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Rewarding Creativity: The Moderating Role of Personality

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Abstract

The aim of this paper is to find out if Openness to Experience and Extraversion have an interacting effect on the relationship between monetary rewards and originality. Therefore, in an online experiment which was set up in two parts - the first part measured participants personality level whereas the second part included a divergent thinking task, where the originality of ideas was measured - I find that Openness to Experience and Extraversion positively influence creativity. Further, it is assumed, that monetary rewards positively influence an individual's creativity, as those individuals being rewarded for creativity performed more creative. However, analysis indicates that there is no interaction effect as assumed. As the ability of creative thinking is essential for companies and can even lead to a competitive advantage, the findings of this study provide useful insights about the relevance of personality on creativity for theory and practice.

Keywords: creativity; divergent thinking, performance; personality; reward sensitivity

1. Introduction

Management problems often require new views and creative insights. Especially due to current change and global competition, creativity is an important issue for managers and companies, as it contributes to discovering new opportunities (Biraglia & Kadile, 2017) and innovation in organizations (Amabile, 1998). Oldham and Cummings (1996) conclude that enhancing the creative performance of employees is necessary for organizations to achieve competitive advantage. As a result, interest has increased in identifying the conditions which may influence employee's creativity (Madjar et al., 2002). Hence, the ability of creative thinking in management is essential, which is typically measured through creativity tests such as divergent thinking tasks (Scratchley & Hakstian, 2001).

Consistent with this, J. Zhao et al. (2020) measured creative performance and proposed the use of reward systems to ensure standards. The impact of rewards on creativity has received much attention in the literature, but only little agreement on the effect of rewards (Shalley et al., 2004). According to Amabile (1996), extrinsic motivation negatively influenced creativity, whereas Eisenberger (1992) found a positive influence by demonstrating the impact of rewards on

personal competencies. Additionally, in a study conducted by Joussemet and Koestner (1999) the authors also found an increased creative performance by using rewards but noticed a decreased quality of answers. In contradiction, other studies (Yoon, Sung, Choi, et al., 2015) could not find any significant relationship between rewards and creativity, which demonstrates the ongoing ambiguous and unclear impact of rewards on creative performance.

Following up on these findings, there has also been a growing interest in the study of personality and its impact on creativity. For instance, Sung and Choi's (2009) analysis of the moderating effect of extrinsic motivation on the personality-creativity relation confirmed a positive influence of extrinsic motivation on openness to experience, which resulted in greater creative performance. Herrmann and Nadkarni (2014) found out that extraversion, openness and emotional stability could be related to CEO personality and creative performance. Similar results can be stated by Harrison et al. (2019) which also propose to take firm particular situations into account, which may influence the relationship between personality traits. Other studies focused on the relation among openness, divergent thinking, and creativity in management (Scratchley & Hakstian, 2001) and found evi-

dence for openness as a key personality and divergent thinking as a key cognitive ability for creativity. This was also confirmed by Myszkowski et al. (2015) who claimed that personality predicts creativity and that openness to experience can be related to the divergent-exploratory part of the creative process. In contradiction to these results, Puryear et al. (2017) could not find any direct influence of personality on creativity.

Although several publications have appeared in recent years documenting the impact of motivation, creativity and personality, research has proceeded only slowly in testing the effects in this relationship. Further, research in this area has resulted in almost as much contradiction as agreement. Additionally, relatively less attention has been paid to the possibility that personality characteristics might have an impact on the reward-creativity relationship. Therefore, research evidence suggests exploring the type of employees that are more likely to engage in creative behavior (Zhou & George, 2001) or how personality can lead to a specific behavior, which in turn relates to firm performance (H. Zhao et al., 2010). Further, as the effect of extrinsic motivation on creativity is contradictory, more research is needed in this area focusing on its impact on creative performance (Shalley et al., 2004) and especially on divergent thinking, in this study measured as originality.

In response to the scholarly call for more research in these areas, the purpose of this study is to contribute to the ongoing discussion by reviewing existing literature to extend our understanding of the impact of personality on the reward-creativity relationship in the strategy field. In other words, I want to test individuals' perception of rewards, and see if specific personality traits, namely openness to experience and extraversion have a higher or lower reward sensitivity and therefore, perform more or less creative. The research question guiding this study is therefore, *How does personality moderate the relationship between monetary rewards and originality?* To research this, I conducted an online experiment among individuals with a (strategic) management background and tested their levels of personality as well as their ability for divergent thinking. Interestingly, this study approved openness to experience and extraversion being relevant factors for creativity, as well as financial rewards having an impact on creative performance, even though the moderating effect of personality could not be found in this sampling.

This study contributes to existing literature by making a new contribution to the ongoing debate on the reward-creativity puzzle. Research testing the impact of rewards on performance have yielded inconsistent findings (Amabile, 1996; Eisenberger, 1992) and only a few studies tested its impact on divergent thinking (Sung & Choi, 2009). However, to the author's best knowledge, no publications can be found in the literature discussing the issue of personality as a moderating factor between extrinsic motivation and creativity. Hence, this is the first study that empirically tests the moderating role of personality on extrinsic rewards and creativity as originality. Useful insights for theoretical appli-

cation can be gained, as there is no literature focusing on this research gap, although the scholarly call for research in this area is clearly defined. Further, this study has also practical implication for management. The results of this study can be useful for managers in terms of recruiting, appraisals, promotions or motivating employees, as it provides insights into the impact of personality characteristics on creativity.

The section that follows presents the literature review and hypotheses underlying this study. Next, and drawing upon data from 141 participants operating in the management field, the methodology and empirical findings are presented. The study concludes with a discussion of the results, their theoretical and managerial implications, future research suggestions, and a conclusion.

2. Literature Review and Hypotheses

2.1. Creativity and the Importance of Divergent Thinking

This study adopts the dominant scholarly definition of creativity using a product-based approach to creativity. Creativity is defined as the production of novel and useful ideas, solutions, or products (Amabile, 1998) and is essential in a volatile business climate, where firms compete to create or maintain their competitive advantage (Walker & Jackson, 2004). Therefore, great effort has been devoted to the study of creativity (Byron & Khazanchi, 2012; Dollinger et al., 2004; George & Zhou, 2001; Mumford, 2000; Runco, 2007).

According to Barron and Harrington (1981), one way to measure creativity is through divergent thinking tests, which are often used in the literature (Chamorro-Premuzic & Reichenbacher, 2008; McCrae, 1987; Myszkowski et al., 2015). Additionally, the authors propose two factors concerning divergent thinking, namely the field-specific relevance of divergent thinking abilities and the state of knowledge regarding creativity in a given field, and the role of intelligence in divergent thinking. In regards to test instructions and test conditions, the authors claim that when divergent thinking instructions to be creative were combined with scoring procedures, the results were more significant regarding creativity. They further propose that the divergent thinking ability and traditional measures of intelligence vary widely depending on the divergent thinking test, the sample heterogeneity, and the testing conditions.

However, research has identified contradictory views on differentiating creativity and divergent thinking. While some authors use both concepts similarly (Silvia et al., 2008), others argue for its need to differentiate, as the former may describe several abilities of acting creative, while the latter describes a cognitive process for creative problem-solving and idea generation (Runco et al., 2008). Nonetheless, it has been noted that most of the literature uses both terms consistently. In fact, even though over the last several decades there has been a discussion regarding distinctions of concepts, this study could not find any contrasting views or research denying the importance of divergent thinking.

It was Guilford (1956) who first proposed a difference between the two information processing modes divergent

thinking and convergent thinking, which can be understood as creative problem solving. Managers often not only have to diverge and find solutions but also converge and decide on the best solution (Myszkowski et al., 2015). Hence, while divergent thinking involves the search for a solution to a given problem for which there are multiple possible answers (Runco, 2007), convergent thinking can be understood as finding and selecting the one best response (Lubart, 2016). Additionally, the ability of divergent thinking results in an advantage to generate and construct a wide range of novel and original ideas, which builds the basis for creativity (McAuliffe, 2016).

To measure creativity, divergent thinking tasks have received much more attention in the literature and are often used as they provide the most reasonable results (Runco, 2007). Tasks measuring divergent thinking consist of different open-ended questions asking for creative uses and solutions for everyday objects. The most common scoring methods used in the literature are based on originality, fluency, and flexibility. Originality represents the number of unusual or unique ideas, fluency stands for the number of ideas in general, and flexibility refers to the number of different categories implied by the ideas (Runco & Acar, 2012). The scoring method in this study will focus on originality.

In a study testing how middle and senior managers' characteristics influence decisions, Behrens et al. (2014) for instance found out that the ability of divergent thinking increases with the level of experience. In contrast to this, Ames and Runco (2005) tested the divergent thinking ability of entrepreneurs and found lower scores regarding their originality. These results could indicate that entrepreneurs rely too much on their experience resulting from their own business knowledge, instead of their skills of generating novel ideas. This may also imply the importance for managers, as their ability to creative thinking changes over time and hence their contribution to performance. Therefore, managers should not only focus on experience, but also on their skills for divergent thinking.

To conclude, it seems reasonable to reinforce the assumption that divergent thinking can be seen as a key cognitive ability for creativity (Scratchley & Hakstian, 2001) and hence, that originality is essential for strategy and management. Now that we have determined the importance of creativity, the question arises as to how divergent thinking can be positively influenced or even increased. A possible answer to this question will be addressed in the next chapters.

2.2. The Influence of Rewards on Divergent Thinking

Pay for performance is the most common practice used by organizations to increase employee performance and motivation (Gupta & Shaw, 2014). When employees are being rewarded for creativity, they understand they have to provide novel but also useful ideas (Sue-Chan & Hempel, 2016).

Thus, scholars have identified two different types of motivation, intrinsic and extrinsic motivation, whereby an individuals' perceived self-determination plays an essential role

(Deci & Ryan, 1985). Theory indicates that intrinsic motivation can be understood as a desire to act based on enjoyment and interest (Amabile, 1998), while extrinsic motivation can be interpreted as a motivation on the result of action provided by others. In addition, Amabile (1998) claims that people are even most creative, when they feel intrinsically motivated, satisfied and challenged by the work itself. Malik et al. (2019) claim that employees with intrinsic task motivation spend their resources and time in creative efforts without the wish or expectation of getting rewarded. However, intrinsic and extrinsic motivation can appear in both, a temporary state form affected by the environment or a more stable personality trait form, relatively consistent across time and situations. Further, findings also suggest that intrinsic and extrinsic motivation can be seen as orthogonal, which indicates that individuals can be for instance motivated by both, money and personal challenge (Amabile, 1993).

Nonetheless, scholars argue for its need to differentiate the types of motivation when it comes to creativity and claim that "motivating creative performance is fundamentally different from motivating routine performance" (Byron & Khazanchi, 2012, p. 809). Further, there are also different research streams when analyzing the effect of rewards on creative performance. While some authors focus more on cognitive effects and argue that rewards undermine intrinsic motivation as individuals perceive rewards as controlling which decreases creativity (e.g. Joussemet and Koestner, 1999), others take its' behavioral effect into account and claim that rewards provide information which may guide an individuals' goal-directed behavior which in turn results in increased creativity (e.g. Eisenberger, 1992).

When testing the effect of rewards, scholars predict that rewards implying regulation or control may decrease an individuals' perceived competence, intrinsic motivation and creative performance. A meta-analysis conducted by Byron and Khazanchi (2012) differentiates between (1) creativity-contingent rewards, which are rewards given for creativity, (2) performance-contingent rewards, which are rewards given for performance without defining a creativity criterion, and (3) completion-contingent rewards, which are rewards for completing tasks without stressing creativity as a factor for valuation. According to their results, the former seems to be the one most positively related to creativity, as it clearly directs an individuals' effort toward creativity and hence, increases creative performance.

The authors have further identified several moderators that affect the relationship between rewards and creativity, namely clear definitions for creativity criteria, positive feedback on performance, and balanced autonomy. This indicates that not only the nature of rewards is essential (Malik et al., 2015), but also the context in which the reward might be offered (Amabile & Gryskiewicz, 1989; Amabile et al., 2002; Hackman & Oldham, 1980; Oldham & Cummings, 1996) and the motivation behind (Amabile, 1998).

Moving on to extrinsic motivation, the situation becomes more complex. Despite the popularity of using extrinsic motivators such as monetary rewards to enhance creativity, there

is still little agreement on the effect on creative performance (Shalley et al., 2004). According to Amabile (1996) and Deci et al. (2001), rewards undermine employee creativity. As already indicated, research proposes that individuals may perceive rewards, namely performance-contingent rewards, as negative because they feel their performance is being determined based on controlling reward mechanisms (Malik et al., 2015). Perry-Smith and Mannucci (2017) even argue that rewards might negatively affect the generation of novel ideas because they might detract from the cognitive thinking process.

To test this, Kruglanski et al. (1971) asked students in an experiment to think of adequate titles for a paragraph; no further information was given about the nature of the titles. The authors noted that those promised a reward produced fewer creative answers, than others not receiving a reward. In response to this study, Eisenberger and Rhoades (2001) used the same test and asked participants to generate creative titles for a story. The main difference this time was that participants were informed that the experiment was about rewarding creative performance. Interestingly, in this study, those participants being rewarded for creativity, achieved much better results. In fact, this leads to the assumption that participants might perform better in creative tasks, as long as it is clearly defined, that the reward is given for creativity. In addition to this, research proposes that rewards only enhance creativity, when they are perceived as important (Yoon, Sung, & Choi, 2015).

But there are also other studies following different approaches and proposing other views. Huo (2020) for instance, tested the effect of rewards on divergent thinking by using three different incentive schemes. The first condition was a fixed incentive regardless of the performance, for the second condition the incentive was an average amount plus additional money for each solution and the last condition provided a conceptual replication of condition one including public recognition. As a result, even though the creative performance was higher for the second condition, no significant correlation could be found between performance incentives and divergent thinking. Also, other studies (George & Zhou, 2002) tested the effect of rewarding creativity on divergent thinking and could not identify any significant correlation.

In addition to the ongoing debate, Bonner et al. (2000) propose that the more complex the cognitive task, the less likely incentives may lead to improved creativity. Baer et al. (2003), tested the relationship between extrinsic rewards and creativity among employees and found a positive relationship between extrinsic rewards and creativity for simple tasks and a weak relation for more complex tasks. The results obtained by Webb et al. (2013) are in line with these propositions and add that assigning participants to easy tasks with a fixed reward leads to higher creativity, than those assigned to complex and challenging tasks or target-based pay.

In contradiction, F. Li et al. (2017) report higher perceptions of rewards, the more challenging the task. This finding is also in accordance with the research of Byron and Khazanchi (2012) who claim that especially for rewards given

for creative performance, task complexity plays an essential role. The authors argue that a higher task complexity is more likely to increase an individuals' perceived competence and will also be more intrinsically motivating, which is why individuals will be more engaged and creative. In this context it should also be considered that employees might become more creative when they start feeling more confident in their work tasks, which could be a possible solution for these contradictory findings (Tierney & Farmer, 2002).

While some studies reported a negative influence and other studies found no influence, Eisenberger (1992) in contrast found a positive influence on creative performance by stating that rewards have an impact on personal competencies. These results can also be approved by Joussemet and Koestner (1999) which also noted an increased performance by rewarding creativity, but a decreased quality of answers. In contradiction, Byron and Khazanchi (2010) confirm the positive influence of creativity-contingent rewards on creativity itself, but state that extrinsic rewards may harm the overall performance.

Following the assumption that rewards may positively influence creative thinking, Kachelmeier et al. (2008) found evidence for the proposition that "quantity-based compensation improves quantity and that creativity-based compensation improves average creativity" (p. 343). Other studies (Eisenberger & Rhoades, 2001) proposed that specific contingency rewards for creativity may increase extrinsic motivation, while general rewards for high performance may rather increase intrinsic motivation. Additionally, it was confirmed that giving rewards for creativity for one task, also increased the creativity for subsequent tasks.

Moreover, Saether (2020) conducted a study among over 300 employees testing the impact of rewards on their divergent thinking. The author assigned the participants randomly into five groups, one of which performance was not rewarded. The other groups were manipulated in terms of the amount of money and instructions that should influence their motivation and perception of justice. As a result, creativity was increased when rewards were evaluated as fair. This also shows the importance of how the perception of fairness influences creative performance among participants, which can also be translated to employees in general. However, since Saether (2020) introduces another variable, namely the time at which the reward is to be paid, I argue that it might be no longer clear whether the motivation to be creative is related to the expected reward or whether the time has a stronger influence. It may be possible that some participants would have provided more creative results, but given different timelines, measuring the impact of the reward itself becomes ambiguous.

In fact, there are different views and results on the effect of rewards on performance or creativity, all stating different reasons for why or why not there might be a positive or negative outcome when using rewards. Kohn (1993) for instance claims that when organizations make use of rewards and incentives, people become even less interested in their work and wait for incentives before expending effort.

To conclude, even though research in this area testing the effect of monetary rewards on divergent thinking is contradictory, recent literature seems to provide more arguments for a positive influence on creativity, as long as it is clearly stated what the reward is given for. In this sense, I believe that this study will provide similar positive results. Further, this study not only wants to understand the reasons for these contradictory findings but also adds to existing literature by offering a new and different view on the rewards-creativity puzzle, which hasn't been solved so far. In fact, I assume that based on the findings the relationship between rewards and creativity might be more complex, which leads to the assumption that other moderators are at play here and might possibly impact the perception of rewards or the ability to creative thinking and problem solving.

Therefore, this study wants to explain those differences by taking personality traits into account, to test their influence. On the one hand I argue that personality might predict the creativity of individuals' and on the other hand there might be differences in terms of how rewards are perceived and how this might impact an individuals' performance based on his or her personality. Even though literature has mentioned their importance, no research has clarified their relationship. Therefore, in a first step, this study assumes a positive impact of rewards on creative performance.

Hypothesis 1. Monetary rewards for creativity are positively related to originality.

2.3. The Influence of Personality on Divergent Thinking

The study of personality is a very large field with an unmanageable number of theories, models, or measurements and there has been research in many areas testing if personality characteristics can be associated with creative achievements. Interestingly, there is a stable set of core characteristics such as broad interests, attraction to complexity or intuition pointing out how a creative personality could look like (Barron & Harrington, 1981).

In contradiction, not all scholars agree with the assumption of linking personality characteristics to creative performance. Zhou (1998) criticizes the dominant view of existing research on judging ideas based on their creativity and claims that mental processes through which those ideas are developed should be stressed more in research. Additionally, the author states that contextual variables may be more effective in predicting creativity than personality.

However, Amabile (1998) states that creative thinking refers to an individual's ability to solve problems, which also depends on his or her personality. Therefore, especially the personality of CEOs, managers' and leaders has emerged as a relevant topic in the strategic management field when examining personality traits, as their personalities can have a major influence on strategic decisions and may determine performance implications (Peterson et al., 2003). According to this, some personality traits might predict a stronger focus on tasks, flexibility or risk-taking, while other traits might enhance passivity or dominance (Herrmann & Nadkarni, 2014).

Amabile (1983) claims that besides other factors, personality characteristics such as self-discipline, perseverance or independence are creativity-relevant skills and hence, related to creative thinking. In addition, Mumford (2000) predicts that creative individuals display a high degree of autonomy and are typically the ones developing new ideas.

Considering that the Five Factor Model (FFM) is one of the most known and used models to measure personality, scholars have already demonstrated its generalizability, validity and reliability in various studies (Costa & McCrae, 1992a). Further, other studies (H. Zhao & Seibert, 2006) have shown that the FFM traits are important drivers of individual human behavior and performance. Hence, this model, more specifically a shorter version of it (BFI; John and Srivastava, 1999), is also used for this study to measure its relation to creativity.

As Openness to Experience and Extraversion are generally predicted to have positive relationships to creative performance, this study wants to test if these results can also be achieved for divergent thinking, namely originality. Therefore, the focus lies on these two traits when testing personality and the creativity rating is based on the number of unusual or unique ideas (Runco, 2007).

2.3.1. Openness to Experience

Leaders with a high level of openness are more likely to express new ideas, are more flexible and open to changes and new experiences (Judge & Bono, 2000). Further, they seek out information, are able to identify more creative solutions for problems and are better in sensing and seizing opportunities (Shane et al., 2010).

Openness to experience "seems to be the most strongly tied to creativity" (Runco, 2007, p. 296) and is predicted as being a key personality for creativity (Dai et al., 2019; Harrison et al., 2019; Herrmann & Nadkarni, 2014; Nadkarni & Herrmann, 2010; H. Zhao & Seibert, 2006; H. Zhao et al., 2010). This is also confirmed by other studies testing the relationship between creativity and personality (Dollinger et al., 2004).

Myszkowski et al. (2015) for instance, found that managers with high levels of openness were able to find more ideas on management problems in divergent thinking tasks than others. To test this, they asked over 100 management students and designed their own creativity measures. The experiment consisted of two tasks each for divergent and convergent thinking and they rated creativity based on fluency, which represents the number of ideas. But also, other studies have consistently identified the positive relationship between openness to experience and divergent thinking and even claim that "creativity is uniquely related to openness to experience" (McCrae, 1987, p. 1263).

Furthermore, King et al. (1996) tested the relation among personality, creative ability and creative accomplishments among psychology students. The authors used the verbal component of the Torrance Test of Creative Thinking (TTCT) which consists of six different tasks such as unusual uses, or

supposing tasks. All answers were rated on two criteria, fluency and originality and as expected, openness to experience is positively related to both criteria. What the authors interestingly point out in the discussion section is the question why individuals with high levels of openness to experience give more creative answers. By trying to find an answer to this question they predict that those individuals might value creativity or novelty differently and might recognize potential situations as more creative than others.

Even from another point of view, namely a neuroscience view, W. Li et al. (2015) find support for the assumption that openness might positively influence the ability of divergent thinking. In fact, the authors propose that individuals with personality characteristics such as high levels of imagination, curiosity, challenge or risk-taking are more likely to have scientific discoveries than others. They conclude with suggesting that openness plays an important role in shaping an individual's creativity.

However, besides openness being positively related to creativity, George and Zhou (2001) also found out that creative answers were highest, when those individuals had unclear ends on their jobs and unclear means. This implies that the more freedom and autonomy people have, and less structure is given in tasks, the higher the ability to develop their creativity.

In fact, all these results indicate that openness to experience is a necessary personality trait in order to explore a high number of creative solutions to problems. Interestingly no literature could be found stating the opposite or presenting negative results for this trait when measuring creativity. It even seems impossible to assume different results as those presented in this study, since openness is being present as a key factor for creativity.

To conclude, there is no reason to expect different results for originality in a more strategic context as I assume that individuals working strategically also rely on openness and will give creative answers.

Hypothesis 2a. Openness to experience will be positively related to originality.

2.3.2. Extraversion

Individuals with a high level of extraversion tend to be enthusiastic and ambitious, which results in a proactive behavior by actively engaging in tasks and trying to find novel ideas (Raja et al., 2004). In contradiction, a low level of extraversion indicates a more quiet, introverted behavior (Costa & McCrae, 1992a).

However, several authors have tested the effect of extraversion on creativity, some of them also included additional variables in their analysis to test the importance of personality. According to Sung and Choi (2009, p. 944), their study indicates that "extraverts tend to seek novel ways of doing tasks and (...) confront problems instead of avoiding them" which leads them to propose a higher creative performance for extraverts. Furthermore, Gocłowska et al. (2019) tested the relation between extraversion, divergent

thinking and creating novel ideas and found a positive relationship. Further, the author proposes that extraversion is, besides openness to experience, one of the creativity-related personality traits and conclude with confirming that novelty seeking is linked to extraversion and leads to greater divergent thinking.

Following this assumption, Kaspi-Baruch (2019) for instance, tested the moderating effect of goal orientation on extraversion and creativity and proposed a positive relationship. The experiment was conducted online using an adapted version of the Alternative Uses Task (AUT; Guilford, 1967) to test creativity. One point was awarded for every original answer. Indeed, as the results indicate, extraverted individuals seem to be the most creative, when they are motivated and oriented toward learning. A possible limitation I see in this study is that it might not be very representative, since 80% of the participants are female and the answers could therefore be biased.

In their study, Chamorro-Premuzic and Reichenbacher (2008) explored the effects of the Big Five personality traits and threat of evaluation on divergent and convergent thinking among students. Their results show that extraversion indeed predicts divergent thinking and is an important trait for creativity. This is explained by arguing that extraverted individuals might have an intrinsic motivated advantage in divergent thinking tasks and outperform their introverted counterparts, especially when they are being evaluated. However, the authors state that extraversion can be seen as facilitator for divergent thinking and is also related to actual creativity and not only to measured creativity.

Nonetheless, Nadkarni and Herrmann (2010) also confirm a positive relationship between extraversion and creative thinking. In their study, the authors tested the relationship between CEO personality, strategic flexibility, and performance. They state that strategic flexibility influences creativity and hence, tested the moderating effect of it on extraversion using the NEO Five Factor Inventory. Moreover, Weiss et al. (2020) noted a strong correlation between extraversion and divergent thinking and pointed out that extraversion was the strongest trait measured in their study related to divergent thinking.

Indeed, extraversion is consistently determined to have a positive relationship with creativity, regardless of whether this involves the personality of CEO's, managers or students. It seems likely to assume that according to the incorporated literature, extraverted individuals are more likely to generate more ideas in creativity tasks and will engage proactively to perform better than others. In fact, it is also quite likely that we will find the same result for originality in this study, since this is a part of divergent thinking and no contradictory results could be found stating the opposite.

Hypothesis 2b. Extraversion will be positively related to originality.

2.4. The Moderating Role of Personality

Given the contradictory findings of the effect of rewards on divergent thinking, research should explore the reasons under which rewards have positive, negative or neutral effects on divergent thinking (Baer et al., 2003) by taking other views into account. As part of a possible solution to this puzzle, I focus on personality in this section and want to test the reward sensitivity of individuals' personality traits, namely openness to experience and extraversion by offering a reward for creativity. With that in mind, it should be considered that individuals' personalities have different characteristics which respond differently to motivational factors such as extrinsic rewards (Shalley et al., 2004; Shaw et al., 2003).

It might be reasonable to argue, that some personalities may have a higher sensibility for rewards than others. In this context, reward sensitivity can be understood as "an incentive motivational state that facilitates and guides approach behavior to a goal" (Depue & Collins, 1999, p. 495). There are also other similar research approaches in this field testing the impact of personality on income and salaries. Hence, literature suggests that it is possible that personality may act as a moderator by interacting with rewards and how they are perceived (Wu & Zumbo, 2008).

Despite extensive research, no literature was found testing this moderating effect in this relationship. Most research in this area is focused on testing the rewarding effect on creative performance by taking different variables into account, such as fairness or different forms of manipulations (Saether, 2020), to contribute to the contradictory reward-creativity puzzle. Other studies tested the effect of all five personality traits on creativity to discover specific traits related to divergent thinking (King et al., 1996) or focused on differences between intrinsic and extrinsic motivation regarding creativity (Malik et al., 2019).

Therefore, related literature and results on openness to experience, extraversion, financial incentives, rewards and creative performance will be drawn together to present a status-quo in this field.

2.4.1. Openness to Experience

Openness to experience involves interest in novel things, ideas or knowledge and is related to characteristics such as being imaginative or adventurous (Shi et al., 2016). Furthermore, as we have already stated, this personality trait is the closest one related to creativity (Kaufman et al., 2015; Nadkarni & Herrmann, 2010). Hence, even though its relation to creativity might be clear, testing if there is a possible interaction effect on the reward-originality relationship might reveal new insights which could contribute to this debate.

An interesting study has been conducted by Sung and Choi (2009) who tested the moderating effect of intrinsic and extrinsic motivation on personality and creativity among business school students. Even though the moderator is a different one compared to my study, we find interesting implications here. Besides their proposition that extrinsic motivation might have a positive effect on creativity, the authors add that

extrinsic motivation may offer a stage where individuals can behave in accordance with their personality trait. According to their study design, they argue that motivation might create a setting in which an individual's openness to experience can be activated to enhance creative performance. Indeed, the authors' hypothesis was supported, confirming a positive interaction effect of extrinsic motivation on openness, resulting in a greater creativity. However, what should be viewed critically is the extrinsic motivator the authors use. Most research provides monetary rewards to measure the impact of extrinsic motivation, while the experiment in this study provided gift certificates to students. In my opinion, I think it is necessary here to critically question the influence of the extrinsic motivator. Moreover, the authors talk about creative performance, but without going into more detail about what exactly is meant by this.

In another study (Heineck, 2011), the author tested the relationship between personality traits and market success in the United Kingdom by taking monetary effects into account. It should be noted that although this study does not measure creativity, it still focuses on performance differences as an outcome. The author used data from the British Household Panel Survey and a fifteen-item questionnaire to capture the personality dimension. The results indicate a positive relationship between openness to experience and wages, which may also be considered for rewards.

This raises the question if besides the positive relationship between openness and wages, there is also evidence for openness reacting more sensitive than other traits to rewards and payments. To test this, Vandenberghe et al. (2008) conducted a study among 967 participants to find out, which personality trait was most attracted to total rewards and its components such as variable or indirect pay, but also prestige and the quality of social relationships at work. Their results showed that openness best predicts the importance employees give to total rewards. Regarding bonus payments, the authors claim that "people who are curious and open to experience tend to ascribe greater prominence to bonuses (...)" (p. 442).

Openness to experience has proven to be a trait that has a positive impact on creativity (Myszkowski et al., 2015; Runco, 2007). Besides, Sung and Choi (2009) have shown the interaction effect of extrinsic motivation on openness and creativity. Hence, if there is a positive interaction effect of extrinsic motivation on openness, it might be reasonable to assume similar results for openness interacting with rewards, by offering a similar stage for individuals' to behave more or less creative according to their reward sensitivity.

Nevertheless, there is also research proposing extraversion instead to be the personality trait most attracted to compensation (Lucas & Diener, 2001), as they argue that those individuals are more risk tolerant and engage more in social interactions. Contrary, openness to experience is linked to seeking new challenges, development and new opportunities (Barrick & Mount, 1991).

In fact, I assume that it seems likely that individuals with high levels of openness, as this trait stands for making new

experiences and being open for novel ideas, might perceive extrinsic rewards as positive which in turn might increase originality. Therefore, this study predicts a higher reward sensitivity for those individuals with high levels of openness.

Hypothesis 3a. Openness to experience will positively moderate the relationship between rewards and originality.

2.4.2. Extraversion

Extraverted individuals are open, sociable, talkative, have positive emotions and thoughts and enjoy interaction with others (Gołowska et al., 2019; King et al., 1996). Research also indicates that extraverted individuals might have a stronger reaction to reward-approach situations than others (Smillie et al., 2012), but more focus is paid on brain systems and connections in the literature, rather than on taking a behavioral approach.

Interestingly, when it comes to defining the core features of extraversion there are contradictory findings in the literature, finding evidence for either social interaction or reward-sensitivity being the key determinants for extraversion (Ash-ton et al., 2002). The authors state that it might be possible that “extraverts are sociable because (a) reward sensitivity is the core of Extraversion and (b) social situations tend to be rewarding” (p. 245).

In a study conducted by Speed et al. (2018), the authors tested the relationship between extraversion on reward sensitivity. Their results indicate that extraversion was associated with reward sensitivity, but only when neuroticism was low. Interesting in this study was further the approach the authors used to test the participant's reward sensitivity. They presented two identical doors on a computer screen to the participants, asking them to select one. Additionally, the participants were told that they could either win or lose money, depending on which door they chose. Participants did not know where the reward was hidden. In my opinion, the fact that participants could also lose money is interesting, as no other studies could be found testing similar effects, but also raises the question if being rewarded and losing money can be tested equally. I wonder what specifically the study is attempting to establish with this. On the one hand, it agrees with previous findings and hypothesizes that extroverts react positively to rewards. But I wonder if the same is true for losing money. However, another critique on this study regarding its validity, is that the study has been conducted on adolescent girls only and therefore cannot be generalized.

In line with these findings the American Psychological Association conducted a study (2021) on approximately 300 participants, testing possible effects of personality traits such as extraversion but also neuroticism or depression on reward-sensitivity. From a neuroscience point of view, their findings suggest that extroverts may have certain connections in their brain system that tend to perceive reward systems as a greater incentive than others. However, even though the foundation for reasoning is a different one, the results stating a higher reward-sensitivity for extraverts are similar.

In returning to a behavioral approach, Gołowska et al. (2019) focused more on the extraversion-creativity relationship and tested the effect of extraversion on novelty seeking and divergent thinking. To test the divergent thinking, the authors used two alternative uses tasks, asking for creative ideas for a "cable" and a "tin can", each to solve within two minutes. They rated the ideas based on originality and further paid every participant a monetary reward of five euros for participating in this study. Their results indicate that novelty seeking is linked to extraversion and can further lead to greater divergent thinking. A possible limitation could be seen in the short time of two minutes, given for each task, as some individuals may come up with a lot of ideas in a short amount of time, while others might need more time to generate novel ideas. Hence, I assume this might have an impact on the results.

Further, Fulmer and Walker (2015) found evidence for increased creativity and productivity for high extraverted people in less structured tasks, but also state that the difference to less extraverted people is rather small. Similar results can also be approved by Sung and Choi (2009). Other studies (Stewart & Bobko, 1996) also tested the interaction effect of reward payments on the relationship between extraversion and sales performance for sales representatives and equally proposed a higher sensitivity for rewards for extraverted individuals and hence, predicted a positive effect resulting in a better performance.

To conclude, various studies indicate that extraverted individuals might be more reward-sensitive and might perform better than other individuals, when it comes to competition. In this case, rewards would positively influence creative performance. Therefore, this study assumes that similar results might be found testing the moderating effect on the reward-originality relationship in a strategic context.

Hypothesis 3b. Extraversion will positively moderate the relationship between rewards and originality.

To give an overview of all the hypotheses presented above, Figure 1 represents this study's conceptual model showing the relationships being analyzed.

3. Methodology

3.1. Data collection

I collected data over a period of one week using personal connections on the one hand, and by making use of these connections to find more participants. This approach allowed me to be aware of the academic and/or working background the participants in this study had, which also ensured the strategic context of this study. Additionally, the link to this experiment was posted on LinkedIn, an online platform for professional business networking and in several social media groups with students studying business administration, management or strategy.

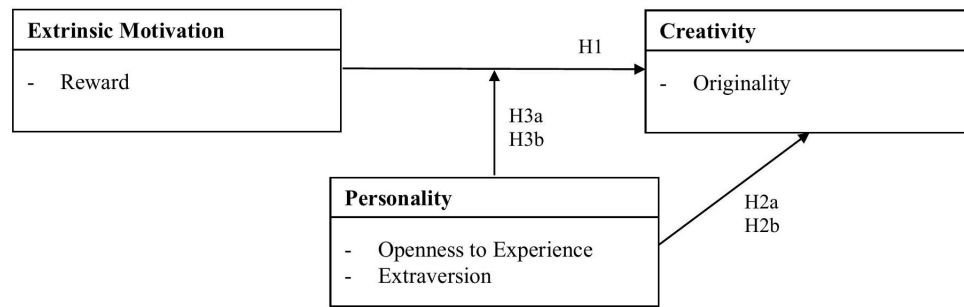


Figure 1: Conceptual Model

Even though this approach allowed me to find a high number of participants, there are still limitations and weaknesses concerning this approach. However, due to this sampling method, I cannot exclude a bias among the participants. First, as this sample was focused on a specific field of participants, it does not represent the population, which should be considered regarding the explanatory power of the results. Second, by using personal connections, I have to assume certain weaknesses in this study regarding participant's motivation to give answers that are more likely to fit into this research, even though the purpose of this study was revealed after finishing the survey and no influencing information was provided beforehand. Third, due to the sharing of the link in social platforms, there was a higher dropout rate than in other sampling methods, which should be taken into account.

3.2. Sample

The sample was composed of 141 participants (no reward condition = 70, reward condition = 71), of which 76 were female, 61 male, and 4 preferred not to say, aged from 18 to 63 years old ($M=29.84$, $SD=9.859$). In terms of education, 2 had no high school degree, 9 had some college but no degree, 13 had a high school degree, 55 had a bachelor's degree, 51 had a master's degree, 9 had a PhD or higher, and 2 did not indicate their educational level. Regarding the employment status, 58 were students, 70 were employed, 7 were self-employed and 6 were currently not working. The level of working experience averaged about 7.33 years.

3.3. Setting and Procedure

Pre-test. Several days before distributing the online experiment to participants, I conducted a pre-test to find possible mistakes, unclear formulations and to receive feedback on the survey design. Therefore, three volunteers agreed to do the testing and give feedback. As those volunteers tested both conditions and were informed about the setting, they did not participate in the experiment. Feedback was given especially on the timing for the divergent thinking task, which was supposed to last for 6 minutes but was then, after processing the feedback, reduced to 4 minutes, as the task was described as too long. Additionally, small adaptations were made in the experiment by highlighting some words in the

text or adding an explanation for the divergent thinking task on how to type in the answers.

Experiment. The study consisted of two phases, with the personality test first and the divergent thinking test second. Participants completed the study online in Qualtrics, which is an online survey experiment software. I chose to conduct an experiment, as this allows for manipulating variables and then observing the corresponding difference in the outcome - in this study, namely manipulating the rewarding condition, to test possible differences in the creative performance. The experiment lasted approximately 8 minutes.

Participants were randomly assigned to a reward or no-reward expected condition. For the analysis of personality traits this study focused on the Five Factor Model (Costa & McCrae, 1985) using the question repertoire of the Big Five Inventory for openness to experience and extraversion on a 5-point Likert scale (BFI; John and Srivastava, 1999). Before introducing the second part, participants were informed, that the following task was about creativity and that they would be rated for originality by an objective judge. Participants in the reward condition were further informed about the possibility to win a reward. Rewards were of medium size (20 €) and were given to the Top 5 participants with the best scores in originality after analyzing the results.

For the second part measuring the divergent thinking ability, this study used an adapted version of the Alternative Uses Task (AUT; Guilford, 1967). Participants were provided with the name of a common object and instructed to think of uncommon or original uses for this object. The time limit to complete the task was four minutes. The task included the following instructions: *"In this task you are asked to use your imagination and be creative. Please note, that there are no wrong answers. Think of all the uses that come into your mind for a fork"*. The aim of the task was to find as many original ideas as possible to provide creative solutions.

At the end of the experiment participants were asked to answer some short questions about their enjoyment of the creativity task and some demographic questions. After all the tasks were judged, the 5 best participants were contacted via email on April 16th 2021, to transfer the promised reward.

3.4. Measures

Reward. The independent variable consisted of two different conditions, a no reward condition and a 20 Euro reward condition. The tournament reward was given to the top 5 participants with the best creative answers according to the originality rating. I decided to use such a reward, as the evaluation of each individuals' performance was dependent on the overall performance, which should increase the competitiveness of participants and hence, their creative performance. Tournament rewards are often used to develop innovative ideas and the participation of individuals is often motivated by money, the love for competition or curiosity-seeking (Morgan & Wang, 2010). As this study is focused on creativity, the aim was not to develop innovative outcome, but novel, useful, and creative ideas according to individuals' ability to divergent thinking.

Regarding the size of the reward, several studies indicate that there is no significant effect on performance outcomes, which suggest that a higher reward does not automatically lead to better results (Holst-Hansen & Bergenholtz, 2020; Mason & Watts, 2009). Therefore, this study did not expect any limitations on the validity regarding the size of the reward.

Personality traits. The moderating variable was measured by a short survey. The personality traits asked were Openness to Experience and Extraversion, whereof ten items relate to openness ("has an active imagination", "likes to reflect") and eight items are related to extraversion ("is talkative", "is full of energy"). In total, the personality test consisted of 18 short questions. For the analysis of personality traits this study used an adapted version of the Five Factor Model (Costa & McCrae, 1985), the Big Five Inventory (BFI; John and Srivastava, 1999). According to Chamorro-Premuzic and Reichenbacher (2008, p. 1096) "The BFI is well validated and has internal consistencies ranging from .75 to .90 and test-retest reliabilities ranging from .80 to .90." In the BFI version, respondents state to what extent the elements pertain to them in a scale from 1 (strongly disagree) to 5 (strongly agree). A complete list of the questions can be found in the appendix. The reason why the BFI version was selected is simply because it's shorter than the Costa and McCrae (1985) version.

This study could have also taken other measures into account, to test participants personality. However, empirical research shows that one of the key strengths of the Big Five model is its consistency across time, culture and age as well as its structure, which avoids overlaps (Costa & McCrae, 1992b). Further, it has internal consistency as well as good divergent validity with the traits measured (Myszkowski et al., 2015).

Originality. Divergent thinking tasks are often used in creativity studies and are seen as reliable and valid (Runco & Acar, 2012). The dependent variable in this study was measured by scores for original ideas in the creativity task and ranged from 0 – 10 points for each idea. The rating focused on originality, which represents the number of unusual or unique ideas (Runco, 2007). The requirement for each

idea to be rated was that it had to be useful, otherwise ideas received 0 points. The ideas were rated by three judges in total.

The procedure of the creativity rating was as follows. First, I created a list with all the ideas participants generated in this task, using MS Excel. For the other two judges it was not possible to link those ideas to participants or any other variables such as age or gender. Second, this list was then distributed to the judges with a brief explanation of the study and clear instructions for the rating. Every judge had to rate the ideas by giving points for originality, as long as the ideas were also useful. Third, after every judge rated every participants' ideas, I added the scores of all ideas per participant together and created the variable originality, based on the sum of those scores. An inter-rater reliability analysis was conducted for the creativity scores of all three judges, indicating to what extent the judges agreed with each other. There is a strong significant correlation (.0,83) between the means of creativity per participant. There were no effects of age or gender on the creativity measure, and also no interaction with the independent variable was given.

Control variables. I also collected data on a number of control variables, such as age, gender, current status of employment, educational level, years of working experience and intrinsic motivation. For measuring intrinsic motivation, the instrument consisted of 3 items using a 7-point scale ranging from 1 (not at all true) to 7 (very true). The questions are based on the Intrinsic Motivation Inventory (IMI; Deci and Ryan, 2003). The questions were (a) "*This activity was fun to do*" (b) "*I would describe this activity as very interesting*", (c) "*I enjoyed doing this activity very much*". These items measured the extent to which participants enjoyed the task and performed it for its own sake.

For analyzing the data and testing the hypothesis IBM SPSS Statistics 27 was used.

4. Analysis and Results

4.1. Missing values and recoding

Before starting the analysis, all data was checked for errors or missing values. As Qualtrics allows a forced answering mode, the questions in this experiment were all completed, and no missing values or data were found. Participants who did not complete the experiment were automatically filtered out by the program and as main parts of the experiment were not completed, those participants - 43 in total, were excluded from the analysis. Additionally, as the Big Five Inventory questionnaire (BFI; John and Srivastava, 1999) for the personality test includes question which ask for reversed scoring, the answers to the question 4, 6, 12, 15 and 18 were reversed before doing the analysis. For further analysis, the variables gender, status of employment, education and working experience were dummy coded.

4.2. Distributions, reliability, and internal consistency

For testing the normal distribution of the variables, I first analyzed the skewness and kurtosis. The skewness is a mea-

sure of the asymmetry of a distribution, whereas the kurtosis measures the extent to which there are outliers. A normal distribution is symmetric and has a skewness value and a kurtosis value of zero. However, the values for both, skewness and kurtosis were analyzed, and some values were computed to normalize the distribution and achieve acceptable values between -1 and +1 (e.g. openness to experience changed from ($S=-1.971$, $SD=.204$) to ($S=-.976$, $SD=.204$); work experience changed from ($S=1.131$, $SD=.204$) to ($S=.122$, $SD=.204$). Additionally, to provide more statistical significance on these results, I also conducted a test of normality by doing a Kolmogorov-Smirnov analysis and a Shapiro-Wilk analysis.

To test the internal consistency of the items presented in the personality scale (BFI; John and Srivastava, 1999) and the intrinsic motivation scale (IMI; Deci and Ryan, 2003) I used in my experiment, I tested the effect of each item of those scales using Cronbach's alpha. The calculation of Cronbach's alpha "has become a common practice in (...) research when multiple-item measures of a concept or construct are employed" (Tavakol & Dennick, 2011, p.53). Cronbach's alpha was developed to provide a useful measure of the internal consistency of a test or scales and is presented as a number between 0 and 1, whereas a value above 0,7 is interpreted as consistent. If the items in the measured scale correlate with each other, the alpha value increases. However, a higher value does not automatically stand for a higher degree of internal consistency, as alpha is also influenced by the length of the scale (Tavakol & Dennick, 2011).

In this study, the personality scale had a Cronbach's alpha value of .831 which indicates a high reliability. Additionally, I also tested if deleting items from the personality scale would increase the Cronbach's alpha value. Deleting one item of openness to experience would have led to a higher value of .846, however I decided to accept the Cronbach's alpha value of .831, as this already indicates a high reliability.

For intrinsic motivation, the scale presented an internal consistency of .826, which is also accepted as a reliable alpha value. However, the results for intrinsic motivation show that the Cronbach's alpha would not increase significantly when deleting a specific item.

I also checked to see whether there were other interesting findings regarding the means, standard deviations or other values for each variable. Regarding the co-variables results revealed that for openness to experience ($M=36.16$, $SD=6.360$)¹ and extraversion ($M=28.76$, $SD=5.861$) the medians were relatively high, as the maximum scoring for openness to experience was 50 whereas for extraversion it was 40. An in-depth analysis proposed further that the lowest score for openness to experience was 22 and the highest score was 49, whereas for extraversion the lowest score was 9 and the highest score was 39. However, even though

the manipulation of this experiment was after measuring the personality levels, analysis revealed significant results ($r=.548$, $p=.001$) indicating that especially for the reward condition individuals showed interestingly higher levels of openness to experience ($M=36.99$, $SD=6.649$) and extraversion ($M=29.32$, $SD=5.613$) compared to the no reward condition (openness to experience ($M=35.33$, $SD=5.985$); extraversion ($M=28.19$, $SD=6.089$).

4.3. Divergent thinking task

The creativity rating revealed that on average, participants had approximately 8 creative ideas on how to use a fork, ranging from 1-30 ideas. In the reward condition participants produced on average 7 ideas, while in the non-reward condition participants produced approximately 9 ideas. The median for the creativity rating in the reward condition was 44.97 (with the lowest possible total score being 5 and the highest possible total score 101), the median for the non-reward condition was 37.00 (with the lowest possible total score being 6 and the highest possible total score 124).

Regarding the rating, in total, 1,214 ideas were generated, whereof 49.01 % received a score of 5 or above. The scores 9 and 10 were not given at all, as the highest given score was 8, received by 0.34 % of the participants, followed by a score of 7 (6.84 %) and 6 (18.95 %). Ideas which scored over 7 were for instance "use to make patterns in the sand", "use as a zen garden tool", "use to make a sculpture", "use as an ice cream stick", "use as a small ladder for bugs" or "use for gardening".

4.4. Descriptive statistics

Table 1 presents the scale means, standard deviations, intercorrelations, and reliabilities for each of this study's variables. As the table displays, intrinsic motivation is positively correlated with openness to experience ($r=.195$, $p=.020$), extraversion ($r=.218$, $p=.009$) and originality ($r=.213$, $p=.011$). This indicates that those individuals with high levels of openness and extraversion were also highly intrinsically motivated while performing the experiment. Additionally, those individuals intrinsically motivated performed better in the divergent thinking task. For originality, the table shows a significant negative correlation for age ($r = -.187$, $p=.027$) which means that the older individuals, the less creative they performed. Regarding the working experience, there is also a significant negative correlation to age ($r=-.174$, $p=.039$). This implies that there is no relation as work experience is a negative indicator for creativity, as more experience did not lead to more creativity.

4.5. Extrinsic and intrinsic motivation

Further analysis revealed significant results ($F=6.366$, $p=.013$) regarding the effect of intrinsic motivation on the reward condition ($M=4.75$, $SD=1.471$) and no reward condition ($M=4.63$, $SD=1.625$). Results show that the intrinsic motivation for the reward condition was even higher than for the no reward condition and as indicated above, the quality

¹ For further clarification it might be useful to note that the personality scores of individual participants were added up and therefore, the sum was taken here instead of the mean. However, statistically this makes no difference.

Table 1: Overall means, standard deviations, and correlations

Variable	<i>M</i>	<i>SD</i>	1	2	3	4	5	6
1. Openness to Experience	36.16	6.36	-					
2. Extraversion	28.76	5.86	.548*	-				
3. Originality	41.01	19.32	.409**	.451*	-			
4. Intrinsic Motivation	4.69	1.56	.195*	.218**	.213*	-		
5. Age	29.84	9.86	.000	−.181*	−.187*	−.144	-	
6. Work Experience	7.33	9.38	.049	−.160	−.174*	−.148	.921**	-

Note: N=141, **p<.01, *p<.05

of answers regarding its originality was higher in the reward condition. As this assumption is part of an ongoing discussion in the creativity field, this finding is of particular interest and will be discussed in the next section.

4.6. Hypotheses testing

In a first step I analyzed the overall model to test whether it had explanatory power and how much. Results indicated significant results regarding this study’s model with an explanatory power of 56.2 % ($R^2=.562$, $F=16.217$, $p=.001$). In a next step, I tested the hypotheses using a regression analysis. Table 2 presents the findings for this study’s hypotheses.

Hypothesis 1 proposed that monetary rewards for creativity are positively related to originality. Table 2 shows that the relationship between monetary rewards and originality is statistically not significant ($F=.229$, $p=.633$). According to these results, hypothesis 1 is therefore not supported. However, there is still reason to believe that there is a positive relationship between rewards and originality. When testing only those two variables (mean originality score for the no reward condition ($M=37.00$), mean originality score for the reward condition ($M=44.97$)), the relationship is significantly positive ($F=6.228$, $p=.014$), which indicates that openness to experience and extraversion might have a strong link to originality. This leads to an overlap between those variables which absorbs the explanatory power of this relationship. Additionally, as a further explanation, when conducting the experiment, the personality test was filled in before the manipulation was introduced, which indicates that the results for personality are based on randomness and not biased by the extrinsic reward manipulation. Therefore, this study assumes a disturbing effect between rewards and originality as presented in this model and believes that due to the absorbing power of the two personality characteristics, the relationship between rewards and originality is displayed as not significant, even though it actually is significant in a bivariate analysis.

Hypothesis 2a proposed that openness to experience will be positively related to originality. As displayed in the table above, the results indicate a significantly positive relationship for openness to experience and originality ($F=5.300$, $p=.023$). Hypothesis 2a is therefore supported.

Hypothesis 2b proposed that extraversion will be positively related to originality. Table 2 shows that the relationship between extraversion and originality is positive and statistically significant ($F=12.856$, $p=.000$). Hypothesis 2b is therefore supported.

Hypothesis 3a proposed that openness to experience will positively moderate the relationship between rewards and originality. Table 2 shows that there is no significant interaction effect of openness to experience with extrinsic rewards ($F=.241$, $p=.624$). According to these findings hypothesis 3a is not supported.

Hypothesis 3b proposed that extraversion will positively moderate the relationship between rewards and originality. As Table 2 presents, there is no significant interaction effect of extraversion with extrinsic rewards ($F=.073$, $p=.788$). Hypothesis 3b found no support.

5. Discussion

5.1. Discussion of results

The main purpose of this study was to test if personality has a moderating effect on the relationship between extrinsic monetary rewards and creative performance, measured as originality. First, I measured the effect of extrinsic rewards on originality. Second, I tested the effect of openness to experience and extraversion on originality and third, I tested for the moderating effect.

This study proposed a positive effect of extrinsic rewards on originality. Despite the popularity of using extrinsic motivators such as performance-contingent rewards to enhance creativity, there is still little agreement on the effect on creativity (Shalley et al., 2004). Nonetheless, this assumption is also in line with the study of Eisenberger and Rhoades (2001) which tested the effect of rewards on creativity and reported higher results for those participants being rewarded, and the studies of Byron and Khazanchi (2010) or Joussemet and Koestner (1999). Even though the measured means for both conditions implied high significance when testing only for those two variables, the effect was absorbed by the two personality traits when testing the significance of all relevant variables. For hypothesis 1 this indicates that even though the hypothesis is officially not supported, there is still reason to believe that there is a positive relationship. Hence, this

Table 2: Results of the regression analysis for originality

Variable	Sum of Squares	df	Mean Square	F	P
Reward	65.135	1	65.135	.229	.633
Openness to Experience	1506.159	1	1506.159	5.300	.023
Extraversion	3653.013	1	3653.013	12.856	.000
Moderator_Openness to Experience	68.615	1	68.615	.241	.624
Moderator_Extraversion	20.664	1	20.664	.073	.788
Error	38361.135	135	284.157		
Total	289421.000	141			

shows that an important factor of increasing creativity can be found in extrinsic motivation.

Regarding the impact of personality on divergent thinking, the findings of this study are in line with research in this area proposing positive effects of openness to experience and extraversion on originality. Especially for openness to experience this study was expecting a positive relationship with creativity as this personality trait is known as being “the most strongly tied to creativity” (Runco, 2007, p. 296) and is predicted as being a key personality for creativity (Herrmann & Nadkarni, 2014; Nadkarni & Herrmann, 2010; H. Zhao & Seibert, 2006; H. Zhao et al., 2010). Research indicates that openness to experience is necessary to explore creative solutions to problems which is also in line with the study findings of Myszkowski et al. (2015). Additionally, no research was found stating the opposite, which indicates that openness to experience and creativity are strongly linked to each other. Therefore, there was no reason to expect a different outcome in a management context, which is approved by these results.

For extraversion, research proposes that individuals with a high level of extraversion tend to be enthusiastic and ambitious, which results in a proactive behavior by actively engaging in tasks and trying to find novel ideas (Raja et al., 2004). This is also supported by Gołowska et al. (2019) stating that extraversion is not only positively related to creativity, but also to novelty seeking which leads to greater divergent thinking. In addition, Chamorro-Premuzic and Reichenbacher (2008) argue that extraverted individuals have an intrinsic motivated advantage in divergent thinking tasks especially when they are being evaluated. This is also displayed in this study's findings presenting a positive significant correlation between extraversion and intrinsic motivation. Therefore, extraversion can be assumed as facilitator for divergent thinking and predicts creativity.

Finally, this study tested the moderating effect of personality on the relationship between extrinsic rewards and originality. Existing research indicates high reward-sensitivity for individuals with high levels of openness to experience (Vandenbergh et al., 2008) and extraversion (Ashton et al., 2002; Lucas & Diener, 2001). Unfortunately, this study found no support for a moderating effect for both personality characteristics. A possible explanation could be that even though research indicates that higher rewards do not automatically lead to better results (e.g. Mason and Watts, 2009), this

study assumes that higher rewards might have led to more significantly positive results regarding the moderation effect. A different and more reasonable explanation could be that personality characteristics simply do not act as moderators in this relationship which sets the stage for future research in this area.

5.2. Theoretical and managerial Implications

This study contributes to existing literature in several ways. First, openness to experience and extraversion were both shown to have a positive effect on creativity, which is consistent with the literature. This is therefore not a new finding as such, but - to the extent that this study allows - it reinforces the validity of these assumptions.

Second, regarding the intrinsic and extrinsic motivation, there is an ongoing debate in the literature which has resulted in contradictory findings. According to Amabile (1998) people are most creative, when they feel intrinsically motivated, while Joussemet and Koestner (1999) claim that extrinsic rewards undermine intrinsic motivation. In fact, the results of this study revealed that there was a higher intrinsic motivation for the reward condition than for the no reward condition. As this study found even higher intrinsic motivation in the rewarding condition, I could not find an undermining effect resulting in less creative performance. This is also approved by Bradler et al. (2016) claiming that tournaments indeed increase creative performance, without any evidence for crowding out intrinsic motivation. In my opinion, this finding resulted due to the high competitiveness among participants in order to perform better or even outperform others, which may have also increased their intrinsic motivation. However, despite extensive research I could not find any literature-based explanation for this finding, which provides a very interesting research idea for future investigations. Thus, this finding indicates that the intrinsic and extrinsic motivation of individuals can be balanced when performing a creative task, without one motivation undermining the other and therefore contributes to the ongoing discussion.

Additionally, when focusing on the extrinsic motivation, this study also indicated that creative performance was higher when rewarding creativity. In practical terms, this finding can be used by managers for instance to conduct idea tournaments to unlock a companies' innovative poten-

tial by motivating employees to participate and reward them for their creative ideas (Morgan & Wang, 2010).

Lastly, the main focus of this study was to test the moderating effect of personality on the reward-creativity relationship. As companies need creative, and motivated employees in their teams, the question arises how this can be achieved. Therefore, this study wanted to find out if openness to experience and extraversion affect this relationship, which could have served as guidance for managers in terms of employee appraisals, recruiting interviews, or promotions. However, even though the moderating effect was not supported, the findings offer useful insights for practice. The study confirmed that openness to experience and extraversion, both have an impact on creative performance. This is interesting for companies in regards to team or project formation, to find the right balance. As some companies already test their employees' personality before joining a project team (e.g. Deloitte), this finding can serve as additional guidance to create and maintain diversity, as this is essential for creativity (Kurtzberg & Amabile, 2001).

5.3. Limitations and future research

This study has several limitations which provide a stage for future research. First, this study was conducted as an online experiment for individuals with a (strategic) management background. Even though in total I had 141 participants, I assume that the validity is a different one compared to experiments conducted in other settings, such as field experiments with less participants. The results concerning the effect of rewards on creativity or the moderating effect of personality may have been different in this setting. Due to the current pandemic situation there was no other choice of conducting the experiment, however, future research could focus its' analysis conducting a field experiment to provide more realistic results.

Second, the results obtained for the personality characteristics and for the intrinsic motivation were self-reported. This leads to the assumption that many participants may have a different self-image and therefore answered accordingly. This study thus assumes that participants' responses may be biased due to self-assessment. Future research could have the personality survey conducted by objective and independent third parties to avoid these same biases, which would lead to better results.

Third, an important variable in this experiment was the introduction of the manipulation in the form of an extrinsic reward. The aim was not only to determine the effect of extrinsic motivation on creativity, but also to find out whether the two personality factors openness to experience and extraversion react more sensitively to extrinsic rewards, and thus whether a statement can be made about the interaction effect. This hypothesis could not be confirmed, which suggests that the limitation lies in the amount of reward. However, although I have referred to studies suggesting the opposite (e.g. Holst-Hansen and Bergenholtz, 2020; Mason and Watts, 2009), it is reasonable to assume that the possibility of a higher reward would have allowed a clearer statement

regarding the interaction with personality. Future research should consider the possibility of introducing rewards at different levels (e.g. 1 € , 10 € , 25 €), and test each participant through each condition, in order to have clearer results in combination with the personality characteristics.

5.4. Conclusion

The aim of this study was to examine the effect of openness to experience and extraversion on the relationship between extrinsic rewards and originality. First, even though in the findings the effect of rewards on originality was not significant, there is still reason to believe that extrinsic rewards positively influence creative performance. Second, it was confirmed that both personality characteristics are positively related to creativity, which indicates that individuals with high levels of openness to experience or extraversion also achieve higher creative performance. Unfortunately, this study could not find support for a moderating effect of those personality traits. However, the results of this study also revealed that there was a higher intrinsic motivation of individuals for the reward condition than for the no reward condition, which indicates that the intrinsic and extrinsic motivation of individuals can be balanced when performing a creative task, without one motivation undermining the other. Additionally, it shows the impact of tournament rewards on motivation and creativity, which sets a stage for future research. Nevertheless, the results of this study contribute to the ongoing discussion in the creativity field regarding extrinsic motivators and provides useful insights for managers concerning personality traits and how to use them effectively to increase creativity.

References

- Amabile, T. M. (1983). The social psychology of creativity: A componential conceptualization. *Journal of Personality and Social Psychology*, 45(2), 357–376. <https://doi.org/10.1037/0022-3514.45.2.357>
- Amabile, T. M. (1993). Motivational synergy: Toward new conceptualizations of intrinsic and extrinsic motivation in the workplace. *Human Resource Management Review*, 3(3), 185–201. [https://doi.org/10.1016/1053-4822\(93\)90012-S](https://doi.org/10.1016/1053-4822(93)90012-S)
- Amabile, T. M. (1996). *Creativity in context*. Boulder, CO: Westview.
- Amabile, T. M. (1998). How to kill creativity. *Harvard Business Review*, 76(5), 77–87.
- Amabile, T. M., & Gryskiewicz, N. D. (1989). The creative environment scales: Work environment inventory. *Creativity Research Journal*, 2(4), 231–252. <https://doi.org/10.1080/10400418909534321>
- Amabile, T. M., Hadley, C. N., & Kramer, S. J. (2002). Creativity under the gun. *Harvard Business Review*, 80(8), 52–61.
- Ames, M., & Runco, M. (2005). Predicting Entrepreneurship From Ideation and Divergent Thinking. *Creativity and Innovation Management*, 14(3), 311–315. <https://doi.org/10.1111/j.1467-8691.2004.00349.x>
- Ashton, M., Lee, K., & Paunonen, S. (2002). What is the central feature of extraversion? Social attention versus reward sensitivity. *Journal of Personality and Social Psychology*, 83(1), 245–251. <https://doi.org/10.1037/0022-3514.83.1.245>
- Baer, M., Oldham, G. R., & Cummings, A. (2003). Rewarding creativity: When does it really matter? *Leadership Quarterly*, 14(4), 569–586. [https://doi.org/10.1016/S1048-9843\(03\)00052-3](https://doi.org/10.1016/S1048-9843(03)00052-3)

- Barrick, M. R., & Mount, M. K. (1991). The Big Five Personality Dimensions and Job Performance: A Meta-Analysis. *Personnel Psychology*, 44(1), 1–26. <https://doi.org/10.1111/j.1744-6570.1991.tb00688.x>
- Barron, F., & Harrington, D. (1981). Creativity, Intelligence, and Personality. *Annual Review of Psychology*, 32(1), 439–476. <https://doi.org/10.1146/annurev.ps.32.020181.002255>
- Behrens, J., Ernst, H., & Shepherd, D. A. (2014). The decision to exploit an R&D project: Divergent Thinking across Middle and Senior Managers. *The Journal of Product Innovation Management*, 31(1), 144–158. <https://doi.org/10.1111/jpim.12085>
- Biraglia, A., & Kadile, V. (2017). The role of entrepreneurial passion and creativity in developing entrepreneurial intentions: insights from american homebrewers. *Journal of Small Business Management*, 55, 170–188. <https://doi.org/10.1111/jsbm.12242>
- Blain, S. D., Sassenberg, T. A., Xi, M., Zhao, D., & DeYoung, C. G. (2021). Extraversion but not depression predicts reward sensitivity: Revisiting the measurement of anhedonic phenotypes. *Journal of Personality and Social Psychology*. <https://doi.org/10.1037/pspp0000371>
- Bonner, S. E., Hastie, R., Sprinkle, G. B., & M., Y. S. (2000). A review of the effects of financial incentives on performance in laboratory tasks: Implications for management accounting. *Journal of Management Accounting Research*, 12(1), 19–64. <https://doi.org/10.2308/jmar.2000.12.1.19>
- Bradler, C., Neckermann, S., & Warnke, A. (2016). Incentivizing Creativity: A Large-Scale Experiment with Tournaments and Gifts. *Tinbergen Institute Discussion Paper*.
- Byron, K., & Khazanchi, S. (2010). When and How rewards increase creative performance: A theoretically-derived meta-analysis. *Annual Meeting Proceedings (Academy of Management)*, 8(1), 1–6. <https://doi.org/10.5465/AMBPP.2010.54485861>
- Byron, K., & Khazanchi, S. (2012). Rewards and creative performance: a meta-analytic test of theoretically derived hypotheses. *Psychological Bulletin*, 138(4), 809–830. <https://doi.org/10.1037/a0027652>
- Chamorro-Premuzic, T., & Reichenbacher, L. (2008). Effects of Personality and Threat of Evaluation on Divergent and Convergent Thinking. *Journal of Research in Personality*, 42(4), 1095–1101. <https://doi.org/10.1016/j.jrp.2007.12.007>
- Costa, P. T., & McCrae, R. R. (1985). *The NEO Personality Inventory manual*. Odessa, FL: Psychological Assessment Resources.
- Costa, P. T., & McCrae, R. R. (1992a). Four ways five factors are basic. *Personality and Individual Differences*, 13(6), 653–665. [https://doi.org/10.1016/0191-8869\(92\)90236-I](https://doi.org/10.1016/0191-8869(92)90236-I)
- Costa, P. T., & McCrae, R. R. (1992b). *Revised NEO Personality Inventory (NEO PI-R) and NEO Five-Factor Inventory (NEO-FFI) professional manual*. Odessa, FL: Psychological Assessment Resources.
- Dai, S., Li, Y., & Zhang, W. (2019). Personality traits of entrepreneurial top management team members and new venture performance. *Social Behavior and Personality: An international journal*, 47(7), 1–17. <https://doi.org/10.2224/sbp.8107>
- Deci, E. L., Koestner, R., & Ryan, R. M. (2001). Extrinsic rewards and intrinsic motivation in education: Reconsidered once again. *Review of Educational Research*, 71, 1–27. <https://doi.org/http://doi.org.proxy.uba.uva.nl:2048/cv9qch>
- Deci, E. L., & Ryan, R. M. (1985). The general causality orientations scale: Self-determination in personality. *Journal of Research in Personality*, 19(2), 109–134. [https://doi.org/10.1016/0092-6566\(85\)90023-6](https://doi.org/10.1016/0092-6566(85)90023-6)
- Deci, E. L., & Ryan, R. M. (2003). Intrinsic Motivation Inventory. <http://selfdeterminationtheory.org/edu/scales/category/5-intrinsic-motivation-inventory>
- Depue, R. A., & Collins, P. F. (1999). Neurobiology of the structure of personality: Dopamine facilitation of incentive motivation and extraversion. *Behavioral and Brain Sciences*, 22, 491–569. <https://doi.org/10.1017/S0140525X99002046>
- Dollinger, S., Urban, K. K., & James, T. A. (2004). Creativity and Openness: Further Validation of Two Creative Product Measures. *Creativity Research Journal*, 16(1), 35–47. https://doi.org/10.1207/s15326934crj1601_4
- Eisenberger, R. (1992). Learned industriousness. *Psychological Review*, 99(2), 248–267. <https://doi.org/10.1037/0033-295X.99.2.248>
- Eisenberger, R., & Rhoades, L. (2001). Incremental Effects of Reward on Creativity. *Journal of Personality and Social Psychology*, 81(4), 728–741. <https://doi.org/10.1037/0022-3514.81.4.728>
- Fulmer, I. S., & Walker, W. J. (2015). More Bang for the Buck? : Personality Traits as Moderators of Responsiveness to Pay-for-Performance. *Human Performance*, 28(1), 40–65. <https://doi.org/10.1080/08959285.2014.974755>
- George, J. M., & Zhou, J. (2001). When openness to experience and conscientiousness are related to creative behavior: An interactional approach. *Journal of Applied Psychology*, 86, 513–524. <https://doi.org/10.1037/0021-9010.86.3.513>
- George, J. M., & Zhou, J. (2002). Understanding when bad moods foster creativity and good ones don't: The role of context and clarity of feelings. *Journal of Applied Psychology*, 87, 687–697. <https://doi.org/10.1037/0021-9010.87.4.687>
- Gocłowska, M. A., Ritter, S. M., Elliot, A. J., & Baas, M. (2019). Novelty seeking is linked to openness and extraversion and can lead to greater creative performance. *Journal of Personality*, 87(2), 252–266. <https://doi.org/10.1111/jopy.12387>
- Guilford, J. P. (1956). The structure of intellect. *Psychological Bulletin*, 53(4), 267–293.
- Guilford, J. P. (1967). *The nature of human intelligence*. New York: McGraw Hill.
- Gupta, N., & Shaw, J. D. (2014). Employee compensation: the neglected area of HRM research. *Human Resource Management Review*, 24, 1–4. <https://doi.org/10.1016/j.hrmr.2013.08.007>
- Hackman, J. R., & Oldham, G. R. (1980). *Work redesign*. Reading, MA: Addison-Wesley.
- Harrison, J. S., Thurgood, G. R., Boivie, S., & Pfarrer, M. D. (2019). Measuring CEO personality: Developing, validating, and testing a linguistic tool. *Strategic Management Journal*, 40(8), 1316–1330. <https://doi.org/10.1002/smj.3023>
- Heineck, G. (2011). Does it pay to be nice? Personality and earnings in the United Kingdom. *Industrial & Labor Relations Review*, 64(5), 1020–1038. <https://doi.org/10.1177/001979391106400509>
- Herrmann, P., & Nadkarni, S. (2014). Managing Strategic Change: The Duality of CEO Personality. *Strategic Management Journal*, 35(9), 1318–1342. <https://doi.org/10.1002/smj.2156>
- Holst-Hansen, J., & Bergenholtz, C. (2020). Does the size of rewards influence performance in cognitively demanding tasks? *PloS One*, 15(10), e0240291. <https://doi.org/10.1371/journal.pone.0240291>
- Huo, K. (2020). Performance Incentives, Divergent Thinking Training, and Creative Problem Solving. *Journal of Management Accounting Research*, 32(1), 159–176. <https://doi.org/10.2308/jmar-52479>
- John, O. P., & Srivastava, S. (1999). The Big-Five trait taxonomy: History, measurement, and theoretical perspectives. In Pervin, L. A. and John, O. P. (Ed.), *Handbook of personality: Theory and research* (2nd ed., pp. 102–138). New York: Guilford Press.
- Joussemet, M., & Koestner, R. (1999). Effect of Expected Rewards on Children's Creativity. *Creativity Research Journal*, 12(4), 231–239. https://doi.org/10.1207/s15326934crj1204_1
- Judge, T. A., & Bono, J. E. (2000). Five-factor model of personality and transformational leadership. *Journal of Applied Psychology*, 85(5), 751–765. <https://doi.org/10.1037/0021-9010.85.5.751>
- Kachelmeier, S. J., Reichert, B. E., & Williamson, M. G. (2008). Measuring and motivating quantity, creativity, or both. *Journal of Accounting Research*, 46(2), 341–373. <https://doi.org/10.1111/j.1475-679X.2008.00277.x>
- Kaspi-Baruch, O. (2019). Big Five Personality and Creativity: The Moderating Effect of Motivational Goal Orientation. *The Journal of Creative Behavior*, 53(3), 325–338. <https://doi.org/10.1002/jocb.183>
- Kaufman, S. B., Quilty, L. C., Grazioplene, R. G., & Hirsh, J. B. (2015). Openness to experience and intellect differentially predict creative achievement in the arts and sciences. *Journal of Personality*, 84, 248–258. <https://doi.org/10.1111/jopy.12156>

- King, L. A., Walker, L. M., & Broyles, S. J. (1996). Creativity and the Five-Factor Model. *Journal of Research in Personality*, 30, 198–203. <https://doi.org/10.1006/jrpe.1996.0013>
- Kohn, A. (1993). Why Incentive Plans Cannot Work. *Harvard Business Review*, 71(5).
- Kruglanski, A. W., Friedman, I., & Zeevi, G. (1971). The effects of extrinsic incentive on some qualitative aspects of task performance. *Journal of Personality*, 39, 606–617.
- Kurtzberg, T. R., & Amabile, T. M. (2001). From Guilford to creative synergy: Opening the black box of team-level creativity. *Creativity Research Journal*, 13(3-4), 285–294.
- Li, F., Deng, H., Leung, K., & Zhao, Y. (2017). Is Perceived Creativity-Reward Contingency Good for Creativity? The Role of Challenge and Threat Appraisals. *Human Resource Management*, 56(4), 693–709. <https://doi.org/10.1002/hrm.21795>
- Li, W., Li, X., Huang, L., Kong, X., Yang, W., Wei, D., & Li, J. (2015). Brain structure links trait creativity to openness to experience. *Social Cognitive and Affective Neuroscience*, 10(2), 191–198. <https://doi.org/10.1093/scan/nsu041>
- Lubart, T. (2016). Creativity and Convergent Thinking: Reflections, Connections and Practical Considerations. *Journal of Psychology and Pedagogics*, 4, 7–15. <https://doi.org/10.22363/2313-1683-2016-4-7-15>
- Lucas, R. E., & Diener, E. (2001). Understanding Extraverts' Enjoyment of Social Situations: The Importance of Pleasantness. *Journal of Personality and Social Psychology*, 81(2), 343–356. <https://doi.org/10.1037/0022-3514.81.2.343>
- Madjar, N., Oldham, G. R., & Pratt, M. G. (2002). There's no place like home? The contributions of work and nonwork creativity support to employees' creative performance. *Academy of Management Journal*, 45, 757–767. <https://doi.org/10.2307/3069309>
- Malik, M. A. R., Butt, A. N., & Choi, J. N. (2015). Rewards and employee creative performance: Moderating effects of creative self-efficacy, reward importance, and locus of control. *Journal of Organizational Behavior*, 36(1), 59–74. <https://doi.org/10.1002/job.1943>
- Malik, M. A. R., Choi, J. N., & Butt, A. N. (2019). Distinct effects of intrinsic motivation and extrinsic rewards on radical and incremental creativity: The moderating role of goal orientations. *Journal of Organizational Behavior*, 40(9-10), 1013–1026. <https://doi.org/10.1002/job.2403>
- Mason, W., & Watts, D. (2009). Financial incentives and the “performance of crowds”. *Proceedings of the ACM SIGKDD Workshop on Human Computation*, 77–85. <https://doi.org/10.1145/1600150.1600175>
- McAuliffe, M. (2016). The Potential Benefits of Divergent Thinking and Metacognitive Skills in STEAM Learning: A discussion paper. *International Journal of Innovation, Creativity and Change*, 2(3), 71–82.
- McCrae, R. R. (1987). Creativity, divergent thinking, and openness to experience. *Journal of Personality and Social Psychology*, 52, 1258–1265. <https://doi.org/10.1037/0022-3514.52.6.1258>
- Morgan, J., & Wang, R. (2010). Tournaments for ideas. *California Management Review*, 52(2), 77–97.
- Mumford, M. (2000). Managing Creative People: Strategies and Tactics for Innovation. *Human Resource Management Review*, 10(3), 313–351. [https://doi.org/10.1016/S1053-4822\(99\)00043-1](https://doi.org/10.1016/S1053-4822(99)00043-1)
- Myszkowski, N., Storme, M., Davila, A., & Lubart, T. (2015). Managerial creative problem solving and the Big Five personality traits. *The Journal of Management Development*, 34(6), 674–684. <https://doi.org/10.1108/JMD-12-2013-0160>
- Nadkarni, S., & Herrmann, P. (2010). CEO Personality, Strategic Flexibility, and firm performance: The case of the Indian Business Process Outsourcing Industry. *Academy of Management Journal*, 53(5), 1050–1073. <https://doi.org/10.5465/amj.2010.54533196>
- Oldham, G. R., & Cummings, A. (1996). Employee creativity: Personal and contextual factors at work. *Academy of Management Journal*, 39, 607–634. <https://doi.org/10.2307/256657>
- Perry-Smith, J., & Mannucci, P. (2017). From Creativity to Innovation: The Social Network Drivers of the Four Phases of the Idea Journey. *The Academy of Management Review*, 42(1), 53–79. <https://doi.org/10.5465/amr.2014.0462>
- Peterson, R. S., Smith, D. B., Martorana, P. V., & Owens, P. D. (2003). The Impact of Chief Executive Officer Personality on Top Management Team Dynamics: One Mechanism by Which Leadership Affects Organizational Performance. *Journal of Applied Psychology*, 88(5), 795–808. <https://doi.org/10.1037/0021-9010.88.5.795>
- Puryear, J. S., Kettler, T., & Rinn, A. N. (2017). Relating Personality and Creativity: Considering What and How We Measure. *The Journal of Creative Behavior*, 53(2), 232–245. <https://doi.org/10.1002/jocb.174>
- Raja, U., Johns, G., & Ntalianis, F. (2004). The Impact of Personality on Psychological Contracts. *Academy of Management Journal*, 47(3), 350–367. <https://doi.org/10.2307/20159586>
- Runco, M. (2007). *Creativity: theories and themes: research, development, and practice*. Elsevier Academic Press.
- Runco, M., & Acar, S. (2012). Divergent Thinking as an Indicator of Creative Potential. *Creativity Research Journal*, 24(1), 1–10. <https://doi.org/10.1080/10400419.2012.652929>
- Runco, M., Kaufmann, J. C., Smith, J. K., & Smith, L. F. (2008). Commentary: Divergent Thinking Is Not Synonymous With Creativity. *Psychology of Aesthetics, Creativity, and the Arts*, 2(2), 93–96. <https://doi.org/10.1037/1931-3896.2.2.93>
- Saether, E. (2020). Creativity-Contingent Rewards, Intrinsic Motivation, and Creativity: The Importance of Fair Reward Evaluation Procedures. *Frontiers in Psychology*, 11, 974. <https://doi.org/10.3389/fpsyg.2020.00974>
- Scratchley, L. S., & Hakstian, A. R. (2001). The measurement and prediction of managerial creativity. *Creativity Research Journal*, 13, 367–384. https://doi.org/10.1207/S15326934CRJ1334_14
- Shalley, C., Zhou, J., & Oldham, G. R. (2004). The Effects of Personal and Contextual Characteristics on Creativity: Where Should We Go from Here? *Journal of Management*, 30(6), 933–958. <https://doi.org/10.1016/j.jm.2004.06.007>
- Shane, S., Nicolaou, N., Cherkas, L., & Spector, T. D. (2010). Do openness to experience and recognizing opportunities have the same genetic source? *Human Resource Management*, 49(2), 291–303. <https://doi.org/10.1002/hrm.20343>
- Shaw, J. D., Duffy, M. K., Mitra, A., Lockhart, D. E., & Bowler, M. (2003). Reactions to merit pay increases: A longitudinal test of a signal sensitivity perspective. *Journal of Applied Psychology*, 88, 538–544. <https://doi.org/10.1037/0021-9010.88.3.538>
- Shi, B., David, Y. D., & Yongli, L. (2016). Openness to Experience as a Moderator of the Relationship between Intelligence and Creative Thinking: A Study of Chinese Children in Urban and Rural Areas. *Frontiers in Psychology*, 7, 641. <https://doi.org/10.3389/fpsyg.2016.00641>
- Silvia, P. J., Winterstein, B. P., Willse, J. T., Barona, C. M., Cram, J. T., Hess, K. I., Martinez, J. L., & Richard, C. A. (2008). Assessing creativity with divergent thinking tasks: Exploring the reliability and validity of new subjective scoring methods. *Psychology of Aesthetics, Creativity, and the Arts*, 2(2), 68–85. <https://doi.org/10.1037/1931-3896.2.2.68>
- Smillie, L. D., Cooper, A. J., Wilt, J., Revelle, W., & King, L. (2012). Do Extraverts Get More Bang for the Buck? Refining the Affective-Reactivity Hypothesis of Extraversion. *Journal of Personality and Social Psychology*, 103(2), 306–326. <https://doi.org/10.1037/a0028372>
- Speed, B., Nelson, B., Levinson, A., Perlman, G., Klein, D., Kotov, R., & Hajcak, G. (2018). Extraversion, neuroticism, and the electrocortical response to monetary rewards in adolescent girls. *Biological Psychology*, 136, 111–118. <https://doi.org/10.1016/j.biopsycho.2018.05.017>
- Stewart, G. L., & Bobko, P. (1996). Reward structure as a moderator of the relationship between extraversion and sales performance. *Journal of Applied Psychology*, 81, 619–627. <https://doi.org/10.1037/0021-9010.81.6.619>
- Sue-Chan, C., & Hempel, P. S. (2016). The Creativity-Performance Relationship: How Rewarding Creativity Moderates the Expression of Creativity. *Human Resource Management*, 55(4), 637–653. <https://doi.org/10.1002/hrm.21682>
- Sung, S. Y., & Choi, J. N. (2009). Do Big Five Personality Factors affect individual creativity? The moderating role of extrinsic motivation.

- Social Behavior and Personality: An International Journal*, 37(7), 941–956. <https://doi.org/10.224/sbp.2009.37.7.941>
- Tavakol, M., & Dennick, R. (2011). Making sense of Cronbach's alpha. *International Journal of Medical Education*, 2, 53–55. <https://doi.org/10.5116/ijme.4dfb.8dfd>
- Tierney, P., & Farmer, S. M. (2002). Creative self-efficacy: Its potential antecedents and relationship to creative performance. *Academy of Management Journal*, 45, 1137–1148. <https://doi.org/10.2307/3069429>
- Vandenbergh, C., St-Onge, S., & Robineau, É. (2008). An Analysis of the Relation between Personality and the Attractiveness of Total Rewards Components. *Relations Industrielles*, 63(3), 425–453. <https://doi.org/10.7202/019096ar>
- Walker, B. R., & Jackson, C. J. (2004). How the Five Factor Model and revised Reinforcement Sensitivity Theory predict divergent thinking. *Personality and Individual Differences*, 57, 54–58. <https://doi.org/10.1016/j.paid.2013.09.011>
- Webb, R. A., Williamson, M. G., & Zhang, Y. M. (2013). Productivity-target difficulty, target-based pay, and outside-the-box thinking. *The Accounting Review*, 88(4), 1433–1457. <https://doi.org/10.2308/accr-50436>
- Weiss, S., Steger, D., Kaur, Y., Hildebrandt, A., Schroeders, U., & Wilhelm, O. (2020). On the Trail of Creativity: Dimensionality of Divergent Thinking and its Relation with Cognitive Abilities, Personality, and Insight. *European Journal of Personality*, 1–22. <https://doi.org/10.1002/per.2288>
- Wu, A. D., & Zumbo, B. D. (2008). Understanding and Using Mediators and Moderators. *Social indicators research*, 87(3), 367–392. <https://doi.org/10.1007/s11205-007-9143-1>
- Yoon, H. J., Sung, S. Y., & Choi, J. N. (2015). Mechanisms Underlying Creative Performance: Employee Perceptions of Intrinsic and Extrinsic Rewards for Creativity. *Social Behavior and Personality*, 43(7), 1161–1179. <https://doi.org/10.2224/sbp.2015.43.7.1161>
- Yoon, H. J., Sung, S. Y., Choi, J. N., Lee, K., & Kim, S. (2015). Tangible and Intangible Rewards and Employee Creativity: The Mediating Role of Situational Extrinsic Motivation. *Creativity Research Journal*, 27(4), 383–393. <https://doi.org/10.1080/10400419.2015.1088283>
- Zhao, H., & Seibert, S. E. (2006). The Big Five personality dimensions and entrepreneurial status: A metanalytical review. *Journal of Applied Psychology*, 91, 259–271. <https://doi.org/10.1037/0021-9010.91.2.259>
- Zhao, H., Seibert, S. E., & Lumpkin, G. T. (2010). The Relationship of Personality to Entrepreneurial Intentions and Performance: A Meta-Analytic Review. *Journal of Management*, 36, 381–404. <https://doi.org/10.1177/0149206309335187>
- Zhao, J., Sun, W., Zhang, S., & Zhu, X. (2020). How CEO Ethical Leadership Influences Top Management Team Creativity: Evidence From China. *Frontiers in Psychology*, 11, 748. <https://doi.org/10.3389/fpsyg.2020.00748>
- Zhou, J. (1998). Feedback valence, feedback style, task autonomy, and achievement orientation: Interactive effects on creative performance. *Journal of Applied Psychology*, 83(2), 261–276. <https://doi.org/10.1037/0021-9010.83.2.261>
- Zhou, J., & George, J. M. (2001). When job dissatisfaction leads to creativity: Encouraging the expression of voice. *Academy of Management Journal*, 44, 682–696. <https://doi.org/10.2307/3069410>