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The psychology of creativity : moods, minds, and motives

Baas, M.

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“The artist is a receptacle for emotions that come from all over the place: from the sky, from the earth, from a scrap of paper, from a passing shape, from a spider's web.”

—Pablo Picasso, *Conversation with Picasso*

“Feeling and longing are the motive forces behind all human endeavor and human creations.”

—Albert Einstein, *Religion and Science*

According to a recent survey among Dutch managers and entrepreneurs, being relaxed is rated among the top-five stimulants of creativity (ten Hoopen & Janssen Groesbeek, 2008). Yet, when asked about the typical creative person, a picture of the blue and troubled artist readily comes to mind – or as Flemish writer Herman Brusselmans (n.d.), not quite a happy camper himself, once said that all major discoveries are made by depressed people. Oftentimes, we feel that an original joke or a creative solution comes easier when we are in a happy mood and focused on positive outcomes. Other times, people track back their creative ideas to upsetting, fearful, and negative events. Nobel Prize laureate Max Perutz commented on his experiment that proved the structure of the alpha-helix: “The idea was sparked off by my fury over having missed that beautiful structure myself” (Ferry, 2007, p. 148) and for fictional character Don Draper, creative advertisement director in the hit series *Man Men* (2007), it is fear that stimulates his imagination.

As these quotes and observations seem to suggest, mood states have a strong and pervasive relation with the human capacity for creativity. Yet, they also beg the question which quotes or observations are right – which moods do, and which do not, promote creative insight and original thinking? Equally puzzling is the empirical evidence: As will be elaborated in Chapter 2, mood stands out as one of the most widely studied predictors of creativity, but the studies on the mood-creativity relationship show many inconsistent findings. This is unfortunate given that mood often serves as an intermediary state between a host of situational and personality predictors on the one hand, and creative performance on the other. Thus, once we understand how mood relates to creativity we may infer from the ways in which leadership influences employee mood how leadership relates to employee creativity (e.g., George & Zhou, 2002). Likewise, from the ways in which group conflict influences individual moods we may infer how conflict relates to group creativity (e.g., Carnevale & Probst, 1998; De Dreu & Nijstad, 2008). Its importance also lies in the fact that moods can be influenced more directly to stimulate creativity. For example, convinced that a calm and relaxed state stimulates creativity, organizations spend large amounts of money on relaxation rooms to stimulate employees’ creative thinking. However, a better understanding of which moods do, and which do not, promote creativity is needed to conclude whether this is justified or merely a waste of money.

My goal in the present dissertation is to examine which mood states help or hinder creativity and to understand why this is the case. The findings of this dissertation will show that some conventional ideas about when and how creativity

is achieved are not correct. People are not more creative when they are relieved, relaxed, sad, or depressed. However, it will appear that mood states that activate the individual, such as happiness, anger, and fear, do promote creativity. Moreover, the findings of this dissertation suggest that this is also true for motivational states that activate the individual (e.g., approach states, unsuccessful avoidance motivation), which lead to more creativity than motivational states that deactivate the individual (e.g., successful avoidance). Finally, the present dissertation will show how these activating moods and motivational states have their effects on creativity. In the remainder of this introduction, I will first give a brief overview of what creativity is and why people feel creativity is so important. Then I introduce a model that helps explain how personality traits and situational factors may have their effects on creativity. I end this introduction with a brief overview of the chapters in this dissertation.

Creativity from a Product, Person, Situation, and Process Perspective

Creativity is broadly defined as the production of ideas, insights, products, or problem solutions that are both novel (original) and appropriate (feasible, potentially useful; e.g., Amabile, 1983; Paulus & Nijstad, 2003; Sternberg & Lubart, 1999). The hallmark of creativity probably is originality – an idea, insight or solution is original when it is novel, infrequent, or uncommon (Amabile, 1996; Guilford, 1967). However, some ideas might be very original but are still useless when they cannot be realized and implemented, and these ideas are bizarre rather than creative. In other words, an idea is creative when it is original *and* appropriate.

Creativity serves several functions. Our creative capacity helps us adapt to changing circumstances in our environment, and to deal with the threats, challenges, and opportunities we encounter in everyday life (e.g., Runco, 2004). For example, research teams from industries, governments, and universities are developing new ways to create, store, and renew energy in order to cope with global warming. Creativity also is critical to successful entrepreneurship and organizational effectiveness and survival (Woodman, Sawyer, & Griffin, 1993). For example, innovative technologies and tools were crucial for Google to become the world's most popular search engine and a robust financial enterprise with its market value continuously rising (Vise, 2005). Third, and finally, creativity helps to achieve evolutionary functional goals, like attracting mating partners (Griskevicius, Cialdini, & Kenrick, 2006), and winning heated conflicts and debates (De Dreu & Nijstad, 2008). In short, creativity helps humans to survive, adapt, and prosper. Accordingly,

creativity has been studied in the psychological sciences for decades and now has its own place within most of the traditional sub-areas in psychology, including social, organizational, personality, cognitive, clinical, and child psychology. Within each of these areas, the study of creativity tends to orient itself to the creative product, the creative person, the situational factors that influence creativity, or the creative process. Each of these perspectives meaningfully contributed to our understanding of creativity and will be discussed briefly below.

Creative product. From a product or “end-state” perspective, creativity refers to the ultimate product that is evaluated in terms of its novelty and appropriateness (Runco, 2004; Simonton, 2003). Such products may be extremely varied and include masterpieces such as the *Brandenburg Concertos* (Bach), the *General Theory of Relativity* (Einstein), and *Les demoiselles d'Avignon* (Picasso), but may also refer to original solutions for everyday problems. The product perspective also includes work that studies the creative achievements of artists and scientists with creative products referring to the quality and quantity of works of classical composers (Simonton, 1977; Weisberg, 1994) and, as a proxy for quality, the number of citations a scientist receives (Simonton, 1992; 1997). Finally, there is a variety of tests in the creativity literature to measure creative ideas, insights, and products (e.g., Hocevar & Bachelor, 1989; Runco, 2004; Simonton, 2003; Treffinger, 1987). For example, researchers have used creativity ratings of participants' poems, stories, collages, and buildings (Hocevar & Bachelor, 1989; Simonton, 2003). Other researchers ask participants to generate ideas about a certain topic and have these ideas subsequently rated in terms of how many ideas someone is able to generate and on how original and rare these ideas are (Lamm & Trommsdorff, 1973). Still other researchers offer participants creative insight problems that have only one correct solution and typically require a mental restructuring of problem information that leads to a clear and sudden understanding of how to solve the problem (Gilhooly & Murphy, 2005; Schooler & Melcher, 1995). For example, in the Remote Associates Test (Mednick, 1962), participants are provided with three words (e.g., envy, golf, beans) and are instructed to generate a word that relates to all of these three words (i.e., green). Participants need to break up the presented material to identify potentially correspondent attributes and relations associated with the three provided words in order to come up with the correct solution. In Chapter 2, these different creativity measures are discussed in more detail.

Creative person. From the creative person perspective, creativity is conceived of as a trait characteristic of a person. Indeed, when we think of creativity, eminent historical figures such as Matisse, Michelangelo, Mozart, and Marie Curie readily come to mind. The aim of this perspective is to understand the characteristics, development, and career trajectories of creative people (e.g., Csikszentmihalyi, 1996; Eysenck, 1993; Galton, 1869; Mumford & Gustafson, 1988; Simonton, 2003). This approach led to inspiring introspections of creative geniuses on how to achieve creativity. For example, Nobel Prize laureate Albert Einstein explains that you can never solve a problem on the level on which it was created, which refers to the necessity to overcome a constrained representation of a problem in order to solve it (i.e., “set-breaking”). Thomas Edison, inventor and holder of more than a 1,000 patents, teaches that creativity is 1% inspiration and 99% perspiration, a method that is echoed in the observation made by Vivien Perutz on her father, Max Perutz, Nobel Laureate and founder of the world-leading MRC Laboratory on Molecular Biology at Cambridge University: “...all his life, whatever he was doing – riding his bicycle, going for walks, dead-heading the roses – his mind would always be occupied by the latest problem ... His approach was that of Isaac Newton who, when asked how he made discoveries, answered: By always thinking about them. I keep the subject constantly before me and wait until the first dawnings open little by little into the full light” (Ferry, 2007, p. 224).

Decades of research on artists, scientists, and people that are considered to be creative led to a profile of the creative person (Barron & Harrington, 1981; Eysenck, 1993; Feist, 1998; McCrea, 1987; Simonton, 2003). First, the literatures on personality and creative achievement show that, in general, creative scientists and artists are less conscientious, they are more open to new experiences, and more hostile, intuitive, and autonomous (Feist, 1998; also Barron & Harrington, 1981; McCrea, 1987). Second, research on the cognitive abilities of creative individuals shows they are intelligent (Barron & Harrington, 1981; Galton, 1869), often show a lowered capacity to screen out so-called “irrelevant details” (Carson, Peterson, & Higgins, 2002; Eysenck, 1993), and they have flat associative hierarchies with many associations available for any given stimulus (Mednick, 1962; Simonton, 2003). Third, investigations of the career trajectories of creative people show that creative people are highly goal-oriented and display a great amount of drive, energy, and persistence (Simonton, 2003). For example, the sheer output of publications is the single best predictor of the impact that a scientist has on his or her discipline (Simonton, 1997, 2003). Fourth and finally, there is evidence that the creative

person has some inclinations towards psychopathology. For example, creativity has been linked to dispositional traits underlying susceptibility to the development of psychoticism (Eysenck, 1993) and to mood disorders (Jamison, 1993; Shapiro & Weisberg, 1999; Weisberg, 1994). As to the latter, mild hypomanic or euphoric states are associated with higher levels of creativity because of increased ideational fluency and tendencies toward overinclusion, whereas mild depressed states did not predict creativity (Shapiro & Weisberg, 1999).

Creative situation. The creative situation perspective is about finding out the circumstances and situational factors that promote or hinder creativity (Amabile, 1983). Over the past decades, much work within social and organizational psychology has explored the effects of different situational variables on creative performance. For example, research has shown that situational factors lead to greater levels of creativity to the extent that they lead to increased levels of task interest and motivation (Amabile, 1996; L. L. Martin, Ward, Achee, & Wyer, 1993). For example, when individuals are rewarded specifically for original thinking, they display more intrinsic involvement in the creativity task, and are more creative in their answers (e.g., Eisenberger & Rhoades, 2001). Similarly, when the goal to be creative is activated with primes of Apple (vs. IBM), people become more creative because of increased motivation (Fitzsimons, Chartrand, & Fitzsimons, 2008). Other research shows that situational factors lead to greater levels of creativity to the extent that they activate global rather than local processing of information, which facilitates accessibility to more remote informational links (Förster, 2009; Friedman, Fishbach, Förster, & Werth, 2003). For example, global processing modes are activated, with greater levels of creativity as a consequence, when people are reminded of love rather than casual sex (Förster, Epstude, & Özelsel, 2009), when people perform approach behavior (pulling a lever towards them) rather than avoidance behavior (pushing a lever away; Förster, Friedman, Özelsel, & Denzler, 2006), and when they are exposed to a blue rather than a red background (Mehta & Zhu, 2009). Situational factors that have been linked to creativity also include moods and motivational states, which are at the core of this dissertation and discussed in more detail in the next section, as well as in Chapter 2, 3, and 4.

Creative process. Finally, the creative process perspective is about examining the possible paths that lead to solutions, discoveries, ideas, and other creative products (Mumford, 2001; Newell & Simon, 1972). The process perspective does not

regard creativity as an attribute of a few brilliant minds (as is the case for the person perspective), but it treats creativity as inherent to human cognitive functioning. For example, everyday creativity is expressed in our flexible use of language, our ability to create and use new mental categories to organize our experiences, and our ability to mentally manipulate objects (Ward, Smith, & Finke, 1999). An example of creativity research from a process perspective is the vigorously investigated phenomenon that creative problem solving is sometimes enhanced after a period of incubation (i.e., while not thinking about the problem; for an overview see Sio & Ormerod, 2009). In an attempt to explain this so-called “incubation effect,” it has been argued that an incubation period weakens the fixation on incorrect strategies during initial attempts towards solution, allowing individuals a fresh view of the problem (S. M. Smith & Blankenship, 1991). In other words, people need to “break set” before the correct solution pops up into their minds as a flash of insight (Duncker, 1945).

Integration of perspectives. The person, process, situational, and product perspectives involve different approaches and research traditions with regards to creativity, but can nevertheless be integrated (Amabile, 1983; Runco, 2004; Simonton, 2003). People are usually regarded as creative because of their work, ideas, and products. The situational and process perspectives explicitly incorporate creative products as their primary dependent variable and argue that the same processes that lead to relatively mundane outings of everyday creativity may also operate in cases of the genuinely important scientific discoveries or works of art made by creative geniuses (Ward et al., 1999; also Guilford, 1950). Moreover, almost all research on creative products, persons, circumstances, and processes fit nicely into the following definition of creativity: the production of ideas, insights, products, or problem solutions that are both novel (original) and appropriate (feasible, potentially useful; e.g., Amabile, 1983; Paulus & Nijstad, 2003; Sternberg & Lubart, 1999). This definition (1) assigns creative products and ideas as the primary dependent outcome variable; (2) allows research on (personalities of) people that have the ability to produce creative products and insights; (3) allows research on the circumstances under which the generation of creative ideas and insights is stimulated or suppressed; and (4) refers to the process of producing products and ideas that are both original and appropriate. This definition of creativity will be used throughout this dissertation.

In showing what creativity *is* and what it *is not*, the integration of the four perspectives into a definition of creativity has provided an important framework for creativity research. Accordingly, much research endeavors have been undertaken in order to discover the situational and personality factors that drive creativity and to understand the psychological principles and processes that underlie creativity. More recently, these different lines of research have been integrated into a model that helps explain how personality traits and situational factors may have their effects on creativity. This model will be introduced below.

Dual Pathway to Creativity Model

In an attempt to understand and explain trait and state-based variations in creativity, the Dual Pathway to Creativity model (DPCM) identifies two pathways to creativity (Baas, De Dreu, & Nijstad, 2008; De Dreu, Baas, & Nijstad, 2008; Nijstad, De Dreu, Rietzschel, & Baas, 2010; Rietzschel, De Dreu, & Nijstad, 2007a). As can be seen in Figure 1.1, DPCM identifies two creativity outcome variables: originality and creative fluency. The hallmark of creativity probably is originality – an idea, insight or solution is original when it is infrequent or uncommon (Amabile, 1996; Guilford, 1967). In addition to originality, creativity researchers often look at fluency – the number of unique ideas, insights, and solutions an individual generates (e.g., Simonton, 1997; Torrance, 1966). Fluency and originality may be correlated (as in the adagio that “quantity breeds quality,” Osborn, 1953; see also Simonton, 1997), but they need not to be – for example, creative fluency may manifest itself in a relatively large number of solved insight problems, with the solutions themselves not being particularly new or uncommon (Förster, Friedman, & Liberman, 2004).

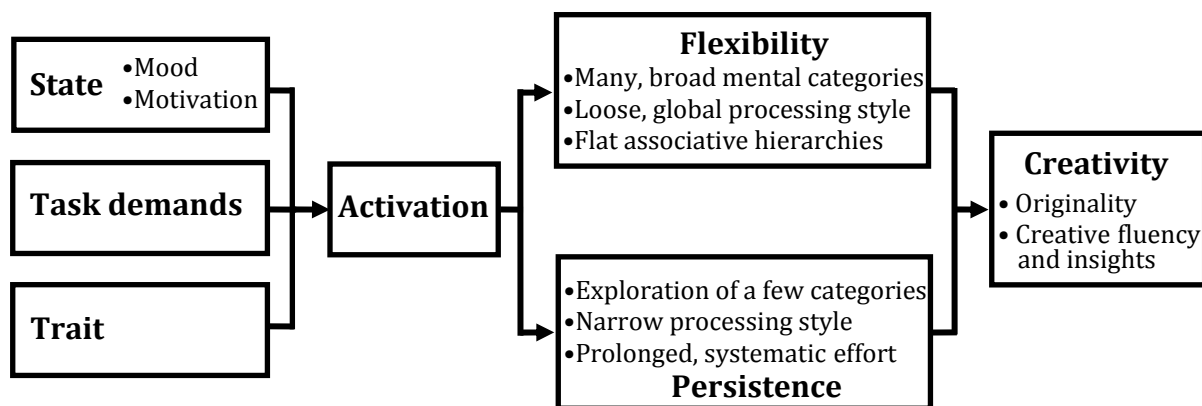


Figure 1.1. The Dual Pathway to Creativity Model

According to DPCM, creativity (originality and fluency) can be achieved through enhanced cognitive flexibility or enhanced cognitive persistence. On the one hand, many and uncommon ideas, insights, and associations can be achieved through flexibility, which involves the use of broad and inclusive cognitive categories, flexible switching among categories, approaches and sets, and global (as opposed to local) processing of information (Ashby et al., 1999; Förster, 2009; Murray, Sujana, Hirt, & Sujana, 1990). The “flexibility pathway” also refers to Albert Einstein’s observation that you can never solve a problem on the level on which it was created (“set-breaking;” e.g., Knoblich, Ohlsson, Haider, & Rhenius, 1999; Ormerod, MacGregor, & Chronicle, 2002; S. M. Smith & Blankenship, 1991) and entails the use of flat and global associative hierarchies (e.g., Eysenck, 1993; Förster et al., 2004; Mednick, 1962).

Alternatively, creativity can be achieved through cognitive persistence – solving problems and generating novel ideas and insights can be achieved through prolonged and motivated effort (Amabile, 1996; Eisenberger & Rhoades, 2001; Fodor & Carver, 2000), and focused and systematic exploration of a few possible solutions and perspectives in great depth (Rietzschel, Nijstad, & Stroebe, 2007b). The persistence pathway refers to Thomas Edison’s statement that creativity is 1% inspiration and 99% perspiration and to the method of renowned Spanish chef Ferran Adrià that the “important thing is to have lots of ideas simmering. Some of these ideas will work, and from these we build our new dishes. ... Our work is systematic: you have to be very organized to achieve a sense of anarchism” (Hoffman, 2009, p. 267).

DPCM further proposes that any trait or state that stimulates flexibility and/or persistence will increase creativity. Whether the flexibility and/or persistence pathway is engaged depends first and foremost on the extent to which the individual is cognitively activated. First, being activated leads to task engagement and motivation to consider the issue at hand (Brehm, 1999; Broadbent, 1972; Dietrich, 2004). Second, moderately high levels of cognitive arousal improve a number of cognitive functions that are important for creativity to come about - these include working memory performance, cognitive flexibility, sustained attention, and cognitive persistence (e.g., Ashby, Valentin, & Turken, 2002; Dreisbach & Goschke, 2004; Flaherty, 2005; Floresco & Phillips, 2001; Gray, 1982; Robbins, 1984). In other words, cognitive activation and engagement is needed to activate both the cognitive flexibility and persistence pathway, thereby stimulating creativity.

Although activating situational and dispositional variables are expected to enhance creativity, some activating states and traits may affect creativity primarily through their influence on cognitive flexibility, while other activating states and traits affect creativity primarily through their influence on cognitive persistence. With regards to cognitive flexibility, euphoric episodes in mood disorders are associated with increases in creativity through overinclusive thinking (Shapiro & Weisberg, 1999), dispositional traits that are associated with psychoticism are linked to creativity through the use of flat and global associative hierarchies (Eysenck, 1993), and intrinsic motivation leads to greater levels of creativity because it associates with a willingness to explore alternative courses of action to reach some desired end-state (Amabile, 1996). With regards to cognitive persistence, because Personal Need for Structure (PNS) is a chronic aversion to ill-structured situations and a longing for certainty and predictability (Thompson, Naccarato, Parker, & Moskowitz, 2001), Rietzschel et al. (2007a) argued that people high in PNS will be inclined to take a structured approach to a creativity task, and systematically explore conceptual categories, which may eventually lead to original ideas. Rietzschel et al. indeed found that PNS was associated with greater levels of creativity through persistence and not through flexibility. Likewise, the anticipation of conflict is associated with a narrow focus of attention and has been found to lead to many and original ideas, but only in conflict-related domains (e.g., in designing strategies to beat the opponent) and not for tasks that are unrelated to the conflict (De Dreu & Nijstad, 2008).

In a first test of DPCM, we compared creative performance by happy, relaxed, angry, fearful, sad, and mood-neutral individuals (De Dreu et al., 2008). Consistent with the idea that some cognitive activation is needed to stimulate creativity, we found that activating moods (happiness, anger, and fear) led to more ideas of greater originality, and to better creative insight performance than deactivating moods (relaxed state and sadness) and the mood-neutral control condition. However, we also found evidence that some activating mood states promote creativity primarily through enhanced flexibility, whereas other activating mood states promote creativity primarily through enhanced persistence. Happy participants tended to be more inclusive and explored many cognitive categories in a brainstorming task (i.e., flexibility), whereas participants in angry and fearful moods tended to explore a few cognitive categories in greater depth in a brainstorming task (i.e., persistence).

De Dreu and colleagues explained these findings in terms of the cognitive tuning model that posits that positive feelings generally lead people to explore new

possibilities in an unconstrained and flexible way (e.g., Fiedler, 2000; Schwarz & Clore, 1988), whereas negative moods generally trigger systematic, constrained, and analytical information processing (Ambady & Gray, 2002; Schwarz, 1990). As such, their analysis focused on hedonic tone (positive vs. negative) and activation (activating vs. deactivating) as critical dimensions underlying the effects of specific mood states on flexibility, persistence, and creativity. However, mood states differ on other dimensions as well, and these may (more) meaningfully relate to the creative process.

For example, some mood states, such as happiness and anger, associate with an approach orientation (i.e., when the individual is focused on aspired goals and positive outcomes), whereas other moods, such as fear and feeling relaxed, associate with an avoidance orientation (i.e., when the individual is focused on aversive stimulation and negative outcomes; Carver, 2004; Higgins, 1997; Mowrer, 1960). An approach orientation associates with a broad attentional focus and may promote creativity primarily because of enhanced flexibility (Förster et al., 2006; Friedman & Förster, 2008). Alternatively, an avoidance orientation associates with the recruitment of resources and enhanced cognitive control (Koch, Holland, Hengstler, & Van Knippenberg, 2009) and a narrowed scope of attention (Förster et al., 2006), and may associate with creativity primarily through cognitive persistence (De Dreu & Nijstad, 2008). Because approach and avoidance orientations have been meaningfully related to flexibility (Förster et al., 2006), persistence (De Dreu & Nijstad, 2008; Luu, Tucker, & Derryberry, 1998), and creativity in general (Friedman & Förster, 2000, 2001, 2002), it could be that a combination of hedonic tone, activation, and, perhaps also, motivational orientation better explains creative performance than do any of these mood dimensions alone. Therefore, a central aim of this dissertation is to examine how specific mood states and motivational orientations associate with one another, and to find out how they promote or inhibit flexibility, persistence, and creative performance in general.

In sum, DPCM proposes that creativity can be achieved by flexible thinking, set-breaking, and the use of broad categories and remote associations, but also by systematic and persistent search processes. DPCM further proposes that the flexibility and/or persistence-pathway is triggered by states or traits that are activating. However, some activating states and traits may affect creativity primarily through their influence on cognitive flexibility, while other activating states and traits affect creativity primarily through their influence on cognitive persistence. Because initial evidence suggests this also applies to moods and motivational

orientations, the focus of the present dissertation, DPCM will prove a good framework to understand which moods and motives help or hinder creativity and to understand why this is the case.

Overview

Chapter 2 – Meta-analysis. Chapter 2 focuses on the mood-creativity relationship. Previous research has shown different effects of hedonic tone (i.e., positive vs. negative moods) on creative performance (e.g., Shalley, Zhou, & Oldham, 2004). In general, positive moods seem to stimulate creativity (for an overview, see e.g., Lyubomirsky, King, & Diener, 2005), but this positive relation has not always been obtained (e.g., Kaufmann & Vosburg, 1997). Effects of negative mood states are even more inconsistent, with some studies finding negative effects, others finding no effects at all, and still others even finding positive effects on creative performance (for an overview, see e.g., Ashby et al., 1999; Kaufmann, 2003). To explain these different findings, it is argued in Chapter 2 that specific moods not only vary in terms of hedonic tone (positive vs. negative), but also to the extent to which they cognitively arouse and activate (activating vs. deactivating) and the degree to which they associate with an approach orientation and promotion focus or with an avoidance orientation and prevention focus. Importantly, hedonic tone, level of activation, and motivational orientation¹ have been meaningfully related to the flexibility and persistence pathways, and to creative performance in general (for a discussion, see Chapter 2).

To determine to what extent, when, and why positive and negative moods relate to creative performance, we conducted a meta-analysis of the mood-creativity relationship. The first goal of the meta-analysis was to provide a quantified insight into the strength and direction of mood effects on creative performance and to examine whether mood states influence various facets of creativity in qualitatively different ways. Another central aim of the present meta-analysis was to test three

¹ The term motivational orientation refers to the different outcome foci of two fundamental biobehavioral systems: approach and avoidance (e.g., Elliot & Thrash, 2002; Gray, 1990). The motivational orientation is towards approach when the individual is moving towards, or anticipates aspired goals and positive outcomes; the motivational orientation is towards avoidance when the individual is moving away from, or anticipates aversive stimulation and negative end-states. The reader should note in advance that in Chapter 2, the term regulatory focus is used instead of motivational orientation. Although subtle differences exist with regards to the origination and conceptualization of motivational orientation and regulatory focus (see e.g., Elliot, 2008 and Scholer & Higgins, 2008 for a review), I will use these terms interchangeably.

sets of more or less contrasting predictions. Accordingly, we examined the effects of specific mood states (happy, relaxed, sad, and fearful) on creativity in terms of hedonic tone (positive vs. negative), level of activation (activating vs. deactivating), motivational orientation (approach and promotion focus vs. avoidance and prevention focus), and combinations of these three dimensions.

Effect sizes revealed that creativity is enhanced most by positive mood states that are activating and associated with an approach orientation and promotion focus (e.g., happiness), rather than those that are deactivating and associated with an avoidance orientation and prevention focus (e.g., relaxed). Negative, deactivating moods with an approach orientation and a promotion focus (e.g., sadness) were not associated with creativity, but negative, activating moods with an avoidance orientation and a prevention focus (fear, anxiety) were associated with lower creativity, especially when creativity was assessed as cognitive flexibility. As such, the results show that the mood-creativity link is better understood as a function of various aspects of specific moods than simply in terms of hedonic tone (positive vs. negative) or level of activation (activating vs. deactivating) - a mood state's associated motivational orientation appears to be critically involved as well.

Moreover, the meta-analysis identified two major issues that are examined further in Chapter 3 and 4. First, the mood-creativity literatures focused on happiness, sadness and trait anxiety, but almost entirely ignored other mood states such as anger. Exploring the role of anger in the creativity process was the goal of Chapter 3. Second, the meta-analysis raised the possibility that specific mood states, motivational orientations, and the extent to which they arouse and activate are highly associated with one another. A further exploration of this relationship and finding out how mood states and motivational orientations promote or inhibit creative performance was the goal of Chapter 4.

Chapter 3 – The role of anger in creativity. Exploring the role of anger in the creativity process was the purpose of Chapter 3. Four experiments examined creativity as a function of anger (vs. sad or mood-neutral controls). Combining insights from the literatures on creativity and on mood and information processing it was predicted that anger (vs. sadness and mood-neutral control) triggers a less systematic and structured approach to the creativity task, and leads to initially higher levels of creativity (as manifested in original ideation, creative insights, and remote associations). Following work on resource depletion, it was further predicted that anger more than sadness depletes energy and that, therefore, creative

performance should decline over time more for angry than for sad people. Accordingly, anger and sadness (and a mood-neutral control condition in Study 3.2 and 3.3) were manipulated using self-generated imagery after which participants engaged in a brainstorming task (Study 3.1 and 3.2), or a creative insight task that required perceptual set-breaking (Study 3.3) and conceptual set-breaking (Study 3.4). Performance on the creativity tasks was broken down in time blocks in order to investigate the effects of mood on creativity over time. Results supported predictions and have important implications for creativity, information processing, and resource depletion which are also discussed in Chapter 3.

Chapter 4 – Moods, minds, and motives. Chapter 4 seeks to further our understanding of how motivational orientations and specific mood states associate with one another, and how they promote or inhibit creative performance. It is argued that approach states generally boost creativity because they associate with activating moods and enhanced cognitive flexibility. With regards to avoidance states, research evidence is less consistent, with some findings suggesting avoidance states promote creativity and other findings pointing to no or even negative effects. In Chapter 4, the hypothesis is proposed that whether avoidance states boost creativity depends on regulatory success, the sense of success or progress towards fulfilling a goal. Therefore, it is predicted that avoidance states that activate the individual (unfulfilled avoidance motivation, fear) lead to similar levels of creativity as approach states, but that avoidance states that deactivate (successful avoidance, relief) lead to lower levels of creativity. This basic prediction was tested in four studies, two focusing on conceptual insight performance (Study 4.1 and 4.3) and two focusing on idea generation (Study 4.2 and 4.4). Moreover, this effect was predicted to be mediated by feelings of activation, an assumption that was tested in Study 4.3 and 4.4. Results of the four experiments supported predictions. Implications for mood, motivational orientations, and creativity are discussed.

Chapter 5 – General discussion. Finally, in Chapter 5, the findings from the previous chapters are integrated and discussed in terms of the Dual Pathway to Creativity Model. I will discuss how these findings may enhance our understanding of the ways moods and motivational orientations, alone or in combination, may

influence creativity. I conclude with practical implications for managers, teachers, and parents about how to boost creativity of their employees, pupils, and children.²

² Chapters 2-4 were written as independent research articles and there is overlap in theoretical introductions and method sections.