# The Maze of Creative Thinking
# Pathways of Traits, States, and Intelligence on Shaping Creativity

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## Abstract

Creativity is a complex and multifaceted construct that has been linked to various cognitive, emotional, and personality factors. This study explores the interplay between fluid intelligence, creative reasoning, personality traits, and mood states in predicting divergent thinking performance. We hypothesize that extraversion, openness to experience, positive moods, and creative reasoning would predict performance on divergent thinking tasks. A total of 120 young adults participated in the study, completing assessments on fluid intelligence (APM), creative reasoning (CRT-Reasoning), creativity (CRT-Creativity, TCT-DP), personality traits (Big Five Inventory 2), and moods (Current Mood Scale). Results revealed a negative relationship between fluid intelligence and divergent thinking performance, suggesting that higher fluid intelligence may be associated with more convergent thinking strategies. Extraversion emerged as a significant positive predictor of divergent thinking, supporting the idea that sociability and external engagement foster creativity. Openness to experience did not significantly predict divergent thinking, indicating that its impact may vary across domains of creativity. Mood states, especially hopelessness, were negatively associated with creativity, but the frequently found association between positive moods and creativity could not be replicated. These findings underscore the importance of considering cognitive, emotional, and personality factors in the study of creativity and suggest potential pathways for future research into how these elements interact to shape creative thinking.

**Keywords:** Creativity; Divergent Thinking; Intelligence; Personality traits; Mood states; Creative reasoning

## Introduction

Imagine a child sitting on the floor, surrounded by crayons and paper. With each color they use, they create a world only they can see, where trees are purple, the sky is green, and reality changes with imagination. This child isn't just drawing; they're exploring creativity. Years later, the same child, now a scientist, whose intelligence has been developed by years of learning and curiosity, looks at a whiteboard full of equations. They pause, suddenly erase half the board, and replace it with a new idea no one has thought of. Creativity sparks once more, connecting the present to what could be. It drives us to imagine and innovate, pushing us beyond the limits of what we know. But despite its power, creativity is one of the most mysterious parts of the human mind. What influences creativity? Is creativity related to intelligence, personality traits or emotional states?

Creativity is a complex and multifaceted construct (Hocevar, 1979; Runco, 2007). Early definitions described it simply as the ability to generate new ideas (Guilford, 1950; Mednick, 1962), but over time, the concept grew to include the usefulness and applicability of those ideas (Sternberg & Lubart, 1999; Mumford, 2003; Runco, 2004;). Today, a wide variety of ways have been developed to measure creativity, ranging from self-assessed questionnaires (e.g., the Creative Achievement Questionnaire, CAQ; Carson, Peterson, & Higgins, 2005) to performing divergent thinking tasks (e.g., the Test for Creative Thinking - Drawing Production, TCT-DP; Urban & Jellen, 1996). Within the last year some research has even investigated artificial creativity (Farina, Pedrycz, & Lavazza, 2024; Lockhart, 2024).

However, most prior studies have examined predictors such as intelligence, personality, and mood in isolation (e.g., Batey & Furnham, 2006; Benedek et al., 2014; Ivcevic & Brackett, 2015; Silvia, 2008). Few studies have investigated the interplay between these factors using creativity tasks (e.g. Jauk et al., 2013). The current study addresses this gap by examining how these multiple factors jointly contribute to creativity performance, measured by divergent thinking tasks.

Divergent thinking tasks measure the ability to generate multiple ideas and explore various possibilities in ill-defined problem spaces (Guilford, 1950; Newell & Simon, 1972).



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The ill-defined problem spaces are open-ended and have numerous to infinite possible outcomes (Newell & Simon, 1972; Kaufman & Sternberg, 2006). Well-defined problems have a closed-ended problem space and have only one correct outcome (Newell & Simon, 1972; Kaufman & Sternberg, 2006). Differences in problem space impact the outcome of reasoning processes (Jaarsveld, Lachmann, & van Leeuwen, 2013).

Divergent thinking is often used as a proxy for creativity, representing only one component of the creative process (Runco & Acar, 2012; Silvia, 2008). While creativity involves both novel idea generation and their usefulness within a context, divergent thinking focuses on fluency and flexibility in idea production (Runco & Acar, 2012; Cropley, 2006). Creative reasoning, in contrast, includes both divergent and convergent thinking, generating novel solutions within an open problem space and organizing the possible solutions according to specific rules or patterns so that the solution devised presents itself as a closed problem (Jaarsveld, Hamel, Lachmann & van Leeuwen, 2010; Jaarsveld, Fink & Lachmann, 2015, Jaarsveld et al., 2012; 2017). While measuring creative thinking provides a foundation and an understanding, defining creativity requires a closer look at the individual factors that contribute to it. In the following sections, we review key factors in the creativity literature: fluid intelligence, personality traits, and emotional states, respectively.

Fluid intelligence, linked to convergent thinking (Guilford, 1950), measures the ability to analyze and synthesize information for problem-solving to identify a single correct solution (Cropley, 2006). The most often used tasks to assess convergent thinking are the Progressive Matrices (Raven, 1962). Note that, these matrices measure a subcomponent of intelligence that is generally associated to the concept of fluid intelligence (Arcot, Srivastava & Jaarsveld, 2023). Fluid intelligence is defined by the ability to solve novel problems and think logically without relying on prior knowledge (Cattell, 1971). The relationship between creativity and fluid intelligence has been a subject of ongoing debate (Benedek et al., 2012; Schneider & McGrew, 2018; Silvia, 2008; Silvia & Beaty, 2012, Welter, Jaarsveld, van Leeuwen, & Lachmann, 2016; Eymann et al., 2024). Despite representing distinct constructs, creativity and fluid intelligence show a moderate positive correlation (Kim, 2005).

In addition to intelligence, longitudinal studies have demonstrated that personality traits are also crucial in understanding creative thinking (Feist & Barron, 2003; Silvia, 2008). One of the most widely recognized frameworks for studying personality is the Big Five personality theory (Costa & McCrae, 1992, 1992a, 2008). It assesses five key traits: Openness to experience, conscientiousness, extraversion, agreeableness, and neuroticism (Costa & McCrae, 1992, 2008). Among these, *openness to experience* stands out for its strong links to imagination and curiosity, traits that are believed to support creative thinking (Batey, 2007; Feist, 1998; Puryear, Kettler & Rinn, 2017; Li et al., 2023). Lower levels of *agreeableness* and *conscientiousness* can enhance creativity by fostering nonconformity and spontaneity, though the effects vary depending on the creativity domain (Feist, 1998; Furnham, Zhang & Chamorro-Premuzic, 2006; Puryear, Kettler & Rinn, 2017). Additionally, *extraversion* has been linked to creativity, particularly in settings where external feedback and interaction can stimulate idea generation (Furnham et al., 2011; Puryear, Kettler & Rinn, 2017). However, even in individual settings, as used in the present study, extraversion may influence creativity through enhanced cognitive engagement, arousal regulation, or increased willingness to explore novel ideas. These mechanisms are thought to support divergent thinking regardless of social context (Silvia et al., 2011). Lastly, *neuroticism*, meanwhile, has a complex relationship with creativity, potentially driving or hindering it depending on the emotional circumstances (Eysenck, 1993, 1995). In sum, a connection between all five personality traits and creative thinking has been observed. A recent study by Awawdeh and Lim (2023) found significant correlations between personality traits and different creativity domains proposed by Kaufman (2012). For instance, openness to experience was positively linked to creativity in artistic, scientific, and everyday domains, while extraversion was associated with performance and scholarly creativity (Feist, 1998).

Alongside the influences of personality traits on creative thinking, emotional states (i.e., mood) play a complex role when it comes to their influence on creativity performance (Baas, De Dreu & Nijstad 2008; Davis, 2009). Positive moods, such as happiness, are often linked to greater cognitive flexibility and heuristic thinking, which are important for creative problem-solving (Ashby, Isen, & Turken, 1999; Lyubomirsky, King, & Diener, 2005). For instance, Isen and Daubman (1984) found that people in a happy mood were better at forming broad and inclusive cognitive categories, leading to more creative ideas. However, positive moods don't always enhance creativity. Some studies, such as those by Anderson and Pratarelli (1999) and Kaufmann and Vosburg (1997), suggest that the effect of positive moods can depend on the type of task and individual differences. Negative moods, on the other hand, show even more variability in their impact on creativity. While some research indicates that negative moods can promote creativity (Adaman & Blaney, 1995), others report no benefits or even detrimental effects compared to neutral moods (Mikulincer, Kedem, & Paz, 1990a). Theoretically, negative moods might encourage more systematic and detailed thinking, which could be helpful for tasks requiring deep analysis (Schwarz & Bless, 1991). This variability in results related to positive and negative moods and creativity highlight the importance of investigating the effects of moods on creativity.

Fluid intelligence, personality traits, and moods were selected as predictors based on empirical evidence linking each domain to creativity. We focused on two divergent thinking tasks: The Test for Creative Thinking–Drawing Production (TCT-DP) and Creative Reasoning Test-

Creativity (CRT-Creativity subscore). These measures were chosen because they assess divergent thinking via distinct modalities. The TCT-DP captures open-ended, drawing-based creativity, evaluating the number, originality, and structural organization of responses (Urban & Jellen, 1996). In contrast, the CRT-Creativity subscore assesses idea generation within an ill-defined (visual-symbolic) problem space, considering the number and type of elements (figurative or non-figurative), pictorial specifications (e.g., texture, line style), and transformational features (e.g., size, orientation, and location; Jaarsveld et al., 2010).

We examined how both measures of divergent thinking are influenced by fluid intelligence, creative reasoning, personality traits, and mood states. This study was guided by the following research questions: (1) To what extent do fluid intelligence, creative reasoning, personality traits, and mood states predict performance on each divergent thinking task? (2) Do these predictors have similar effects across different types of divergent thinking tasks? We hypothesized that: (a) creative reasoning will not significantly predict performance on either divergent thinking task; (b) openness to experience and extraversion will positively predict creativity scores; (c) positive moods will be associated with higher creativity scores; and (d) we expect task-specific differences, with TCT-DP performance more strongly associated with positive moods, and CRT-Creativity more closely linked to fluid intelligence and creative reasoning. It is important to note that this study is correlational; our aim is to explore patterns of association between individual differences and creativity, not to infer causality.

## Methods

### Participants

A total of 120 young adults ($M_{age}$ = 22.67 years, *SD* = 2.21 years) participated at University of Kaiserslautern-Landau (RPTU) in this study. All were native German speakers, with 61 identifying as male ($M_{age}$ = 22.67 years, *SD* = 2.21 years). Eligibility criteria included normal or corrected-to-normal vision, right-handedness, and no history of neurological or psychological disorders. Participants were compensated with either monetary payment or course credit for their involvement. This study was conducted in accordance with the principles of the Declaration of Helsinki (World Medical Association, 2013).

### Materials & Procedure

After providing informed consent, participants completed a series of individual assessments using pen and paper. First, participants' mood states were measured using the Current Mood Scale (Aktuelle Stimmungsskala, ASTS; Dalbert, 2002) and demographic questions. Second, fluid intelligence was measured using the Advanced Progressive Matrices (APM; Raven, 1962), evaluating reasoning within a well-defined problem space. Third, the creative reasoning abilities were assessed with the Creative Reasoning Task (CRT; Jaarsveld, Lachmann & van Leeuwen, 2012), which is designed to evaluate both convergent and divergent thinking within an ill-defined problem space. The CRT requires participants to generate original matrix-based puzzles, using logic and rule formation to create a pattern that is novel, logical, and solvable by others. Unlike traditional intelligence tests where participants solve given problems, the CRT evaluates how individuals construct problems themselves, offering insight into creative structure-building and rule application. This dual demand makes the CRT especially well-suited for assessing real-world aspects of creative cognition (see Figure 1). Fourth, the TCT-DP (Urban & Jellen, 1996) measures divergent thinking through a drawing task. Participants are presented with an incomplete visual prompt and asked to complete the drawing creatively. Lastly, the Big Five Inventory-2 (BFI-2), adapted for German-speaking populations (Danner et al., 2019), was used to investigate five personality traits.

It is important to mention that the order of the tasks and questionnaires were as introduced to avoid any potential creative priming effects. Since CRT is based on APM, we need to keep the same order to make sure participants have a clear idea about matrices.

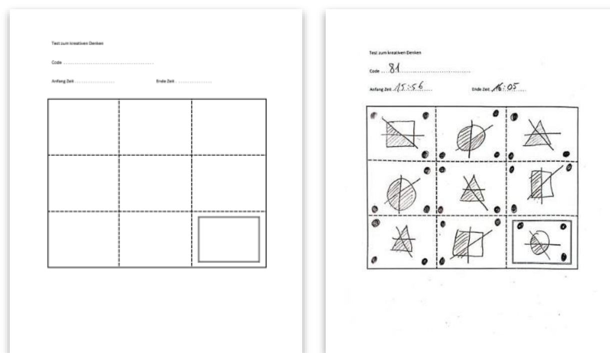

Figure 1: CRT Blank and a participant’s solution.

### Scoring and Analyses

The current mood questionnaire (Aktuelle Stimmungsskala, ASTS) comprises five scales, sadness, hopelessness, fatigue, anger, and positive mood, each calculated by averaging the responses to the corresponding items. The APM is scored based on the number of correct answers. Higher scores indicate better abstract reasoning and problem-solving abilities. The CRT scoring includes two subscores, Reasoning and Creativity. The CRT-Reasoning subscore involves assessing the logical structure of the matrix by assigning a value to each of the nine cells according to their contribution to the overall relationship(s), ensuring its originality and it’s solvability by others. On the other hand, the CRT-Creativity subscore evaluates the divergent thinking component of the creative process. Its score consists of the number of elements and specifications applied in the created matrix. For a detailed discussion of the score method please see Jaarsveld et al. (2010, 2012). The TCT-DP evaluates divergent thinking through a drawing task, scored on 14 criteria with a maximum score of 72. The test typically takes 12 minutes, but faster completion can contribute to a higher score, as timing is one of the evaluation criteria. The Big Five Inventory-2 (BFI-2) was scored according to the guidelines provided in the manual. Participants responded to 60 items on a 5-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). Each of the five personality dimensions extraversion, agreeableness, conscientiousness, neuroticism, and openness to experience was assessed through 12 items.

We investigated the relationship between individual differences and creativity using backward stepwise multiple linear regression for two outcomes variables: TCT-DP and CRT-Creativity scores. Each initial model included predictors for personality (extraversion, neuroticism, agreeableness, openness, conscientiousness), moods (sadness, tiredness, hopelessness, anger, positive moods), fluid intelligence (APM), and creative reasoning (CRT-Reasoning). Models were refined via backward elimination based on Akaike Information Criterion (AIC). Analyses were implemented in R using the *lm* and *step* functions. Twelve predictors, five personality traits, five mood states, CRT-Reasoning, and APM, were initially entered into both models. Predictors were removed step-by-step based on the AIC. For the TCT-DP model, AIC decreased from 315.4 to 290.7. For the CRT-Creativity model, AIC decreased from 309.8 to 288.2, indicating improved model fit through predictor reduction.

## Results

The descriptive statistics provided an overview of the key variables in the study. All mood scales showed a sufficient variability. Positive moods indicated that participants generally reported high positive emotional states, while scores for sadness, hopelessness, tiredness, and anger were notably low. The participants achieved average intelligence scores in the APM (T-score = 49). CRT-Reasoning exhibited a wide range of scores, reflecting diverse levels of analytical reasoning within the sample. CRT-Creativity suggested a more constrained distribution of divergent thinking abilities. TCT-DP represented a range of creative potential across the sample (T-score = 56), which was relatively high, yet remained within the upper bounds of the average range. Average values were achieved in all personality traits, although the values in Neuroticism (T-score = 51) and Agreeableness (T-score = 48) were slightly higher than the scores in Extraversion (T-score = 45), Openness to experience (T-score = 44) and Conscientiousness (T-score = 43). All variables had complete data, ensuring reliable statistical analysis (See Table 1).

The final model for the TCT-DP included extraversion, APM, sadness, hopelessness, and CRT-Reasoning as predictors, accounting for 42.2% of the variance in TCT-DP ($R^2 = .446$, adjusted $R^2 = .422$). The overall model was statistically significant, $F(5,114) = 18.39$, $p < .001$ (see Figure 2a).

Table 1: Descriptive Statistics and Pearson’s Correlation

| | Mean | *SD* | Correlation with CRT-C | TCT-DP |
|---|---|---|---|---|
| APM | 22.08 | 4.32 | 0.120 | -0.111 |
| CRT-Reasoning | 48.35 | 17.74 | -0.206* | 0.055 |
| CRT-Creativity | 6.18 | 2.22 | - | - |
| TCT-DP | 35.07 | 11.36 | - | - |
| Extraversion | 2.90 | 0.49 | 0.654*** | 0.616*** |
| Openness | 2.99 | 0.42 | 0.655*** | 0.590*** |
| Agreeableness | 3.67 | 0.60 | 0.011 | 0.024 |
| Neuroticism | 2.79 | 0.68 | -0.137 | 0.045 |
| Conscientiousness | 3.21 | 0.68 | 0.003 | 0.055 |
| Sadness | 5.10 | 2.70 | -0.206* | 0.025 |
| Tiredness | 12.40 | 4.90 | -0.072 | -0.025 |
| Hopelessness | 4.51 | 2.24 | 0.047 | -0.063 |
| Anger | 3.89 | 2.41 | -0.048 | -0.078 |
| Positive Moods | 26.90 | 6.84 | 0.160 | 0.093 |

Note. $N = 120$; SD = Standard Deviation; CRT-C = CRT-Creativity; * $p < .05$, *** $p < .001$

In the final model for TCT-DP, extraversion was a significant positive predictor ($\beta = 15.03$, $SE = 1.63$, $t(114) = 9.25$, $p < .001$), indicating that higher levels of extraversion predict higher TCT-DP scores. CRT-Reasoning was also a significant positive predictor ($\beta = 0.10$, $SE = 0.05$, $t(114) = 2.21$, $p < .05$), suggesting that stronger creative reasoning abilities predict higher TCT-DP scores. APM was also a significant, although negative, predictor ($\beta = -0.43$, $SE = 0.19$, $t(114) = 2.21$, $p < .05$), suggesting that lower fluid intelligence predicts to higher TCT-DP scores. Additionally, hopelessness was also a significant negative predictor ($\beta = 1.20$, $SE = 0.47$, $t(114) = -2.55$, $p < .05$), suggesting that lower scores in hopelessness predict higher TCT-DP scores. Sadness, although not a significant predictor, was included in the final model ($p = .14$).

Taken together, this model suggests that higher TCT-DP performance is associated with higher extraversion and creative reasoning, but surprisingly, lower fluid intelligence and lower hopelessness. These findings reflect the complex and non-linear nature of how individual traits influence drawing-based divergent thinking task.

The final model for the CRT-Creativity (see Figure 2b) included extraversion and CRT-Reasoning as predictors, accounting for 43.5% of the variance in CRT-Creativity ($R^2 = .445$, adjusted $R^2 = .435$). The overall model was statistically significant, $F(2,117) = 46.88$, $p < .001$. Extraversion was a significant positive predictor of CRT-Creativity ($\beta = 2.88$, $SE = 0.31$, $t(117) = 9.21$, $p < .001$), indicating that higher levels of extraversion predict higher CRT-Creativity scores. CRT-Reasoning was a negative predictor ($\beta = -0.02$, $SE = 0.01$, $t(114) = -1.89$, $p = .06$), suggesting that lower creative reasoning abilities predict higher CRT-Creativity scores.

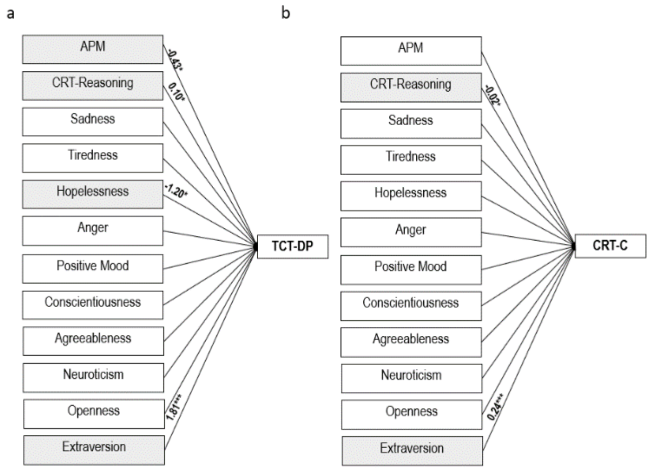


Figure 2: The models of predictors for divergent thinking tasks a. TCT-DP and b. CRT-Creativity. Using Backward Stepwise Regression Analysis; grey background indicates that these predictors are part of the final models.

Note*:* *β*-coefficients of the direct relationships, * $p < .05$, ** $p < .01$, *** $p < .001$, $^{+}\, p < .10$, N = 120.

## Discussion

The current study offers a nuanced understanding of how our predictors, fluid intelligence, personality traits, mood states, and creative reasoning contribute to divergent thinking performance, assessed via the TCT-DP and CRT-Creativity. By analyzing both measures, we uncovered complex and sometimes unexpected patterns that inform ongoing debates about the cognitive and emotional underpinnings of creativity. Our findings build upon and challenge existing theories, emphasizing the complex nature of creativity and the importance of task-specific interpretations.

The role of mood states in creativity has long been a topic of debate, with some studies suggesting that positive moods enhance creativity (Ashby, Isen, & Turken, 1999; Baas, De Dreu & Nijstad 2008; Davis, 2009) and others highlighting the benefits of negative moods (Bartolic et al., 1999). Our findings add complexity to this discussion. While positive moods did not emerge as a significant predictor of divergent thinking, hopelessness was negatively associated with TCT-DP performance. This suggests that feelings of hopelessness may constrain cognitive flexibility and hinder the generation of novel ideas. On the other hand, sadness and anger did not significantly predict divergent thinking, showing that the impact of negative moods may depend on their specific emotional tone and intensity. The lack of a significant relationship between positive moods and creativity is notable, as it contradicts the widely held belief that happiness fosters creative thinking (Baas, De Dreu, & Nijstad, 2008). One possible explanation is that positive moods may enhance creativity only under certain conditions, such as when tasks require broad cognitive categories or heuristic processing (Isen & Daubman, 1984). Alternatively, the relationship between mood and creativity may be mediated by other factors, such as task complexity or individual differences in emotional regulation.

A notable and unexpected result was the negative relationship between fluid intelligence (measured by APM) and performance on the TCT-DP. While meta-analyses have reported a moderate positive correlation between fluid intelligence and creativity (e.g., Kim, 2005), our results suggest that individuals with higher fluid intelligence rely more on convergent thinking strategies, which prioritize logical and systematic problem-solving over open-ended exploration. In contrast, those with lower fluid intelligence may rely on more flexible and unconventional thinking, leading to higher scores on divergent thinking tasks. This interpretation aligns with the dual-process theory of creativity (Beaty et al., 2016) which highlights the interplay between associative (divergent) and analytical (convergent) processes. Interestingly, this effect did not extend to the CRT-Creativity, which showed no significant relationship with fluid intelligence, suggesting that different divergent thinking tasks rely on distinct cognitive mechanisms. This suggests that while fluid intelligence may support logical and structured problem-solving, it does not necessarily enhance the ability to produce original ideas. Future studies should investigate whether this pattern holds across different measures of creativity and intelligence, as well as in more diverse samples and different situations.

The present study also sheds light on the role of creative reasoning, as measured by the CRT-Reasoning, in divergent thinking. While CRT-Reasoning was positively related to TCT-DP performance, it was negatively related to CRT-Creativity. This finding is paradoxical because it was not observed in earlier studies (Jaarsveld, Lachmann, Hamel & van Leeuwen, 2010). However, the findings of the current study suggest an independence of both subscores within one test. The CRT scores two independent measures, divergent and convergent thinking. CRT may serve as a bridge between divergent and convergent thinking, enabling individuals to navigate ill-defined problem spaces while maintaining logical coherence. On the other hand, the observed negative relationship between CRT-Reasoning and CRT-Creativity highlights the potential trade-offs between originality and feasibility in creativity tasks. Individuals who excel at generating novel ideas may struggle to ensure their ideas are logically sound, while those who prioritize logical structure may produce fewer original solutions. This tension underscores the importance of balancing divergent and convergent thinking in creative problem-solving.

One of the most striking findings of this study is the significant positive relationship between extraversion and divergent thinking, as measured by both the TCT-DP and CRT-Creativity. This aligns with previous research suggesting that extraversion, characterized by sociability and external engagement, fosters creativity in contexts that benefit from interaction and external stimulation (Furnham et al., 2011; Puryear, Kettler, & Rinn, 2017). This finding underscores the importance of considering personality traits when studying creativity, as they may serve as catalysts or inhibitors depending on the context. Although extraversion often tied to social creativity, our results suggest extraversion may enhance solitary creativity through cognitive flexibility, lower inhibition, or ideational fluency, indicating a broader cognitive role beyond social contexts. These traits may benefit individual creativity tasks as well. While extraversion likely amplifies performance in collaborative environments, its consistent predictive power across both CRT-Creativity and TCT-DP implies a broader cognitive role worth deeper investigation.

In contrast, openness to experience, widely regarded as a core trait of creative individuals (Feist, 1998; McCrae, 1987), did not significantly predict divergent thinking in our models. This finding contrasts with much of the literature, which highlights openness to experience as a key predictor of imaginative and unconventional thinking (McCrae, 1987; Kaufman et al., 2016). One possible explanation is that the relationship between openness to experience and creativity may be domain-specific, with openness to experience playing a stronger role in artistic or scientific creativity than in the divergent thinking tasks used here (Silvia et al., 2009). Future research should explore this discrepancy by examining diverse populations in varying creative domains (e.g., artistic, scientific, or everyday creativity). Investigating how openness to experience interacts with other cognitive and emotional factors across different contexts could provide a more comprehensive understanding of its role in creativity. Furthermore, longitudinal studies could help determine whether the relationship between openness to experience and creativity evolves over time or with increased expertise in a particular domain.

The findings of the current study have several implications for theory, methodology, and practice. Theoretically, the findings call for more integrated models of creativity that consider the interplay of cognition, personality, and emotion, rather than treating these in isolation. Frameworks such as Csikszentmihalyi's systems model (1999) may help contextualize these interactions. Methodologically, the difference between TCT-DP and CRT-Creativity highlights the importance of using multi-modal and domain-specific creativity assessments. Relying on a single test may obscure important task-dependent effects. Practically, our findings point to the value of personalized creativity interventions. For example, individuals high in extraversion may have better performance in socially enriched tasks, while individuals lower in fluid intelligence might benefit from open-ended explorations. In addition, interventions targeting emotional well-being could enhance creativity performance by reducing inhibitory effects of hopelessness.

In our study, several limitations must be noted. The observed relationships in this study are specific to visual divergent thinking tasks (TCT-DP and CRT-Creativity), and may differ for verbal tasks or other creative domains. This highlights the need for examining creativity across multiple modalities to capture its full complexity. Our sample, consisting of German-speaking young adults, limits generalizability across different age groups and cultures. Lastly, the cross-sectional design prevents causal inferences; longitudinal studies are needed to explore how these relationships evolve over time.

## Conclusion

In conclusion, this study advances our understanding of the multifaceted nature of creativity by revealing both expected and unexpected patterns, challenging some assumptions while confirming others. As we continue to unravel the maze of creative thinking, studies like this remind us that creativity is not merely a product of individual traits or abilities but a dynamic process shaped by the interplay of cognitive, emotional, and social factors.

Much like the researcher in our opening example, creativity performance may not solely depend on intelligence but also on personality traits and mood states. While intelligence helps structuring problem-solving, it might be more critical to foster extraversion and reduce hopelessness for enhancing creative flexibility in real-world problem-solving.

Our findings underscore the value of a multidimensional framework for understanding creativity, one that accounts for both trait-like characteristics and task-specific demands. As creativity continues to be a valued asset in education, business, and innovation, research that explores how individual differences interact with contextual demands will be increasingly important.

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