

Doctoral Dissertation

- Exposé -

A New Approach to Explain Crowding Effects within Creativity

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1. Abstract

1.1 Research Question

Goal of the present study is to enhance the understanding of mediational processes underlying crowding effects on intrinsic motivation within creative performance. The results shall contribute to a better understanding of the motivational bases of creativity in social contexts.

1.2 Theoretical Contribution

Following Kehr's (2004) compensatory model of motivation and volition as well as self-regulation theory (Deci & Ryan, 1985) it is proposed that stress caused by conflicts between implicit and explicit motives mediates the crowding effects on intrinsic motivation and its resulting attenuation of creative performance.

1.3 Model and Hypotheses

Basing on a mediational model in which subconscious conflicts are causing crowding effects on intrinsic motivation fully mediated by stress, the following four hypotheses are proposed:

Hypothesis 1. Subconscious conflicts between explicit and implicit motives are causing effects that crowd out intrinsic motivation.

Hypothesis 2. Stress mediates the relationship between subconscious conflicts between implicit and explicit motives and resulting crowding effects on intrinsic motivation.

Hypothesis 3. Stress is also mediating the relation between crowding effects on intrinsic motivation and a predicted attenuation of creativity.

Hypothesis 4. Perceived competence and perceived self-determination are moderating the relationship between conflicting implicit and explicit motives and the resulting crowding effect in such a way that higher perceived competence and higher perceived self-determination is alleviating the predicted crowding effect.

1.4 Methods

500 employees and their supervisors within research and development departments of companies operating in industries highly depending on research and innovation within the US and Germany will be asked to participate. The study will be carried out within the context of several brainstorming sessions as well as *Idea Markets* in which creative performance under the influence of subconscious conflicts will be investigated.

1.5 Practical Implications

Overall this research may extend our understanding of some of the least understood parts of creativity, namely its subconscious processes, by revealing how subconscious conflicts interfere with creativity.

2. Research Question

Intrinsic motivation is considered one of the key ingredients of creativity (Amabile, 1988) and much of the contemporary research on creativity is relying on intrinsic motivation theory (Shalley, 1995; Amabile, 1996; Oldham & Cummings, 1996; Zhou, 1998; Shin & Zhou, 2003). Intrinsic motivation is also largely considered the mechanism by which situational factors affect creativity (Amabile, 1988; Oldham & Cummings, 1996). Particularly, intrinsic motivation is alleged to explain motivational crowding effects: Extrinsic constraints, such as reward, evaluation expectation, surveillance, and competition may “crowd out” (decrease) an existing intrinsic motivation toward the task and, by doing so, undermine creative performance (Amabile, 1986; Deci, Koestner, and Ryan, 1999; Meier, 2007, p.68).

However, despite the theoretical importance of intrinsic motivation theory for creativity research, to date, only few studies have been exploring the underlying mediational processes of crowding effects on intrinsic motivation within creative performance (Deci, Koestner, and Ryan, 1999, p. 653 f.).

Goal of the present study is to enhance the understanding of these mediational processes underlying crowding effects on intrinsic motivation within creative performance. The results are also hoped to contribute to a better understanding of the motivational foundations of creativity.

3. Theoretical Contribution

Within both of the two most commonly applied approaches to intrinsic motivation - cognitive evaluation theory (cf. e.g. Deci, 1971) and attributional theories (cf. e.g. Lepper et al., 1973; Lepper, 1981) - only little research has been directly dedicated to mediational effects of intrinsic motivation. All of the mediational research known to the author has relied on cognitive constructs like perceived competence (cf. e.g. Blanck, Reis, & Jackson, 1984; Vallerand & Reid, 1984; Harackiewicz, Manderlink, & Sansone, 1984; Harackiewicz, Abrahams, & Wageman, 1987; Sansone, 1989) or perceived self-determination (Pittman et al., 1977; Brockner & Vasta, 1981; Reeve & Deci, 1996).

However, an increasing number of articles emphasizes the importance of unconscious processes in the explanation of intrinsic motivation effects (Epstein, 1994; Greenwald & Banaji, 1995; Ryan, Kuhl, & Deci, 1997; Kazén, Baumann, & Kuhl, 2003; Kehr, 2004). Therefore, a synthesis of self-regulation theory (Ryan, Kuhl, & Deci, 1997) with the compensatory model of motivation and volition (Kehr, 2004) is proposed (c.f. Fig. 1). With this model the present research seeks to contribute to the literature by explaining how crowding effects within creativity are related to unconscious conflicts between implicit and explicit motives. These conflicts are assumed to rise from an impaired self-regulation, resulting from a mismatch between explicit motives resulting from consciously perceived social values on the one hand and unconscious implicit motives on the other hand. It is assumed that these conflicts are subjectively experienced as stressful. Understanding creativity as the ability to “build a problem solving bridge” between these implicit and explicit motives, stress¹ is assumed to mediate this “bridge-building ability” by having an inverted u-type of impact on creativity. It is proposed that in a mild form stress functions as an enabler of creativity stimulating the “building of new bridges” between slightly conflicting explicit and implicit motives. However, in a high dose stress is assumed to reduce creativity by absorbing mental activity required to re-calibrate the then highly distorted relation between explicit and implicit motives.

¹ According with current stress research (Ice & James, 2007) a transactional view on stress is taken in which an individual goes through a cognitive assessment to determine whether a particular circumstance is a threat and if he has the resources and skills to cope with it. Therefore stress is highly subjective and lies “in the eye of the beholder”. At the same time we can differentiate between behavioral, affective and physiological responses to stress.

Within this model human creativity is conceptualized as mental activity conciliating the conflicting poles of our need for independence on the one hand and our need for social relatedness on the other hand (van Schaik, 2007). Due to the constraints of our being “animaux sociale” it seems reasonable to define human autonomy in a relative way (Zahn-Waxler & Radke-Yarrow, 1990; Ryan, Kuhl, & Deci, 1997). In accordance with self-regulation theory (Deci & Ryan, 1985) a general natural progression toward integration and the autonomy is assumed. Thus, creative performance can be depicted as the manifestation of a successful self-regulation, the building of a stable bridge between these two poles of human existence. Thus, from a more holistic point of view creativity can be described as a complex process of social adaptation and integration.

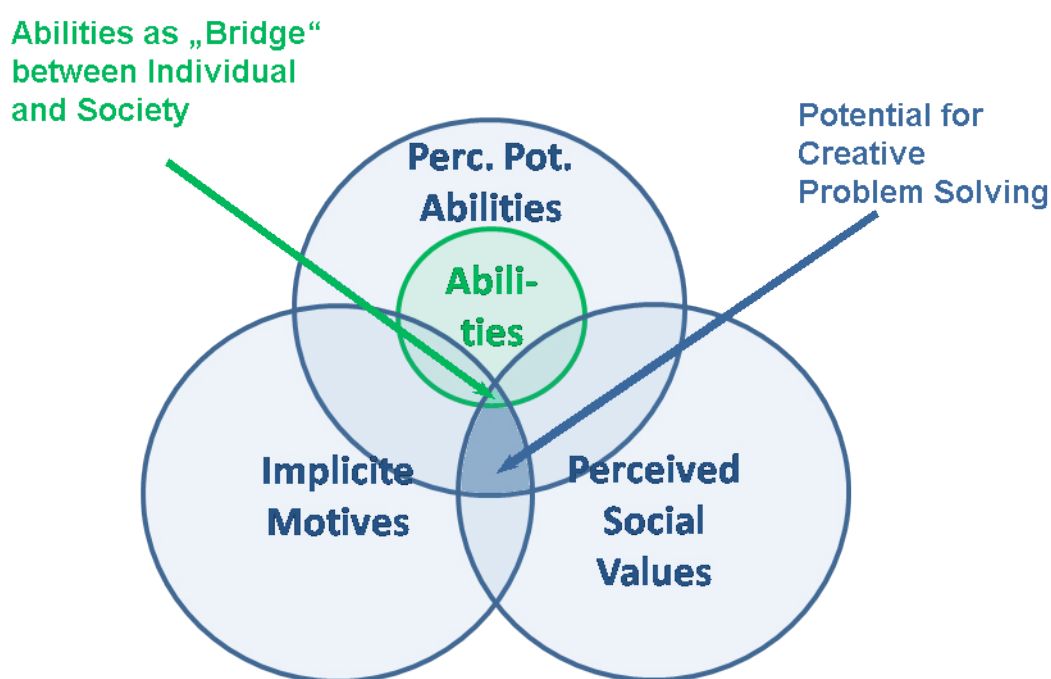


Fig. 1: Modified Compensatory Model of Motivation and Volition (following Kehr, 2004).

However, because implicit and explicit motives happen to change over time, self-regulation is a constant fragile process. This process is prone to social interference and depending on favorable social conditions². Depending on the degree to what implicit and explicit motives are in conflict with each other, more or less stress should subjectively be experienced (Harter 1978; Cox, 1985; Kanfer, 1987; Ryan, Kuhl, & Deci, 1997; Kehr, 2004). Being both physiologically as well as psychologically relevant, stress is assumed to trigger physical as

² These social conditions may of course considerably vary between different cultures and by that way constitute a specific cultural dimension of self-regulation (c.f. “cultural consonance”, Dressler, 2007).

well as mental adaption and thus represents an elemental link between psyche and soma (Fliege, 2005; Flinn, 2007).

In sum, here it is proposed that stress caused by conflicts between implicit and explicit motives mediates the crowding effects on intrinsic motivation and its resulting attenuation of creative performance. Due to the unconscious character of the conflicts between implicit and explicit motives it is assumed that perceived self-determination and perceived competence play only a moderating role within crowding effects on intrinsic motivation (Baron & Kenny, 1986; Baumann & Kuhl, 2003).

4. Model and Hypotheses

Basing on the theoretical concept of self-regulation as postulated by Ryan, Kuhl, and Deci (1997) this research will go beyond the already existing meditational research on crowding effects (Deci, Koestner, & Ryan, 1999) by assessing subconscious conflicts as potential explanation for crowding effects within creativity. Within this research subconscious conflicts between implicit and explicit motives are assumed to induce crowding effects on intrinsic motivation (c.f. Fig. 2). Thus,

Hypothesis 1. Subconscious conflicts between explicit and implicit motives are causing effects that crowd out intrinsic motivation.

It is argued that the above described conflicts are perceived as stressful and that stress mediates the relation between the described conflicts and the resulting crowding effects on intrinsic motivation. In the present study we will directly test this theorized mediating role of stress:

Hypothesis 2. Stress mediates the relationship between subconscious conflicts and resulting crowding effects on intrinsic motivation.

Further, stress is also assumed to play a mediating role between crowding effects and a predicted attenuation of creativity. Thus,

Hypothesis 3. Stress is also mediating the relation between crowding effects on intrinsic motivation and a predicted attenuation of creativity.

Finally, due to their cognitive nature, perceived competence and perceived self-determination are only moderating the crowding effect of conflicting implicit and explicit motives on intrinsic motivation. Thus,

Hypothesis 4. Perceived competence and perceived self-determination are moderating the relationship between conflicting implicit and explicit motives and the resulting crowding effect in such a way that higher perceived competence and higher perceived self-determination is alleviating the predicted crowding effect.

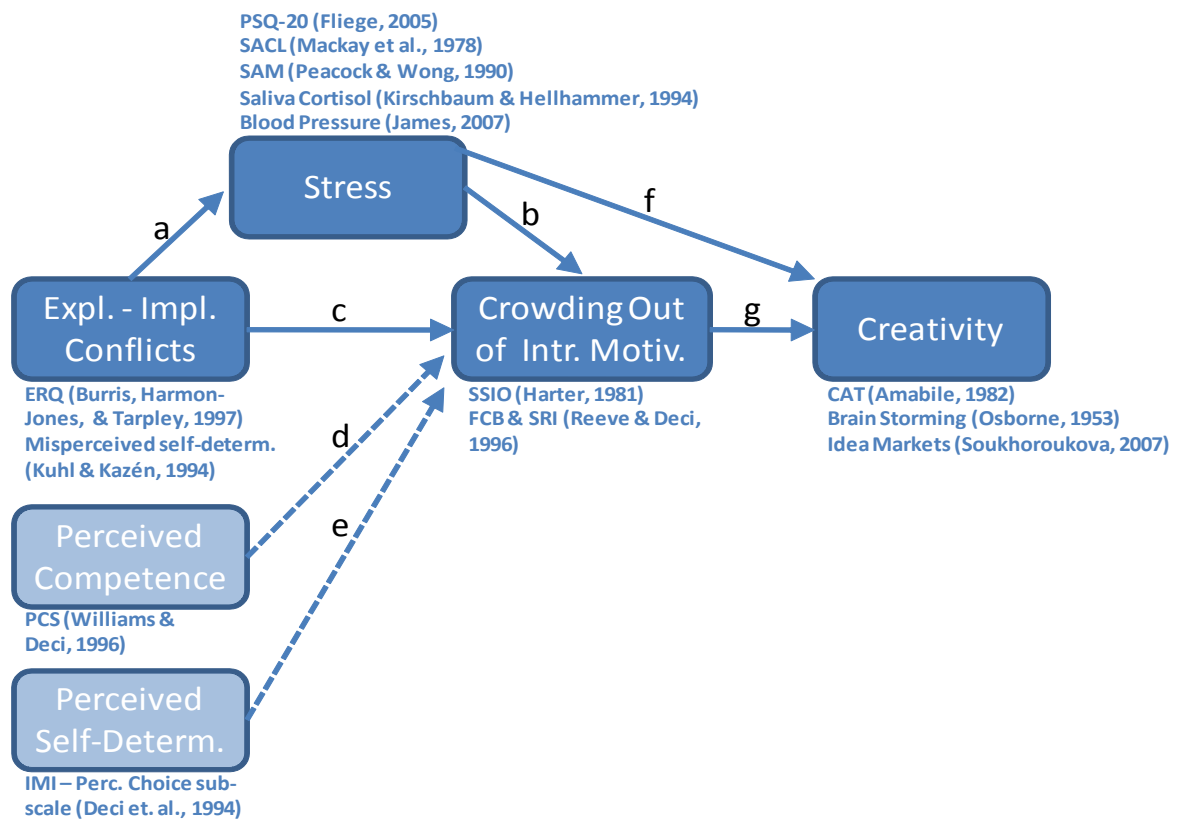


Fig. 2: Causal Model underlying Hypotheses 1 to 4
(the five causal connections a-e are positive, causal connection f and g are supposed to be negative).

5. Methods

Pilot Surveys

To investigate the hypothesized relation between stress and creativity a series of pilot surveys will be conducted. The main goal of these surveys is to demonstrate the general relevance of stress within creativity. Further, the mediating role of stress within crowding effects in creative behavior will be demonstrated. In order to achieve these goals the following four surveys will be conducted:

- (1) The context of creative performance will be investigated by using Critical Incident Technique: It will be freely asked for the circumstances in which a person recently has been especially creative. The specific goal of this first survey will be to explore the general relevance of stress within the context of creative performance. As the degree of stress is assumed to vary between different professional context settings, this survey will try to collect data from preferably diverse contexts³ as well as from different cultural backgrounds. To ensure a collection from diverse contexts an online questionnaire with the possibility for free text entry will be set up in different languages. This survey will also be used to acquire contact data from potential participants for subsequent, more detailed studies on stress and creativity.
- (2) Within student sample settings stress schemata will be primed by stress-related adjectives from three psychological stress scales⁴. Here students will be asked to sort these adjectives and will subsequently given creative tasks⁵. For control reasons another group of students will sort not stress-related (neutral or positive) adjectives. It is hypothesized that the group sorting the stress-related adjectives will perform worse in the creative tasks than the other groups. With this survey it is hoped to demonstrate the unconscious impact of stress on creative information processing.
- (3) Finally, we will seek to provide evidence for the mediating role of stress within creativity by setting up an idea competition for students and scholars. Several art and

³ E.g. schools, universities, private art and music academies as well as research and development related companies.

⁴ PSQ-20, SAM, and SACL.

⁵ Possible tasks would be Duncker's (1945) candle task, Mednick, Mednick, and Mednick's (1964) Remote Associates Test or Luchins' (1942) word task.

design classes will be invited to take part in this competition. By manipulating the favorability of the context (more vs. less pressuring competition, offering of rewards vs. no rewards, inducing time pressure vs. no time pressure) it will be attempted to substantiate the above described relation between explicit-implicit conflicts and crowding effects on intrinsic motivation as well as the mediating role of stress within this relation. It is hypothesized that competition⁶, not-maximum tangible rewards, and time will induce conflicts especially within state (vs. action) oriented subjects. These conflicts should subjectively be experienced as stressful and this stress should mediate the expected crowding effect within creativity.

Main Study: Samples, Research Setting

Within the main study 500 employees and their supervisors within research and development departments of large as well as small and medium companies operating in industries highly depending on research and innovation⁷ within the US⁸, Canada⁹, the UK¹⁰ and Germany will be asked to participate. To assure high interest and response of the participants as well as sufficient control over the research conditions the study will be carried out within the context of several online conferences¹¹. Companies' interest to participate will be ensured by providing them with a large number of pre-assessed new creative ideas of their research and development employees in a relatively short period of time. In addition, research results on

⁶ The competition should yield an attractive opportunity for the participants to ensure the general motivation to participate. To ensure the general attractiveness for students and scholars it seems promising to hold an idea competition in cooperation with a prominent and renowned corporation.

⁷ E.g. biotechnology, pharmaceutical, software, electronics, information technology, defensive technology, automotive, telecommunication.

⁸ Within the US cooperation partners within the field of creativity research are sought. Potential candidates are Dean Keith Simonton of UCLA, Davis and Geoffrey Miller of the University of New Mexico as well as the International Center for Studies in Creativity at the Buffalo State University. To support the functioning of an online conference a cooperation with Ely Dahan of the UCLA is sought.

⁹ The author here is in contact with Gad Saad of John Molson School of Business in Montreal.

¹⁰ Potential candidates for a cooperation are here Robin Dunbar of the University of Oxford as well as Claudia Sacramento at Aston Business School.

¹¹ An internet-based method to create and evaluate creative business ideas will be applied. With this method it will be possible to connect a large network of participants who interact by giving and receiving information and expectations about business ideas. Within this context the creative ideas of participants can be efficiently elicited and aggregated using the market-like mechanisms. An advantage of this method is the possibility to let the market participants assess the creative outcome themselves. This valuation of the creative outcome can be interpreted as a quantifiable application of the technique of consensual assessment of creativity (Amabile, 1982). The general practicability of such a quantifiable application of the consensual assessment technique has been proven by Taylor & Greve (2006). By the application of this internet-based information and communication technique this approach also intends to overcome main arguments against the classical use of the consensual assessment technique including time-demand, impracticality and lack of appropriateness for individual differences (Horn & Salvendy, 2006).

the favorability of the company's individual conditions for creativity will be offered in return for participation. The creative ideas themselves will remain available only to the respective company¹².

Preliminary Procedures

In coordination with the supervisors of the research and development employees of each participating company a fixed date will be scheduled to hold either an online brainstorming session or an Idea Market. In either way the process can be thought of as an online conference, so every participant has to be online and logged into an internet platform at the scheduled date¹³. To prepare the timely start-up of the actual creative performance within the conference, participants will be given in advance, in coordination with their supervisor, a general topic¹⁴ which will later serve as a background for the development of specific creative ideas in the online conference. To prepare for the later process of developing and evaluating ideas, participants will also be asked in advance to log into the online platform and test it by developing and publishing some sample ideas for this topic¹⁵. They will also be asked to evaluate sample ideas¹⁶ of others to be prepared for the later ongoing assessment.

Prior to the beginning of the conference the employees will complete scales¹⁷ on their actual stress level, their intrinsic motivation as well as on their perceived competence and perceived self-determination¹⁸. Also, several demographical data and some of the collected control variables¹⁹ will be asked in advance.

¹² All researchers involved will sign non-disclosure agreements to avoid any caveats regarding the safety of intellectual property rights.

¹³ To ensure that every participant will be able to attend the conference the fixed date will – if available - be booked into an electronic scheduling system (e.g. Outlook, etc.) and, in coordination with the supervisor, reminders will be sent to all designated participants prior to the actual holding of the Idea Market. Also, participants will be informed in advance on the functioning as well as on the general procedure of the Idea Market and will be sent a personal login name and password to access the Idea Markets online platform.

¹⁴ The topic should generally be related to and have significance for the company's activities. However, it should also be of general interest for the participating employees. If possible, it should be an "approach" goal, related to upcoming future activities of the company, e.g. new product development, new sales or marketing methods, etc. .

¹⁵ The time spent with developing creative ideas before the actual Idea Market can be interpreted as free-choice behavior, measuring intrinsic motivation according to Deci (1971).

¹⁶ To ensure that some ideas are available for assessment for the first participant it might be possible to publish some sample ideas after consultation with the supervisor.

¹⁷ If not existing, German versions of all measures will be created by following Brislin's (1980) translation-back-translation procedure.

¹⁸ For questions on measurement please see below.

¹⁹ All the control variables that will be collected are indicated below.

Within every conference participants then will be randomly divided into four groups²⁰:

- (1) Group 1: Inducing conflicts²¹ by rewards²²
- (2) Group 2: Inducing conflicts by competition
- (3) Group 3: Inducing conflicts by rewards and competition
- (4) Group 4: Control Group (no manipulations)

Predictor

Explicit-Implicit Conflicts

In this study it will be our goal to elicit conflicts between implicit and explicit motives within participants of three of the four groups of each conference by using rewards, competition or rewards and competition together. According to Kuhl's (1992) self-discrimination theory conflicts should arise especially for introjections that affect the integrity of the self (Kuhl & Kazén, 1994). To provoke this kind of introjections, seemingly self-compatible goals which are in fact self-alien or are only imperfectly assimilable be induced by using rewards and competition in the following ways:

(1) Rewards

Within the reward groups participants will be split up randomly into two sub-groups. In the first sub-group, participants will be informed that they will be rewarded for the highest-valued (self-generated) idea. In the other sub-group participants will be aware that they will be rewarded according to their evaluation performance, meaning how good they were able to estimate the value of the posted ideas. Rewards will be held out and given strictly according to the participants' performance in terms of their ideas respectively their evaluation²³. The value of the ideas will be found through consensual assessment of the ideas between all

²⁰ Due to statistical reasons every group within a conference should as far as possible consist of at least 20 persons. Overall, within this study it is planned to carry out conferences within at least seven different companies with preferably 80 or more participants in each company. Yet, also smaller groups of participants may occur and will be integrated into the total sample. For those smaller groups some statistical comparisons (e.g. between groups, between companies) however will probably not be possible.

²¹ Please see below for theoretical details on the induction of conflicts.

²² Following Deci, Koestner, & Ryan (1999) and Cameron, Banko & Pierce (2001), expected, tangible, performance contingent, not maximum rewards will be used to achieve strong effects. However, goal of this study is to specifically investigate when and how these rewards may induce explicit-implicit conflicts within the participants.

²³ According to Deci et al. (1994) it will be avoided to provide a meaningful rationale, to acknowledge the participants' feelings, or to convey choice as this would allow internalization and thus reduce the probability of the occurrence of intrapersonal conflicts.

participants²⁴. Participants will additionally be asked to rate the creativity of each idea on a seven-point scale ranging from 0, “not at all creative” to “extremely creative”. Prior to the assessment all participants of the reward groups will be held to assess the developed ideas in a realistic²⁵ way. Rewards will be paid to the participants subsequent to the first idea assessment.

(2) Competition

Within the competition groups competition will be fostered by advocating winning resp. finding the best participant as ultimate goal of the conference. This will be made clear by establishing the rule that the winner²⁶ of the conference alone will be rewarded. In addition, competition can be toughened by emphasizing the significance of the outcome of the conference for the company as well as for the participants²⁷.

(3) Rewards and Competition

The reward and competition condition will be combined in the third group by giving out monetary rewards after the first idea trading only conditionally. The money will be subject to revocation and will be given to the participant with the best rated idea and or the highest evaluation performance after the final assessment. Additionally, the significance of the outcome of the conference will be emphasized.

(4) No rewards and no competition (control group)

Within the control group the prices of the traded ideas are not linked to any rewards and thus should most accurately reflect their real value. Participants will be told prior to the conference that the value of their ideas or their stock of ideas is not necessarily related to the quality of their performance. A competition for the highest rated idea or highest valued stock of ideas will thus not be fostered. Instead it will be suggested to use the trading of the ideas to encourage the creative performance. This can be achieved in a way that buying an idea stock can indicate the potential value of an idea. All participants of this group will be encouraged to use the prices resulting from the market mechanism as a positive, helping information comprising the bundled experience of all group participants.

²⁴ In case of the Idea Markets this value will be found by trading. Here, every idea can be bought and sold for a price between 0 and 1 currency unit. Prices will be created only by buying and selling idea stocks from an equally distributed amount of play money.

²⁵ To ensure a realistic assessment the costs of a potential failure, viz. of ideas falsely believed in, produced and marketed, will be made clear to all participants. Alternatively, to ensure not maximum rewards, the price building mechanism can be manipulated to generate systematically lower idea values.

²⁶ Either, the one with the highest rated idea or, the one with the highest evaluation performance.

²⁷ For example, it may be mentioned that outstanding performance with respect to Idea Markets has led to promotions in other companies (Soukhoroukova, 2007).

Measures

All measures indicated below will be pre-tested for reliability and validity prior to a final application within the online conference.

Explicit- Implicit Conflicts

To be able to measure subconscious conflicts between explicit and implicit motives it is necessary to employ preferably nonreactive, implicit methods (Kazén, Baumann, & Kuhl, 2003). One nonreactive method which seems appropriate to tap into subconscious conflicts is the Emotional Reactions Questionnaire (ERQ) of Burris, Harmon-Jones and Tarpley (1997). The ERQ is measuring affective components of cognitive dissonance.

In addition, we will use the nonreactive, implicit method to measure the internalization of self-alien goals developed by Kuhl and Kazén (1994) as measure for induced conflicts. This method measures misperceived self-determination (false self-ascription of assigned tasks in a memory test) as an indicator for self-conflicting introjections (Baumann & Kuhl, 2003). Because this self-infiltration is positively moderated by a subject's state vs. action orientation (Kazén, Baumann, Kuhl, 2003) we will also assess these individual differences in volitional functioning with the Action Control Scale (Kuhl, 1994). Sad mood has been identified as another predictor for self-infiltration. However, we will assess the participants mood with the stress scales indicated below.

Stress

Difficulty of measuring stress results from its multifaceted character (Cox, 1985; Ice & James, 2007). To choose the right measure which is able to tap subconsciously arising stress the following stress scales will be pre-tested:

- SAM (Peacock & Wong, 1990)
- SACL (Mackay et al., 1978)
- PSQ-20 (Fliege, 2005)

The decision regarding the appropriate scale to use will be made depending upon the psychometric quality of the measures determined within the pre-testing, especially their internal consistency reliability (Cronbach's alpha) as well as their validity. Additionally, a physiological control variable to test for and increase the reliability of the psychological stress

measure will be collected. This will be either cortisol or blood pressure, depending on the practicability, cost efficiency as well as the sensitivity of these physiological measures²⁸.

Intrinsic motivation

Following Ryan, Koestner, & Deci (1991) intrinsic motivation will be assessed by measuring both free-choice behavior and self-reported interest and considering them intrinsic motivation only when they correlate within the specific conditions. At the end of the Idea Market the participants will have the possibility to spend 15 minutes freely either on developing more creative ideas or on the pure assessment of ideas. As the idea creation involves the development of new concepts this measure of free-choice behavior also takes into consideration the conceptualization of intrinsic motivation as willingness to seek out and master new challenges (Deci & Ryan, 1985). Self-reported interest will be measured on a seven-point scale ranging from 0, “corresponds not at all” to “corresponds exactly,” indicating the extent to which participants are enjoying their current creativity-related task²⁹. Cumulatively, the first three subscales of the self-report scale of intrinsic orientation from Harter (1981) will be applied to measure self-reported interest.

Creativity

Within this study creativity will be measured with the Consensual Assessment Technique (Amabile, 1982). On a seven point scale ranging from 1, “not at all creative” to 7 “highly creative” participants of the conference will indicate the extent to which a published idea is assessed creative. To increase reliability the correlation with the emerging price of the idea is calculated and a composite index consisting of price and assessment of creativity will be considered.

Perceived Competence

This variable will be measured using a slightly adapted version of the Perceived Competence Scale. The Perceived Competence Scale (PCS) is a short, 4-item questionnaire, and is one of the most face valid of the instruments designed to assess feelings or perceptions of competence (Williams & Deci, 1996).

²⁸ Physiological stress measures will be pre-tested in cooperation with Gerhard Steinbeck from Munich’s clinical center “Großhadern” as well as with Stefan Duschek from Munich’s LMU Neuro-cognitive Psychology Unit.

²⁹ Therefore, five items will be adapted from Tierney, Farmer, & Graen (1999).

Perceived Self-Determination

Perceived self-determination will be measured with the Perceived Choice subscale of the Intrinsic Motivation Inventory. The perceived choice concept is theorized to be a positive predictor of both self-report and behavioral measures of intrinsic motivation (Deci, Eghrari, Partick and Leone, 1994). In addition, misperceived self-determination will be measured by slightly adapting the nonreactive technique of Kuhl & Kazén (1994). It is proposed that due to subconscious conflicts between implicit and explicit motives perceived self-determination will not correctly reflect the actually existing extent of self-determination³⁰.

Control variables

Within this study control variables will be used to be able to statistically control for potentially relevant concomitant circumstances. This study will include several control variables suggested by prior research as well as by its specific research question.

First, a dummy variable for company type will be provided (0, “large company,” 1, “small or medium company”) to control for differences in how the company type might influence the individual’s generally creativity. For example, employees in large, established companies might generally be less creative due to the higher prevalence of well-established rules and policies.

Second, it is necessary to control for the company’s general economic condition. Companies in good economic condition might probably exert significantly less pressure and stress on its employees than companies in bad condition. Thus, the economic climate within the industry as well as the company’s economic situation is controlled for.

Third, task domain expertise will be controlled for because it might be associated with creativity (Amabile, 1988).

Fourth, size and composition of the group of market participants will be controlled for, especially participants will be asked for amicable relationships to other participants within the group constituting the Idea Market.

³⁰ This could be tested by introducing thematic sub-categories on the background of the general topic of the Idea Market. After the Idea Market an unexpected memory test could be done to test the participant’s perception of who initially created the sub-categories. There it would be predicted that participants will falsely ascribe more categories to themselves as it would actually be the case.

Fifth, dummy variables to control for the type of the creative background topic to prevent confounding effects of task difficulty or task interest will be included. Also, it will be controlled for the general character of the task, namely “approach” and “avoidance” tasks³¹.

Finally, individual variables potentially related to altered stress reactivity like diet, age, sex, body size, smoking, health, fitness, emotionally disturbing events (Brown, 2007), and chronic social stressors³² (Dressler, 2007) are controlled for.

Procedure during the conference

The complete carrying out of each conference will be scheduled to take three hours. This time will be divided into five phases:

- (1) Creative idea generation (45 min)
- (2) First idea assessment with subsequent payout of rewards in group 1 and 3 (30 min)
- (3) Completion of scales on stress, intrinsic motivation, perceived competence and perceived self-determination (20 min + 10 min break)
- (4) Creative idea generation (30-45 min)³³
- (5) Final idea assessment (30-45 min)³⁴

De-Briefing, Demographical Data and Control Variables

Due to the induced conflicts and the perceived stress of the participants it seems ethically necessary to carry out a detailed de-briefing in which participants are informed of the induced conflicts and of the actual relevance of the developed ideas for the company as well as for their career. In addition, all remaining demographical data and control variables will be collected.

³¹ E.g. selling more products vs. saving money on the production process.

³² One possible way to control for this variable in a more reliable way than by self-report could be measuring blood pressure.

³³ Between the last two phases (4 and 5) participants are given the opportunity to spend 20 minutes freely either on the creative idea generation or on the idea assessment. In this way free choice behavior as a behavioral measure for intrinsic motivation will be assessed (Deci, 1971).

³⁴ C.f. footnote 26.

6. Practical Implications

With respect to the eminent relevance of creativity within our modern environment of increasingly complex challenges, understanding the underlying processes of creativity is important to practitioners as well as to researchers. An empirically tested meditational explanation of the crowding effects on intrinsic motivation within creative performance will help to identify the contexts in which creativity is most likely to occur.

As core elements of creativity are assumed to happen below the surface of consciousness (Sawyer, 2006, p. 61 f.) it seems warranted to investigate subconscious conflicts between implicit and explicit motives as potential cause for crowding effects within creativity. Also, stress seems to be an ideal potential mediator for the crowding effect as it is very likely to tap also unconscious psychological reactions to extrinsic impacts (Ice & James, 2007).

Overall this research may extend our understanding of some of the least understood parts of creativity, namely its subconscious processes, by revealing how subconscious conflicts interfere with creativity.

Finally, testing the theory within the framework of an online conference will offer new insights on the creative potential of market-like online applications as well as on the motivation of its participants. It might in addition indicate further possible applications of online conferences for creativity research.

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