability in business"*. Overall, twelve search enquiries were conducted and 1191 potential articles were derived. All of the articles were then evaluated on the basis of the criteria listed in table 1. For the ultimate inclusion in the review, thematic relevance was the most decisive criterion. Besides studies focusing on employees, also studies with students are included as in the literature it is generally assumed that findings for students are applicable to employees in corporate contexts (Baas et al., 2008; Bledow et al., 2013, Fong, 2006).

Publication language	English or German
Journal	Only peer-reviewed journals; only A-, B- journals of the VHB3 Journal Ranking
Author	Articles of popular authors irrespective of ranking, but must be peer-reviewed
Setting	Organizations or controlled environments e.g. universities/laboratories
Study participants	Employees; students (in exchange of employees); no not normal adult populations
Date of publication	2005-2015
Content	Affective states, not affective traits; no other emotion-related phenomenon; creativity, not innovation; creativity as dependent variable, not the reverse

Table 1: Inclusion and exclusion criteria

During this process, 703 articles were dropped due to their title and another 402 articles were excluded after reading the abstract, remaining 86 potentially relevant articles. Removing the duplicates led to 27 articles, which were then read in full text and, by process of elimination, reduced to 16. Three studies were excluded because it was questionable whether they measured affective states or traits. Another seven studies were disregarded since they only touched on the affective states-creativity link, and thus had a distorted focus. Two studies were not considered as they measured highly related concepts but not creativity itself as dependent variable. One study was excluded because the mood induction procedure was only partly successful, limiting its meaningfulness.

The relevant articles appeared in eight international journals (Creativity Research Journal, Academy of Management Journal, Organizational Behavior and Human Decision Processes, Journal of Personality and Social Psychology, Journal of Organizational Behavior, Psychological Bulletin, Journal of Experimental Social Psychology, and Administrative Science Quarterly). Their distribution among the journals is shown in figure 1. The investigated articles were published between 2005 and 2015. Figure 2 illustrates the number of articles that were published per year.

Where possible, the 16 articles were approached in a uniform fashion in order to systematically analyze and report their findings. Four essential points were extracted from each: the theories on which the authors based their assumptions and claims, the relevant, derived hypothesis or new theories that were developed, the study design used to test the proposed train of thought, and the results. Engaging in such a systematic data extraction enhanced the comparability of study findings, and made them easier to synthesize. The results of this evaluation are summarized in the appendix.

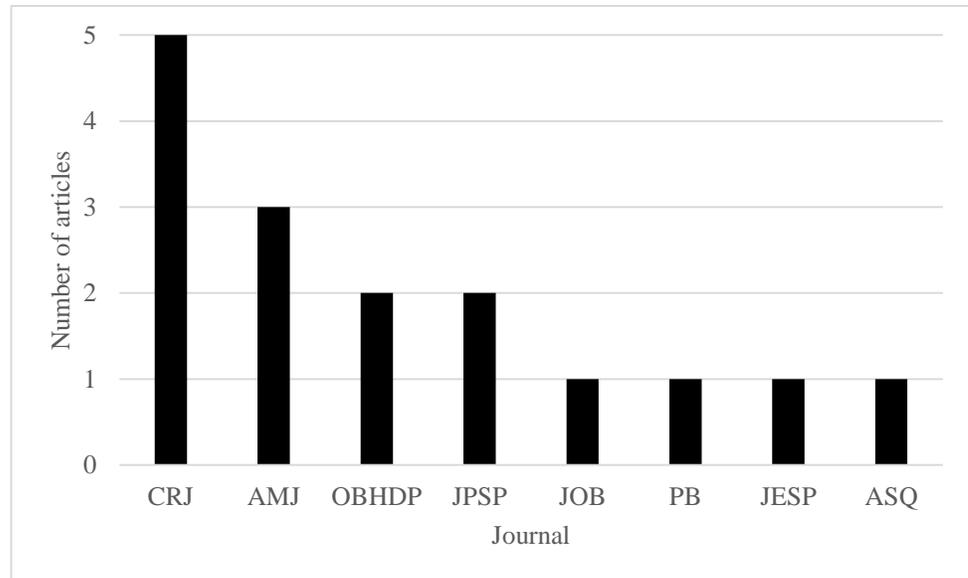


Figure 1: Number of articles per journal.

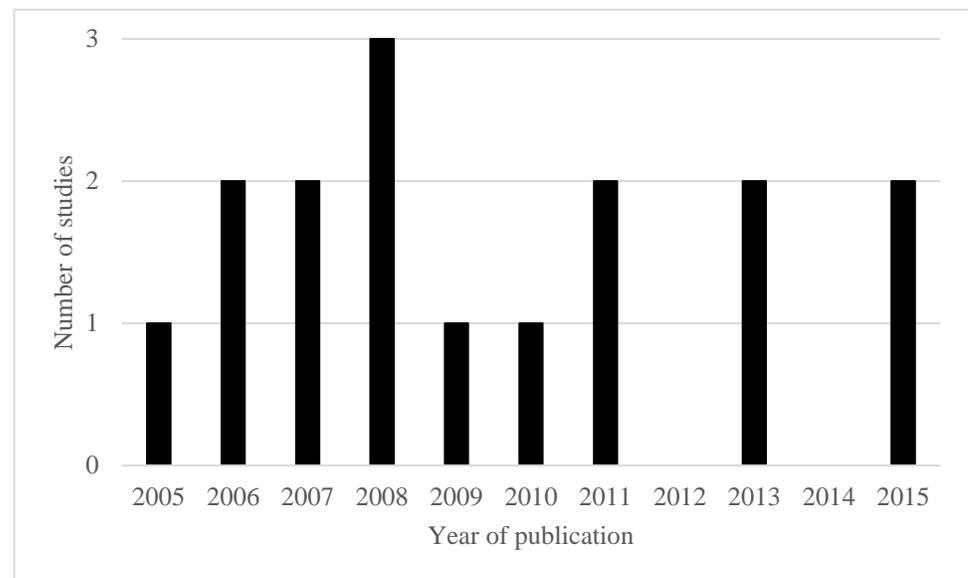


Figure 2: Number of articles published per year.

With regard to the characterization of the included articles, all 16 (apart from one, which also incorporates qualitative elements) are quantitative in nature. Seven articles used experiments, whereas three papers describe observational studies taking place in organizations. Two articles incorporated both, an experimental and observational study. The remaining two articles are meta-analyses.

Concerning the valence of affective states, two studies focus on positive affective states, two on their negative counterparts and the remaining investigate both hedonic states. Five articles focus on independent effects and three articles propose interaction effects. Thus, the included papers constitute a quite

heterogeneous sample, which allows for insight into the affective states-creativity link from multiple directions. It is worth noting that the studies do not always precisely distinguish between moods and emotions with regard to their usage of terms/induction. Therefore, also in the discussion section, no differentiation is made between moods and emotions. Instead, their effects on creativity are discussed under their higher-order construct of affective states. Finally, the studies relied on five theories, whereas the number of studies referring to those is quite unilateral (figure 3). Besides existing theories, new theories were established in the last decade. The number of studies that make use of those theories is shown in figure 4.

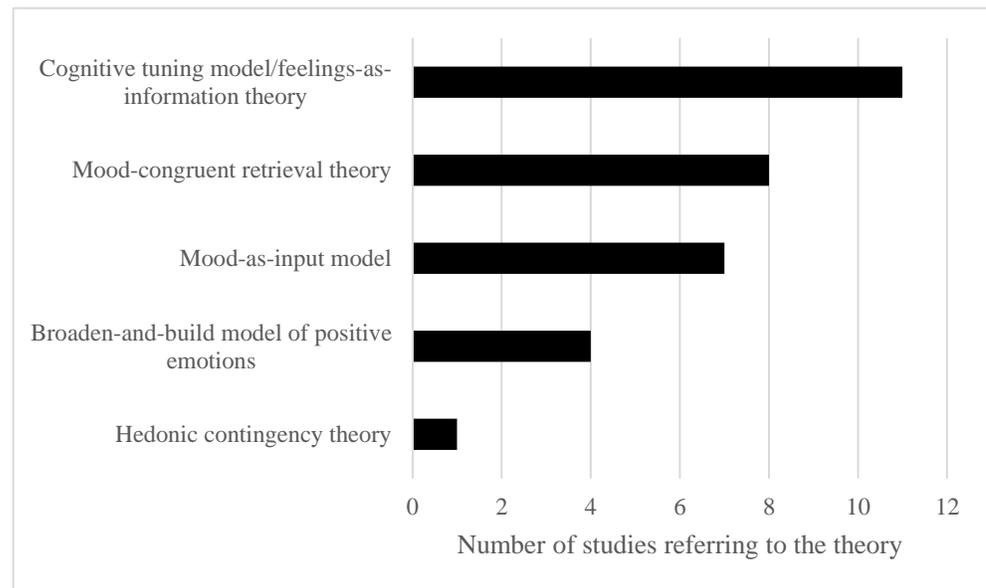


Figure 3: Underlying theories

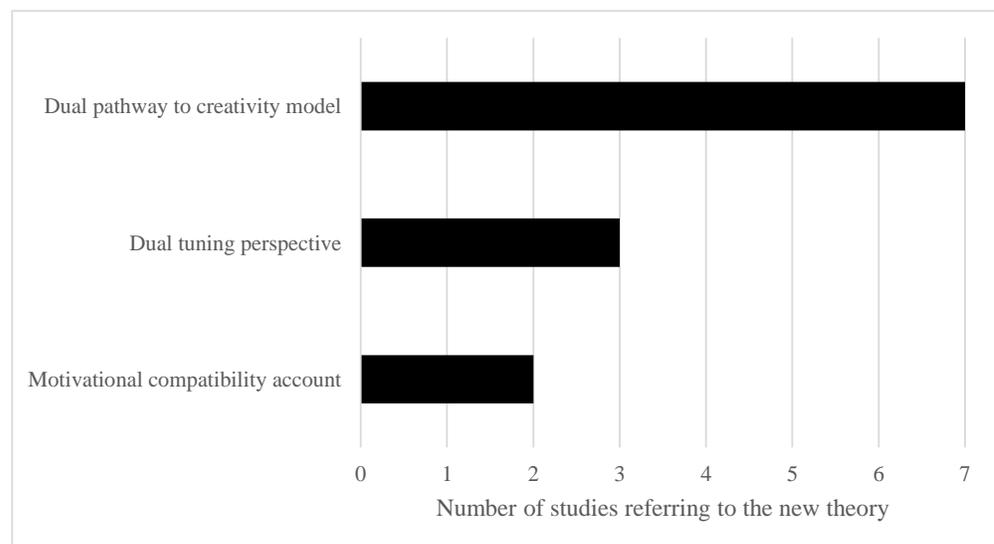


Figure 4: Newly established theories

Findings

Studies investigating only positive affective states

The first paper that focuses on positive affective states and their relation to creativity is a longitudinal field study conducted by Amabile et al. (2005). The authors mainly refer to Fredrickson's (2001) broaden-and-build theory. Beyond considering the pure link between positive affect and creativity, they hypothesize more complex patterns that might influence the relationship, e.g. affective intensity and affective lability. Interestingly, they also contemplate temporal aspects, most notably incubation periods, such that a positive mood at day one might be followed by enhanced creativity at day two. To test their assumptions, for several months, 222 employees engaged in creative work filled in a daily questionnaire that asked for quantitative as well as qualitative data on their momentary experienced affect and creativity. Additionally, a monthly peer-rated questionnaire was employed. The results suppose a simple and linear relationship between positive affect and creativity, finding no effects of affective intensity and lability. Furthermore, incubation periods of up to two days have been found.

Another study investigating positive mood as an independent variable was run by Hirt et al. (2008). They investigate the correctness of the mood management hypothesis and suggest that happy individuals only exert more creativity, if it is clear that their creative efforts will serve to sustain their mood. The expectations were tested on the basis of three experimental studies, using students as subjects. Film clips induced the desired mood and category generation tasks were used to measure creativity on its three dimensions. First results showed that happy individuals systematically selected tasks according to their pleasantness and potential for creativity. Study two lends further support by confirming that individuals, when instructed to perform a mood-threatening task, transform the activity into something less tedious by leveraging creativity to sustain their mood. The last study verified these results.

Studies investigating only negative affective states

Baas et al. (2011) test if the discrete affective state of anger has creativity-enhancing effects. Their argumentation is based on the style of information processing anger evokes. Partially criticizing their own dual pathway to creativity model, they argue that anger compared to sadness leads to a less systematic but more heuristic information processing style and will, via this route, enhance creativity. However, they hypothesize that the creative production of angry participants will decline stronger over time, since their flexible processing style demands for more resources. The authors tested their assumptions in three experiments, two using an idea generation task (assessed on dimensions of fluency and originality) and one an insight task to measure creativity. Mood was induced by an autobiographical memory task. Results show that anger leads to comparably unstructured creative production, peaking early on and declining precipitously over time.

Conversely, González-Gómez and Richter (2015) explore how shame can contribute to creativity. Their reasoning is built on the perspective that discrete emotions motivate specific behavioral reactions. By proposing that creativity might be a suitable activity to potentially repair one's self-view, the authors infer that shame should have a positive effect on creativity. This main effect is supposed to be jointly moderated by creative team environment and the suppression of shame expressions. To test their hypothesis, the authors initially administered a twice-daily survey, over five consecutive days, to 306 employees. The daily survey assessed shame and creativity by self-ratings and by supervisor ratings of creativity at the end of the working week. Results do not suggest a main effect; however, substantial support was found for the moderating hypothesis. To verify the assumption of restore motivation in study one, the authors further conducted an experiment, which affirmed its the mediating mechanism.

Studies investigating positive and negative affective states ***Studies proposing single effects***

The dual pathway to creativity model, developed by De Dreu et al. (2008), offers a new explanation for the question why positive and negative moods may independently strengthen creativity. The authors propose that creativity may not only result from cognitive flexibility as it is predominantly theorized, but can also be a function of cognitive perseverance and persistence. That means that hard work and prolonged effort may equally enhance creativity. Further, the authors advocate for the importance of distinguishing moods not only on the basis of their hedonic tone but also with regard to the level of activation, assuming that activating moods lead to more creativity than deactivating moods irrespective of hedonic tone. However, the hedonic tone of mood states is thought to determine the route – flexibility or perseverance – through which creativity is evoked.

Friedman et al. (2007) consider the interactive effects that mood and task framing might have on creativity. By deriving their arguments from the feelings-as-information framework, they develop a motivational compatibility account for the mood-creativity relation. It suggests that positive and negative moods lead to different goals and motives. These in turn will determine how much processing effort an individual exerts on a creative generation task. That means, only when they are compatible with the nature of the task an individual will be motivated to pursue the task for the sake of goal attainment. Thus, in the case of positive affective states, the evoked motive is hypothesized to increase effort on creativity tasks framed as fun and silly (fun-seeking motive) relative to tasks that are framed as incompatible with the motive. In contrast, negative affective states could increase effort on creativity tasks framed as serious and important (problem-solving motive). The model was tested in three experiments, which employed creative generation tasks that were either construed as compatible with the fun-seeking or the problem-solving motive. Results of experiment one and two are only partially supportive - the effects of positive mood seem not to

depend on task framing. However, experiment three successfully found a compatibility effect also for positive mood, which bolsters the model.

Binnewies and Wörnlein (2011) elaborate on how different hedonic variants of affect relate to creativity by daily surveys in a real work environment. They suggest that positive mood in the morning of a working day will be positively related to daily creativity. With regard to negative affective states, no main effect on creative production is proposed. Instead, the importance of possible moderators is pointed out, leading to the examination of job control as a boundary condition. It is hypothesized that the positive relation between positive affective states and daily creativity is intensified for high levels of job control. For negative affective states, the affect-creativity link may be positive when high levels of job control exist, whereas it may be negative low job control situations. 90 interior architects were advised to complete a morning and an afternoon survey on five consecutive days in order to provide data on their current mood and creativity. Results prove the direct, favorable effect of positive mood, and that for employees with low job control negative mood leads to reduced creativity. The remaining assumptions could not be confirmed.

Fernández-Abascal and Díaz (2013) compare the influences positive and negative affective states independently exert on creative thinking. To lay the foundation of their paper, they mainly review theories of cognitive processes that attribute creativity enhancing effects to positive moods. For negative moods, they refer to earlier empirical findings and newly emerged theories. The authors conducted two experiments that are of relevance for this review. In the first experimental setting, affect was induced by film clips (happiness, sadness); in the second, a masked induction procedure was applied (happiness, anger, control condition). In both experiments, creativity was assessed with the Torrance Test of Creative Thinking (TTCT; Torrance, 1984). Results of the two settings show that happiness, in contrast to sadness or anger, facilitates creativity. Thus, an individual's positive affective state enhances creativity, whereas an individual's negative mood was found to have no effect on creative production. A third experiment measuring habitual affect was disregarded.

Most recently, Xiao et al. (2015) likewise investigated the relation of different hedonic states to creativity, and went one step further by incorporating potential moderators. They suggest that two types of autonomy, namely dispositional and situational autonomy, might be suitable to explain previously inconsistent findings. It is hypothesized that high dispositional autonomy weakens the effects of mood, whereas high situational autonomy strengthens them. Generally, the authors presume that positive moods are more conducive to creativity. To test their assumptions, two experiments were conducted. In both settings, after the mood induction, subjects completed the TTCT to measure creativity on its three dimensions. Results of experiment one show that positive moods foster creativity more than negative moods. Furthermore, the effects of induced moods are contingent upon the level of dispositional autonomy, but they only stimulate creativity when dispositional autonomy was low. Similarly, experiment two also

found that positive moods enhance creativity more than negative ones, but only when situational autonomy was high. Otherwise, the two moods have the same effect on creativity.

Studies proposing interaction effects

A defining characteristic of George and Zhou's (2007) work is that it considers the interaction of positive and negative moods. More precisely, they investigate how the encounter of both states at different times will boost creativity in supportive work contexts. They develop their arguments on the basis of the feelings-as-information theory, and contend that the cognitive tuning effects of both moods on information processing are critical in creative generation. It is hypothesized that the differential tuning effects of positive moods (less systematic processing) and negative moods (analytic processing) jointly operate through boosting each other to facilitate creativity. Therefore, the authors test the hypothesis that negative mood is most strongly and positively related to creativity, when positive mood is high and the context is supportive. They further propose that creativity is at its ultimate level when all variables in the three-way interaction are high. For their observational study design 161 employees filled in a questionnaire with items about the independent variables, while their creativity was rated by their respective supervisors. Findings confirm the three-way interaction. Unexpectedly, positive mood also has a direct positive effect on creativity.

Similarly, Bledow et al. (2013) distance themselves from isolated effects and rather consider the dynamic interplay of the two hedonic states. They propose that positive and negative affective states vary over time, and that these changes in affective experience trigger alterations in the applied styles of information processing. The dynamic interplay of the two affective states should then enable the integration of the different processing styles, which are vital for creativity. Consequently, two dynamics are estimated. Firstly, the strength of the positive relationship between positive affective states and creativity is hypothesized to increase when positive affect is preceded by a period of negative affect. Thus, negative mood at time one (t_1) should operate as a moderator in the positive mood-creativity relation at time two (t_2). Secondly, high creativity should emerge following an affective shift, involving an increase in positive affect and a decrease in negative affect from t_1 to t_2 . Since these two changes in mood are associated with different alterations in processing styles – which are together highly conducive to creativity – the decrease in negative mood from t_1 to t_2 should moderate the relation between change in positive mood from t_1 to t_2 and creativity. In a field study, which spanned one working week, 102 employees from different companies were asked to fill out a morning (t_1) and evening (t_2) online survey to measure the variables of interest. Results are supportive of both dynamics. Finally, an experimental study, using students as subjects, verified the positive consequences of an affective shift on creativity.

Instead of proposing that positive and negative affective states fluctuate over time to add to creativity, Fong (2006) suggests that their simultaneous

experience, defined as emotional ambivalence, may boost creative generation. She bases her argumentation on the theory that feelings operate as information or signals about the current environment. Thus, given that emotional ambivalence is perceived as an unusual affective state, it signals to the individual that it is in an atypical environment. As a reaction to this informational cue, the individual is hypothetically reminded that stimuli in the environment, which seem to be unconnected, could actually be related, increasing the individual's sensitivity to unusual associations and ultimately its creativity. This relationship is expected to be moderated by the perceived typicality of ambivalence, while the favorable effects on creativity will drop when ambivalence is no longer considered unusual. Two experiments tested these assumptions. In experiment one, mood was manipulated and sensitivity to remote associations was assessed by a creative thinking task. In experiment two, the perceived typicality of ambivalence was additionally manipulated to test for moderation. Results support the two hypotheses.

Meta-analyses

As one might already infer from the depiction of the previous articles, the research field is quite heterogeneous and results are not always consistent. Therefore, the portrayal of two meta-analyses might be helpful. In order to address the widely-held view that positive mood consistently leads to creativity, Davis (2009) conducted a meta-analysis of 62 experimental and ten observational studies. He estimates positive moods to promote creativity, while neutral or negative moods are used as a referent mood state. Further, he argues that the effects of mood on creativity are dependent on the sort of task that is used to operationalize creativity. Thus, positive mood should only lead to enhanced performance on ideation tasks. Contrary, achievement on problem-solving tasks is not expected to vary due to mood. Additionally, the duration of negative mood effects was found to exceed the one of positive moods. Therefore, it is assumed that positive mood should improve creativity on timed tasks and negative mood on untimed tasks. As a third aspect, the author considered the influence of mood intensity. With regard to the design of experimental investigations, mood induction procedures evoking moods of moderate intensity should have stronger effects on creativity than the ones that evoke high or low intensity moods. To find relevant studies, Davis conducted a multi-stage search process and based the decision for inclusion on three rules. In summarizing results, despite the finding that negative moods do not enhance performance on untimed tasks, no hypothesis is rejected. Overall, the author calls for a contextual perspective on the mood-creativity link.

Another meta-analysis that synthesized 102 effect sizes and incorporated studies of a time period of 25 years was carried out by Baas et al. (2008). The authors distinguish between mood states, not only on the basis of their hedonic tone, but also on the two dimensions of activation and regulatory focus (promotion vs. prevention focus). Relating these dimensions of mood to

creativity, three hypotheses are derived. The hedonic tone hypothesis suggests that positive moods, due to increases in cognitive flexibility, lead to greater creativity than negative or neutral moods. The activation hypothesis attributes greater creativity to activating moods than to their deactivating counterparts. Lastly, the regulatory focus hypothesis postulates that a mood state's associated regulatory focus in combination with its degree of activation determines creativity. Compared with mood-neutral controls, activating promotion focused moods would enhance creative performance, whereas activating prevention focused moods would hamper creativity. Deactivating mood states are thought to have only minor impacts, regardless of their regulatory focus. The authors based their literature search on various sources and filtered the potential articles by four inclusion rules. Results largely approve the first two hypotheses and fully support the regulatory focus-activation interaction.

Discussion

Influence of positive and negative affective states on creativity

An often inherent assumption of the above articles is that positive affective states are more conducive to and have a more direct effect on creativity than negative ones. However, the results show that the relationship between positive affective states and creativity is a relatively stable one that is positive in nature. Given that not only the general study designs of these investigations were different but additionally distinct operationalizations of the concepts were used, it can be concluded that the effect is relatively robust and generalizes across findings.

With regard to negative affective states, the results are far less consistent and no ultimate conclusions can be drawn. While some studies detect a positive link between negative mood and creativity, others find no direct relationship. Knowing that earlier studies also found direct negative relations, the conflicting findings lead to the conjecture that the impact of negative mood on creativity might be more context-dependent than the impact of positive mood, e.g. the effect of negative mood on employee creativity is dependent on the level of job control. Consequently, considering moderators or interaction effects might help in explaining the inconsistent relationship. Alternatively, one might propose that the relationship is not unitary in its valence, because distinct negative emotions might affect creativity differently. Therefore, it would be inappropriate to subsume them under one concept. Support for this train of thought might be derived when comparing the effects of anger and shame on creativity. While both were hypothesized to increase creativity, only anger had a direct positive effect. Shame instead did not lead to enhanced creativity in an organizational setting, unless two boundary conditions were fulfilled. The dual pathway to creativity model further bolsters this view in that two different moods of the same hedonic tone (anger and sadness) did not lead to an equal level of creativity as they varied on another dimension. Altogether, these findings allude to the importance of considering discrete emotions separately, and distinguishing mood

states on the basis of more dimensions. This advice should likewise be followed for positive affective states. It seems that categorizing moods merely on the basis of the hedonic tone dimension has become too simplistic to yield new insights and that more fine-grained differentiations are desirable in future. A last explanation for the inconsistent findings might consider the varying operationalizations of creativity used to measure the concept. Given that the effects of negative moods seem to be more context-dependent, it is possible that different creativity tasks and scales are not equally appropriate to capture the effects of negative moods on certain facets of creativity. Therefore, inconsistent results might be obtained. In general, the distinct measures applied should be selected with caution. One could criticize whether comparisons are admissible, and if so, to what degree they are meaningful and can reliably be generalized to other circumstances. Future investigations might therefore try to apply more uniform measures of creativity. However, probably for the sake of simplicity, it is common practice to compare the results of different operationalizations and at least for positive mood it seems to make no difference.

Latest developments in the research field

Lastly, to do justice to the question of whether the research field has been advanced, the results will be discussed with regard to the new insights they yield. Three areas of advancement could be identified.

First, while past work was merely based on the hedonic tone dimension of affective states, it seems that the research community increasingly tried to incorporate additional dimensions. For example, De Dreu et al. (2008) added a mood state's level of activation and found that a mood's effect on creativity also depends on this dimension. Also, Filipowicz (2006) attributes greater importance to the dimension of activation than to an affective state's valence in driving creative generation. The underlying logic of this development, even though in the future some dimensions might be more valued than others, is that their combination better explains creativity than do any of these aspects alone.

Second, within the last decade, interactions between positive and negative affective states seem to have become a key research area. While former investigations mostly considered the two hedonic states in isolation, three papers of the literature review focus on their dynamic interplay. For instance, George and Zhou (2007) and Bledow et al. (2013) investigate how both hedonic states rise and fall over time to promote creativity, whereas Fong (2006) even suggests that their simultaneous experience leads to higher creativity. The intention behind this new line of inquiry is to look at affective states more realistically, since real life moods are continuously changing and therefore clearly both hedonic states are experienced.

Third, on the basis of previous theoretical accounts, new models that try to offer a better explanation for the mood-creativity relation were established. In this connection, the dual pathway to creativity model, developed by De Dreu et al. (2008), is probably the most important. Providing new insights into how

negative moods may enhance creative performance, it is frequently cited by subsequent research papers. To summarize, the three areas illustrate that progress has been made and that research approaches are continuously improved to better approach still existing inconsistencies. However, it seems that to unravel the impacts of especially negative moods, more research is needed.

Contributions, limitations and implications

Taking into account that affect permeates organizations (Barsade & Gibson, 2007) and also that a lack of research existed in the subject area a decade ago (Shalley et al., 2004), the research question asked for a deeper investigation of affective states as a determinant of creativity.

In summary, positive and negative affective states both have the potential to influence employee creativity. Nevertheless, the influences that they exert are not equally well discovered and explained. In previous theory, most models that build a bridge across the two concepts focus on the favorable effects of positive affective states. Theoretical models that incorporate negative moods and emotions are quite rare. This review fills this gap through analyzing the latest findings on the affective states-creativity link. Comparisons of the 16 included articles largely illustrate that positive affective states boost creativity irrespective of the context. Their influences on creativity seem to be direct and stable. However, with regard to their negative counterparts, there are still sharp divisions over their relation to creativity: positive, negative and no correlations have been found. Therefore, the only proper conclusion that can be drawn for negative affective states is that their influences seem to be more context-dependent. Moderators, a more precise distinction between negative affective states and more uniform measures of creativity, are proposed to be able to help in unraveling the still existing complexity. Even though the results of the literature review show that the influences of negative affective states are still very much of an open question, they certify that good progress has been made in advancing the research area. Most notably, new dimensions of mood, interaction effects of both hedonic states and new models were proposed, with one of those even elaborating on the favorable effects of negative mood.

A natural implication of the above findings is that managers should try to cultivate positive affective states among their employees to maximize their creativity. This recommendation is of major importance as Eubanks et al. (2010) found that positive affective states may offset disadvantages in individual creative potential. Instead, the induction of negative affective states in employees is not recommended. Even though anger and shame were shown to have the potential to boost creativity (Baas et al., 2011; González-Gómez & Richter, 2015), the impacts of negative emotions are too context-dependent and therefore instable and easily reversible. Managers that intentionally shame or annoy their employees are thus not only at risk to miss the intended outcome, but above all threaten the working atmosphere. If negative emotions unavoidably occur, managers should try to reshape the context so that negative

emotions might also lead to enhanced creativity e.g. by fostering a creative team environment (González-Gómez & Richter, 2015).

Even though research question was answered, further research in this field is highly recommended. Although more than 1100 articles were investigated and the quality of the analyzed articles ensured a well-regarded sample, an extensive literature review would enhance the salience of findings. Further, the discussion of results focused on the relation of affective states, classified according to their hedonic tone and creativity, with only minor debate about affective states that are distinguished based on other dimensions. Therefore, future studies might focus more on how activating versus deactivating mood states are linked to creativity. Another limitation that needs to be addressed is the missing differentiation between moods and emotions as they were subsumed under affective states. Future studies might try to distinguish more precisely between the two subgroups, to test if they really exert the same effects. However, this would be a difficult endeavor, as the research articles themselves do not delineate the concepts strictly. Finally, the most pressing issue that demands for future research is the impact of negative affective states on creativity. As a starting point, the three proposed explanations for the inconsistent results could be used. Lastly, for the research community, this systematic literature review provides a useful synopsis to distribute research efforts appropriately within the next decade.

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