

Investigating the Relationship between Need Satisfaction and Creative Performance: Intrinsically Motivated Students Value Creativity

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Abstract

Self-Determination Theory (SDT) examines how personal and sociocultural factors affect an individual's growth. When the basic psychological needs (i.e., autonomy, competence, and relatedness) are satisfied, intrinsic motivation arises, and one's creativity manifests. However, it has not yet been investigated how the perceived value of creativity, a concept that underscores the importance of recognizing and appreciating creative endeavors, further shapes the interplay between need satisfaction and creative expression, bridging the gap between SDT and Expectancy-Value Theory (EVT). The objective of the present cross-sectional study was to investigate, in a sample of 360 university students, how need satisfaction in an educational context translates into intrinsic motivation and the perceived value of creativity, informing creative performance in four verbal creativity tasks. Structural equation modeling showed that the effect of need satisfaction on creative performance was completely statistically mediated by intrinsic motivation and the perceived value of creativity, while the effect of intrinsic motivation was only partially mediated by the perceived value of creativity. Although the results of this study are limited by its cross-sectional design, these findings indicate that both intrinsic motivation and the perceived value of creativity play an important role in the context of creative performance.

Keywords: creativity, intrinsic motivation, need satisfaction, self-determination theory, expectancy-value theory

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Introduction

Glăveanu and Beghetto (2017, p. 42) described creativity as “a process of recognizing, valuing, and acting on difference within concrete material and socio-cultural settings,” highlighting the interplay between environmental and personal values in creative performance. Individuals must be able to identify and appreciate unique perspectives that differ from the norm. Then, they must be able to apply these perspectives to specific material, considering the social and cultural context in which it exists. However, acting creatively and introducing innovative ideas in an organizational setting is always associated with a risk of failure. Environmental support is therefore an important prerequisite for creativity and learning across domains of creativity, including education and business (Beghetto, 2021; Collin et al., 2021; Geng et al., 2022).

Barriers associated with the lack of environmental support can hinder creative endeavors. These barriers may include a fear of criticism or negative consequences for unconventional ideas, rigid organizational structures that discourage deviation from established norms, and a lack of resources or time allocated for experimentation and innovation (Alpkan et al., 2010; Evans, 2023; Ryan et al., 2023). Although the most creative individuals may be able to overcome barriers associated with a lack of environmental support, most people need a supportive environment to appreciate the value of taking such risks and facing uncertainty (Beghetto, 2021; Glăveanu & Beghetto, 2017).

Furthermore, organizational norms influence how individuals perceive the value of specific behaviors (Wigfield et al., 2016). For example, cultivating the perceived value of creativity becomes vital in organizational environments that prioritize the development of

innovative ideas. Perceived subjective value is a pivotal motivational construct in educational psychology (Eccles & Wigfield, 2002), and it has been linked to numerous positive outcomes, including long-term interest and high educational performance (Hulleman et al., 2010). However, the role of the perceived value of creativity has not been fully integrated into creativity research, which has predominantly focused on teachers' beliefs about creativity (Bereczki & Kárpáti, 2018; Rubenstein et al., 2013). Therefore, the aim of the present study is to explore the distinct role that the perceived value of creativity plays in the creative performance of university students.

There are four main components of perceived value: intrinsic value forms the basis of personal enjoyment of an activity (e.g., an employee considers the process of brainstorming enjoyable, and coming up with new and creative ideas for a new marketing strategy is seen as fun; or a student might find essay writing enjoyable purely for the satisfaction of writing it, without any external rewards). The attainment value emphasizes the importance of a particular behavior for an individual (e.g., the employee may perceive the introduction of a new marketing strategy as an important and meaningful task, where they can employ all their skills and competences; or a student might see writing a research paper on a specific historical event as important because it allows them to showcase their research and analytical skills, contributing significantly to their overall understanding of the subject). The utility value highlights the usefulness of a particular behavior in the context of future intentions (e.g., the employee may perceive the implementation of the new marketing strategy as beneficial in the future, as it could help the company stay competitive and attract new customers; or a student might consider writing additional essay drafts as beneficial for success in their course). Finally, each behavior is linked to its perceived cost. Individuals may perceive the process of creating innovative ideas as enjoyable, meaningful, and practical, and yet the cost of engaging in such an endeavor may be too high (e.g., the employee may also

see the process of developing the new marketing strategy as time-consuming and requiring a lot of effort; or a student might consider writing an original essay as time-consuming, requiring substantial effort and commitment). When considering a certain behavior, individuals assess its psychological and social costs and ask themselves how much effort they will have to invest in it (Sánchez-Fernández & Iniesta-Bonillo, 2007; Wigfield et al., 2016; 2017).

The Role of Supportive Environment

To support the integration of perceived values, Ryan and Deci (2016) suggested that an environment should satisfy three basic psychological needs of individuals: autonomy, competence, and relatedness. Drawing on the assumptions of Self-Determination Theory (hereafter SDT; Deci & Ryan, 2000), autonomy is conceptualized as the feeling of being free to make one's own decisions. Competence is the experience of mastery, a perceived capacity to perform well. Relatedness refers to the feeling of being close to other people in a specific social environment.

In the context of creative performance, the importance of supporting the satisfaction of basic psychological needs has been investigated in both work and educational environments. Collin et al. (2021) conducted interviews with 118 employees in growth organizations, and Tuhkala et al. (2021) investigated 177 essays about collaboration in digital, game-based learning environments. Both studies found that learning and creativity in both work and school environments are facilitated by the freedom to make autonomous decisions, which satisfies the need for autonomy, having opportunities to use and develop one's competences, meeting the need for competence, and working collaboratively with sparring partners or in teams, which responds to the need for relatedness. In schools, teachers who encourage students' confidence to solve problems autonomously play a mediating role in

students' creative performance (Yuan et al., 2019). A meta-analysis conducted by Byron and Khazanchi (2012) found that creative performance is linked to frequent constructive feedback that fosters one's competence and to the presence of choices that allow individuals to make autonomous decisions.

Furthermore, the satisfaction of basic psychological needs underlies personal growth (conceptualized as a successful integration of individuals' psychological elements into a unified sense of self and integration of themselves into larger social structures; Deci & Ryan, 2000) and promotes intrinsic motivation (Ryan & Deci, 2000; 2016). SDT distinguishes between behaviors based on personal interests (i.e., intrinsic motivation) and those which individuals engage in for external reasons (i.e., extrinsic motivation). Ryan and Deci (2000) consider intrinsic motivation to be “the prototypic manifestation of the human tendency toward learning and creativity” (p. 69). Intrinsically motivated individuals seek novelty and challenges (Ryan & Deci, 2000), and intrinsic motivation has been repeatedly associated with higher creativity (Hennessey, 2019; Kaufman et al., 2016; Tan et al., 2019; Urban et al., 2021). It is important to note that intrinsic motivation has been shown to mediate the relationship between the satisfaction of basic psychological needs and creative behavior in both educational (Klaeijnsen et al., 2017) and working environments (Devloo et al., 2014). In other words, merely satisfying a person's basic psychological needs may not necessarily lead to increased creativity unless it also increases their intrinsic motivation. When individuals feel autonomous, competent, and connected to others, they are more likely to feel intrinsically motivated to engage in creative behaviors. Intrinsic motivation, in turn, leads to increased creative behavior.

These findings highlight the importance of environments that support the satisfaction of basic psychological needs. In supportive environments, intrinsic motivation arises, and supportive environments therefore allow people to act creatively even without the initial

presence of intrinsic motivation (Amabile, 1996; Hennessey, 2019). Based on this conclusion, De Dreu and Nijstad (2017) suggested that an environment can support creative performance in two different ways. Intrinsically motivated individuals need to be faced with adequate challenges to satisfy their need for autonomy and competence, while extrinsically motivated individuals need an environment that emphasizes the importance and practical (utility) value of creative thinking. In schools, teachers who value creativity may consider nurturing it as important as supporting academic learning (Beghetto & Karwowski, 2018).

The Perceived Value of Creativity

Although Bradshaw (2023) made several theoretical propositions on how to incorporate perceived values into the conceptual framework of SDT, the perceived value of creativity originally stems from the value component in Expectancy-Value Theory (EVT; Eccles & Wigfield, 2020). In creativity research, a conceptual link between the satisfaction of basic psychological needs and the perceived value of creativity can be found in a theoretical chapter written by Luria and Kaufman (2017). Creative individuals perceive the (intrinsic and attainment) value of beauty. The autonomy of creative individuals is satisfied when they can express their individuality and contribute original ideas. Relatedness is satisfied by communicating their ideas to their social environment, while competence is satisfied by constant discovery. Satisfaction of basic psychological needs leads to the pleasure of being creative, or, in other words, to an intrinsic motivation to create something unique.

However, there is still little empirical evidence regarding the relationship between the perceived value of creativity, intrinsic motivation, and creative performance. Dollinger et al. (2007) found in a sample of university students that valuing conformity and security negatively correlated with creative performance. Carpenter (2016) interviewed engineering students with high creative abilities and those with low creative abilities. The highly creative

students valued creative thinking throughout the engineering design process and enjoyed thinking outside the box. Students with low creative abilities, on the other hand, valued creativity only insofar as it coexisted with logic and reason. Kasof et al. (2007) analyzed the so-called self-direction value personality type, i.e., individuals who choose their own goals, value creativity and freedom, and are curious and independent. They found that value orientation and intrinsic motivation accounted for 14% of the variance in creative performance. These findings are consistent with studies that show the relationship between perceived value and creativity is related to the personality characteristics of the individual (Kaufman et al., 2016; Puryear et al., 2019; Tomassoni et al., 2021).

More importantly, Karwowski and Beghetto (2019) found that valuing creativity moderates the effect of creative potential on creative behavior. In other words, they showed that individuals who demonstrate predispositions to creativity manifest more creative behavior only when they also personally recognize creativity as something that has merit and is congruent with their sense of self. Based on these findings, Karwowski et al. (2019) developed a model of creative behavior where the perceived value of creativity functions as an irreplaceable prerequisite for creative performance.

Present Study

From the perspective of SDT, the satisfaction of basic psychological needs translates directly into higher levels of intrinsic motivation (Deci & Ryan, 2000; Ryan & Deci, 2016). The meta-analysis made by Bureau et al. (2022) showed that satisfaction of autonomy ($\rho = .57$), competence ($\rho = .58$), and relatedness ($\rho = .44$) are all strongly related to intrinsic motivation. In other words, when individuals feel free to make their own choices (autonomy), when they exhibit mastery and are faced with adequate challenges (competence), and, at the same time, when they feel accepted by others (relatedness), they tend to engage in activities

based on their own will, their own interest – and this leads to the experience of joy and personal fulfillment (Ryan & Deci, 2017). This is why previous studies found that intrinsic motivation mediates the relationship between the satisfaction of basic psychological needs and creative performance in both educational ($\beta = .05$; Klacijnsen et al., 2017) and working environments ($\beta = .25$; Devloo et al., 2014).

The present study expands this area of research by examining the potential role played by the perceived value of creativity stemming from EVT (Eccles & Wigfield, 2020; Karwowski et al., 2019). Individuals may value creativity for various reasons (Wigfield et al., 2016; 2017): they may see the long-term usefulness of coming up with new ideas (utility value), appreciate the importance of creativity for personal growth (attainment value), or simply value creativity for the joy experienced during the process of creation of new ideas (intrinsic value). Conceptually, the intrinsic and the attainment value are closely related to intrinsic motivation; once individuals engage in activities from their own personal will (intrinsic motivation), they consider these activities both meaningful (attainment value) and joyful (intrinsic value). The utility value is connected to so-called ‘identified regulation’ (Ryan & Deci, 2000; Vallerand et al., 1993): individuals exhibit identified regulation by participating in activities that need not be considered inherently satisfying, but they view these activities as important or useful. In other words, they recognize the utility value of even such activities like cleaning or driving a car to work.

Based on these considerations, it is hypothesized that intrinsic motivation will act as a statistical mediator between the satisfaction of basic psychological needs and the perceived value of creativity (H1). According to Ryan and Deci (2017), once individuals feel their needs are satisfied (need satisfaction), they engage in activities freely (intrinsic motivation), and attribute value to them based on their meaning or personal importance (perceived value of creativity).

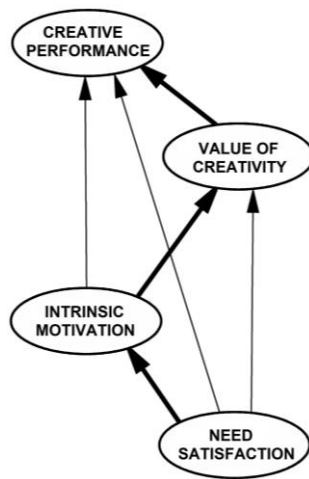
Furthermore, it is assumed that the perceived value of creativity will act as a statistical mediator between intrinsic motivation and creative performance (H2). Yamauchi and Tanaka (1998) showed that among students of elementary schools, intrinsic motivation predicted a greater value placed on schooling ($r = .58$), resulting in deeper approaches to learning ($r = .56$) and less work avoidance ($r = -.42$). H2 investigates the specific amount of contribution of intrinsic motivation and perceived value of creativity to creative performance. Because both constructs are closely related, it is important to explore the proportion of the mediated effect, in other words, to assess how much of the effect of intrinsic motivation on creativity is mediated by the perceived value of creativity. Furthermore, the findings by Kasof et al. (2007) suggest that the relationship between intrinsic motivation and perceived values may be moderational rather than mediational. Therefore, the present study will examine both the mediation and moderation effects.

Finally, the present study hypothesizes that intrinsic motivation and the perceived value of creativity act as statistical mediators between the satisfaction of basic psychological needs and creative performance (H3). This hypothesis is in line with previous studies (Devloo et al., 2014; Klaijnsen et al., 2017) which claimed that need satisfaction directly translates into motivation and only subsequently into creative performance.

All hypothesized relationships are schematically illustrated in Figure 1 in the form of a structural equation model that will be investigated further.

Figure 1

Hypothesized relationships between need satisfaction, intrinsic motivation, perceived value of creativity, and creative performance



Note. Bold lines represent the hypothesized mediation effects.

To conclude, the present study represents an effort to integrate components of two distinct theoretical frameworks – SDT and EVT – to gain a deeper understanding of how psychological needs, intrinsic motivation and perceived values inform the creative performance.

Methods

Participants

The a priori sample size for the structural model with 4 latent and 14 observed variables was calculated for $\alpha = .05$, $\beta = .20$. Given the lack of previous studies, the a priori sample size calculation was conducted to detect a small effect size, $r = .20$. The minimum required sample size was 342 participants. The final sample consisted of 360 university students (69 males; the questionnaire contained a list of options, i.e., ‘male’, ‘female’, ‘other’, ‘do not want to respond’, but none of the participants selected option other than ‘male’ or ‘female’), with $M_{\text{age}} = 24.6$ years ($SD = 7.2$). The participants were graduate students of psychology and pedagogy in their last year of study at a university within the broader region of the capital city. The race and nationality of the participants were homogenous

(predominantly ‘white’ and ‘Czech’). There were no missing data in the dataset as the survey forced participants to respond. Ethics approval was obtained from the Ethics Committee of the last author’s institution in conformity with the APA ethical principles.

Measures

Need Satisfaction

To investigate the basic psychological need satisfaction, three scales were selected from Sheldon et al. (2001) and adapted to the educational environment. Each scale consisted of three items assessed on a 5-point Likert-type scale ranging from 1 (*does not correspond at all*) to 5 (*corresponds exactly*). The instruction at the beginning of the questionnaire ran as follows: “Please focus on the last six months spent in your school. Try to imagine *your typical school day*. Using the scale below, indicate to what extent each of the statements corresponds to what you have experienced during your typical day at school.” Scales of autonomy (e.g., “During my typical school day, I felt that my choices were based on my true interests and values.”; $\alpha = .71$), competence (e.g., “During my typical school day, I felt I was successfully completing difficult tasks and projects.”; $\alpha = .76$), and relatedness (e.g., “During my typical school day, I felt close to and connected with other people who are important to me.”; $\alpha = .83$) exhibited good reliability. Confirmatory factor analysis (hereafter CFA) indicated an excellent fit of the devised questionnaire to the obtained data, $\chi^2(20) = 33.82$, $p = .027$, CFI = .995, RMSEA = .044, SRMR = .047.

Intrinsic Motivation

To measure the different aspects of intrinsic motivation (Vansteenkiste et al., 2006), three scales were selected from the academic motivation scale (AMS-C28; Vallerand et al., 1993). Each scale consisted of four items rated on a 7-point Likert-type scale ranging from 1 (*does not correspond at all*) to 7 (*corresponds exactly*). The items reflect the different kinds

of intrinsic motivation that can be exhibited within the educational environment. The individual scales assess intrinsic motivation to know (e.g., “Because I experience pleasure and satisfaction while learning new things.”; $\alpha = .89$), intrinsic motivation to accomplish (e.g., “For the pleasure I experience when surpassing myself in my studies.”; $\alpha = .82$), and the intrinsic motivation to be stimulated (e.g., “For the pleasure that I experience when I read interesting authors.”; $\alpha = .83$). All scales showed excellent reliability. The CFA indicated an excellent fit of the established item structure of the questionnaire to the obtained data, $\chi^2(47) = 72.44, p = .010, CFI = .999, RMSEA = .039, SRMR = .034$.

Perceived Value of Creativity

Three distinct personal value concepts (Eccles & Wigfield, 2002; Gaspard et al., 2015) and environmental value (De Dreu & Nijstad, 2017) were adapted to fit the context of creativity in university environment. The questionnaire consisted of four scales, with each scale having three items rated on a 5-point Likert-type scale ranging from 1 (*does not correspond at all*) to 5 (*corresponds exactly*). Intrinsic value ($\alpha = .86$) focuses on the positive affect related to creativity (e.g., “I enjoy creative activities.”). Attainment value ($\alpha = .77$) is defined as the importance of doing well and refers to personal importance (e.g., “It is important for me to develop my creative skills.”). Utility value ($\alpha = .81$) refers to short- and long-term goals; the items measured general utility (e.g., “Being able to think creatively will be useful for me later in life.”) and utility for daily life (e.g., “I think creative skills are useful for my everyday life.”). Finally, the environmental value ($\alpha = .71$) measured how the environment emphasizes the value of creative thinking (e.g., “My university teachers emphasize creative thinking in the classroom,” or “My university courses encourage creative thinking.”). The CFA indicated excellent fit of the devised questionnaire to the obtained data, $\chi^2(36) = 42.92, p = .199, CFI = .999, RMSEA = .023, SRMR = .036$.

Creative Performance

Four verbal creativity tasks were used to assess the level of creative performance. In the similarities task ($\alpha = .76$), participants were asked to list associations of “how a carrot and potato are alike” (Runco, 2014). In the unusual uses task ($\alpha = .71$), participants listed all the possible uses of a paperclip they could think of. In the supposing task ($\alpha = .77$), participants were asked to list all consequences of a spontaneous blink they could think of. Finally, in the product improvement task ($\alpha = .73$), participants were asked to list the ways in which a stuffed toy (a bunny) could be enhanced to make it more fun to play with (Torrance, 2008). For each task, three commonly used components, namely fluency (the overall number of generated ideas), flexibility (the number of different categories), and elaboration (the amount of detail), were scored consensually by all the three authors (Torrance, 2008). Any discrepancies were discussed immediately until a consensus was reached. No scales were used for the creative performance evaluation. Any generated idea counted for one point in fluency, each category counted for one point in flexibility, and any additional detail counted for one point in elaboration (e.g., an answer that a paperclip can be used as ‘a key’ would be scored 0 for elaboration, answer ‘a key to the closet’ would be scored 1, and ‘a key to the closet with secrets’ would be scored 2 for elaboration). For each task, the mean score was calculated as the average of all three components (similarly to Urban et al., 2021).

Procedure

Participants received a paper–pencil survey at the beginning of a regular lecture in the middle of the semester. They were informed that participation is voluntary and that they would receive a small number of additional credits for their participation in the research. The questionnaire took about 30 minutes to complete.

Analytical Approach

To estimate the mediation effect in the model, two different approaches were used. First, the amount of mediation in the hypothesized model was calculated using the following formula (Baron & Kenny, 1986):

$$\text{the effect of mediation} = \frac{\text{indirect effect}}{\text{total effect}} \quad (\text{a})$$

This formula estimates the proportion of total effect that can be attributed to mediation, that is, how much of the total effect is actually mediated by the mediator. Kenny et al. (1998) proposed that when a mediator mediates at least 80% of the total effect, mediation can be described as complete; otherwise, mediation is considered partial.

The second approach to effect size calculation was developed by de Heus (2012). Derived from the formula (b), the R^2 values can be calculated for both direct effect and mediation effect.

$$R_{tot}^2 = \beta_{tot}^2 = (\beta_{dir} + \beta_{indir})^2 = \beta_{dir}^2 + \beta_{indir}^2 + 2\beta_{dir}\beta_{indir} \quad (\text{b})$$

Values are reported as intervals between conservative ($R_{dir}^2 = \beta_{dir}^2$; $R_{indir}^2 = \beta_{indir}^2$) and maximum possible estimates ($R_{dir}^2 = \beta_{dir}^2 + 2\beta_{dir}\beta_{indir}$; $R_{indir}^2 = \beta_{indir}^2 + 2\beta_{dir}\beta_{indir}$).

Assumptions and model testing were performed in IBM SPSS Amos 28 using structural equation modeling (SEM) with maximum likelihood (ML) estimation. The p value of the mediation effect was estimated by bootstrapping for 5,000 samples with 95% bias-corrected confidence intervals.

The present study used several fit indices to evaluate the fit of the hypothesized model to the data: CFI (values above .950 indicate an excellent fit), RMSEA (values below .10 indicate an acceptable fit, values below .06 indicate a good fit), and SRMR (values below .08 indicate an excellent fit). The thresholds are based on recommendations of Hu & Bentler (1998).

Table 1
Descriptive statistics and linear correlations between observed variables

	<i>M (SD)</i>	1	2	3	4	5	6	7	8	9	10	11	12	13
Creativity														
1 Similarities	6.14 (3.11)	–												
2 Unusual Uses	5.53 (2.87)	.61***	–											
3 Supposing	5.44 (2.95)	.47***	.46***	–										
4 Product Improvement	4.46 (2.31)	.43***	.48***	.45***	–									
Perceived value														
5 Environmental	3.63 (0.73)	.09*	.07	-.04	.04	–								
6 Utility	4.25 (0.67)	.19***	.14**	.14**	.18***	.42***	–							
7 Attainment	4.22 (0.70)	.22***	.19**	.15**	.20**	.51***	.75***	–						
8 Intrinsic	4.22 (0.77)	.19***	.14**	.19***	.19***	.37***	.58***	.74***	–					
Intrinsic motivation														
9 To know	5.29 (1.29)	.17***	.14**	.09*	.13**	.37***	.40***	.48***	.41***	–				
10 To accomplish	4.29 (1.42)	.17***	.10*	.10*	.16**	.26***	.31***	.36***	.25***	.69***	–			
11 To stimulate	3.49 (1.41)	.18***	.12**	.08	.17**	.29***	.32***	.39***	.32***	.67***	.64***	–		
Need satisfaction														
12 Relatedness	3.22 (0.93)	.04	.07	.08	.13*	.12*	.15**	.11*	.09*	.16**	.11*	.16**	–	
13 Competence	3.63 (0.80)	.13**	.08	.10*	.06	.09*	.19***	.17***	.15**	.28***	.37***	.23***	.33***	–
14 Autonomy	2.94 (0.80)	.04	.03	.04	.04	.32***	.26***	.26***	.22***	.35***	.26***	.27***	.36***	.36***

Note. * $p < .05$, ** $p < .01$, *** $p < .001$

Results

The Results section will briefly examine linear correlations among the observed variables and unique relationships between the latent constructs. Subsequently, the hypothesized model will be investigated and all three hypotheses will be addressed.

Descriptive Statistics and Linear Correlations Among the Observed Variables

The descriptive statistics and linear correlations in Table 1 offer several initial insights. First of all, satisfaction differed for each of the examined basic psychological needs, $F(2, 358) = 103.98, p < .001, \eta_p^2 = .37$. Competence was satisfied the most ($M = 3.63, SD = 0.80$), followed by relatedness ($M = 3.22, SD = 0.93$), while autonomy was satisfied the least ($M = 2.94, SD = 0.80$). Interestingly, among the variables expressing psychological needs, it was autonomy that had the strongest relationship with both perceived values, $r_{\text{Fisher } z} = .28$, and intrinsic motivation, $r_{\text{Fisher } z} = .29$, but there was no direct relationship between autonomy and creative performance, $r_{\text{Fisher } z} = .04$. Competence, on the other hand, was related to all the examined variables: weakly to perceived values, $r_{\text{Fisher } z} = .15$, moderately to intrinsic motivation, $r_{\text{Fisher } z} = .27$, and weakly to creative performance, $r_{\text{Fisher } z} = .10$.

Second, it can be seen that all the facets of intrinsic motivation were similarly related to creative performance (to know, $r_{\text{Fisher } z} = .13$; to accomplish, $r_{\text{Fisher } z} = .13$; and to stimulate, $r_{\text{Fisher } z} = .14$). The same holds of the relationship between perceived value and creative performance (utility, $r_{\text{Fisher } z} = .16$; attainment, $r_{\text{Fisher } z} = .19$; intrinsic, $r_{\text{Fisher } z} = .18$), except for the environmental value. Environmental value was well intercorrelated with all other value constructs, $r_{\text{Fisher } z} = .44$, but not directly linked to creative performance, $r_{\text{Fisher } z} = .04$. This finding is understandable because utility, attainment, and intrinsic values are directly related to personal beliefs and expressed by individuals, while the environmental value is expressed by the social environment.

Relationships Among Latent Constructs

Correlations between the latent constructs in Table 2 were calculated by structural equation modeling. Examination of relationships in Table 2 shows that creative performance had a moderately strong relationship with both intrinsic motivation ($R^2 = 5\%$) and the perceived value of creativity ($R^2 = 7\%$), and a weak relationship with the satisfaction of basic psychological needs ($R^2 = 2\%$). Need satisfaction, on the other hand, had a moderately strong relationship with perceived value ($R^2 = 12\%$) and a very strong relationship with intrinsic motivation ($R^2 = 27\%$).

Table 2

Correlations between the latent constructs in a structural equation model

		1	2	3
1	Creative performance	–		
2	Perceived value	.26***	–	
3	Intrinsic motivation	.23***	.54***	–
4	Need satisfaction	.15*	.35***	.52***

Note. * $p < .05$, *** $p < .001$

The Hypothesized Model

Before testing the hypothesized mediation effects of intrinsic motivation and perceived value of creativity, three assumptions formulated by Baron and Kenny (1986) were tested in individual steps. The first assumption requires a significant effect of the predictor on the outcome, establishing a direct effect that is mediated. The second assumption requires a significant effect of the predictor on the mediator. The third assumption requires a significant effect of the mediator on the outcome while controlling for the relationship between the predictor and the outcome. In this step, it is insufficient to test only the relationship between the mediator and the outcome, because they may both be caused by the predictor. The effect of the predictor must be therefore controlled for.

In the first hypothesized mediation (need satisfaction → intrinsic motivation → perceived value of creativity), intrinsic motivation acts as a mediator between need satisfaction and the perceived value of creativity. In the first step, the regression path between need satisfaction (predictor) and the perceived value of creativity (outcome) was significant ($\beta = .35, SE = .07, p < .001$). In the second step, the regression path between need satisfaction (predictor) and the intrinsic motivation (mediator) was significant ($\beta = .52, SE = .22, p < .001$). In the third step, the relationship between intrinsic motivation (mediator) and the perceived value of creativity (outcome) was significant ($\beta = .51, SE = .03, p < .001$) also when controlling for the effect of need satisfaction (predictor).

In the second hypothesized mediation (intrinsic motivation → perceived value of creativity → creative performance), the perceived value of creativity acts as a mediator between intrinsic motivation and creativity. In the first step, the regression path between intrinsic motivation (predictor) and creativity (outcome) was significant ($\beta = .23, SE = .14, p < .001$). In the second step, the regression path between intrinsic motivation (predictor) and the perceived value of creativity (mediator) was significant ($\beta = .54, SE = .03, p < .001$). In the final step, the relationship between perceived value of creativity (mediator) and creativity (outcome) was significant ($\beta = .20, SE = .38, p < .001$) when controlling for the effect of intrinsic motivation (predictor).

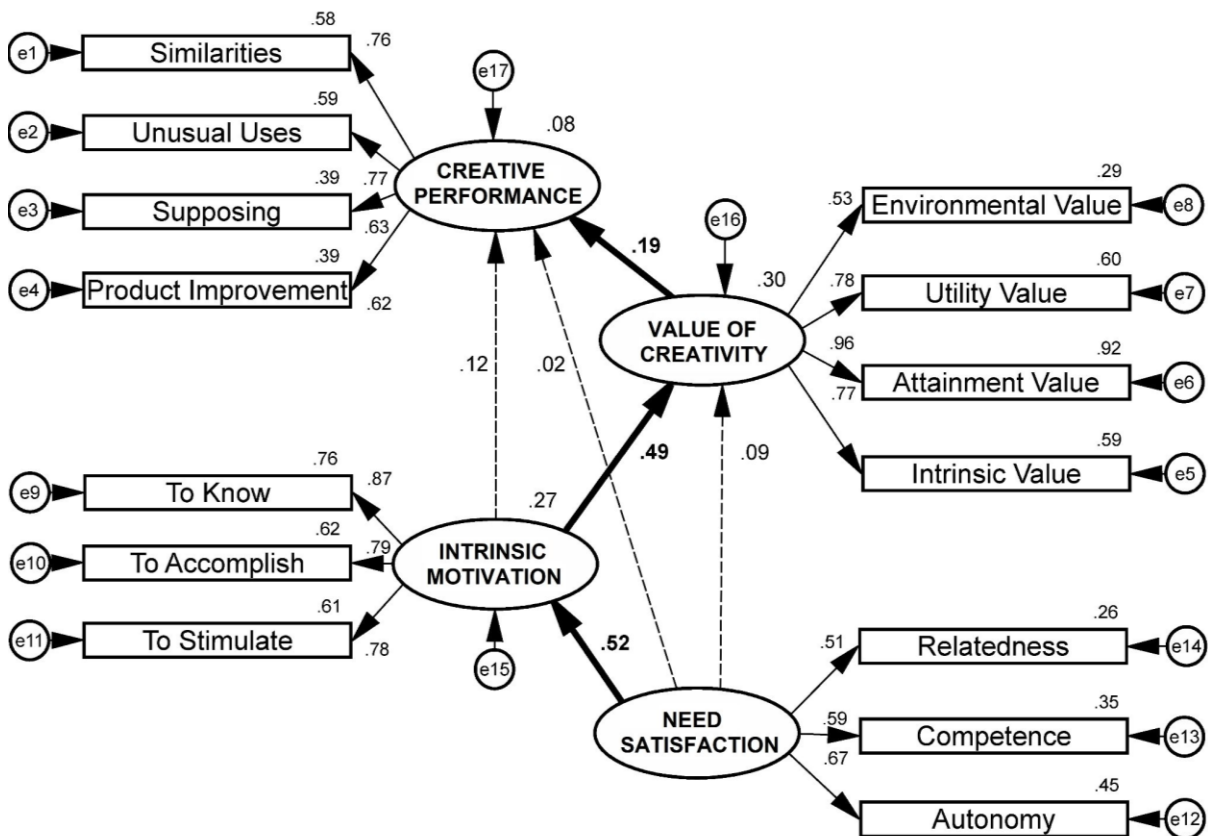
The third hypothesized mediation (need satisfaction → intrinsic motivation → perceived value of creativity → creative performance) met the required assumption tested above. One additional assumption, namely the regression path between need satisfaction (predictor) and creativity (outcome), was significant ($\beta = .16, SE = .34, p = .041$).

All the requisite assumptions for the construction of the three hypothesized mediations thus turned out to hold.

The hypothesized model with the calculated path coefficients and effect sizes is shown in Figure 2. Exact values for direct and indirect effects are reported in Table 3. The fit indices of the final model, $\chi^2(71, 360) = 126.59, p < .001, CFI = .971, RMSEA = .047$ with 90% CI = [.033, .060], PCLOSE = .645, SRMR = .045, indicated an excellent fit of the hypothesized model to the data.

Figure 2

Relationships between need satisfaction, intrinsic motivation, perceived value of creativity, and creative performance



Note. The dotted lines represent non-significant relationships.

Hypothesis 1: Intrinsic motivation mediates the relationship between need satisfaction and perceived value

Examination of the model shows that need satisfaction was strongly associated with intrinsic motivation, $\beta = .52$, $SE = .22$, $R^2 = 27\%$. Subsequently, intrinsic motivation directly predicted the perceived value of creativity, $\beta = .49$, $SE = .03$, with a strong effect size, $R^2 = 24\%$. The weak to moderate direct relationship between need satisfaction and perceived value was non-significant, $\beta = .09$, $SE = .07$, $R^2 = [1\%–6\%]$, but the moderate indirect effect of need satisfaction on perceived value was significant, $\beta = .26$, $SE = .05$, $R^2 = [7\%–11\%]$. These findings indicate that intrinsic motivation mediated the relationship between need satisfaction and the perceived value of creativity; Hypothesis 1 is therefore supported. Overall, intrinsic motivation mediated 74% of the total effect of need satisfaction, indicating that the satisfaction of basic psychological needs directly translates into higher levels of intrinsic motivation and is only later expressed in perceived values.

Hypothesis 2: The perceived value of creativity mediates the relationship between intrinsic motivation and creative performance

Intrinsic motivation directly predicted the perceived value of creativity, $\beta = .49$, $SE = .03$, with a strong effect, $R^2 = 24\%$, and the perceived value of creativity directly predicted creative performance, $\beta = .19$, $SE = .46$, with a small effect, $R^2 = 4\%$. The small direct effect of intrinsic motivation on creative performance was non-significant, $\beta = .12$, $SE = .19$, $R^2 = [1\%–4\%]$, but the small indirect effect of intrinsic motivation on creativity was significant, $\beta = .10$, $SE = .04$, $R^2 = [1\%–3\%]$. Based on these findings, it can be concluded that the perceived value of creativity mediated the relationship between intrinsic motivation and creativity. Hypothesis 2 is therefore supported. It should be noted, though, that only 45% of the total effect of intrinsic motivation was mediated by the perceived value of creativity. In line with the theory, this finding indicates that these two motivational constructs, although highly intercorrelated, are not equivalent.

Furthermore, one additional moderation analysis was conducted to investigate the interaction between intrinsic motivation and perceived value of creativity in relation to creative performance. The moderation analysis showed that there was no significant interaction between intrinsic motivation and perceived value, $\beta = -.30$, $SE = .16$, $p = .540$, indicating that there is no moderation.

Hypothesis 3: Intrinsic motivation and perceived value of creativity mediate the relationship between need satisfaction and creative performance

Finally, as can be seen in Figure 2, the satisfaction of basic psychological needs did not directly predict creative performance, $\beta = .02$, $SE = .47$, $R^2 = [0\%–1\%]$, but the small indirect effect of need satisfaction on creative performance was significant, $\beta = .13$, $SE = .05$, $R^2 = [2\%–3\%]$. The proportion of the total effect of need satisfaction that was mediated by intrinsic motivation and the perceived value of creativity was 88%. This large proportion of the mediated total effect indicates that need satisfaction completely translated into motivational variables and only higher motivation lead also to a higher creative performance. Hypothesis 3 is therefore supported.

Table 3
The direct and indirect (mediation) effects in a structural equation model

Predictor	Outcome	β	<i>SE</i>	95% CI	<i>R</i> ²
Direct effects					
Need satisfaction	→ Intrinsic motivation	.52***	.22	–	27%
Intrinsic motivation	→ Perceived value	.49***	.03	–	24%
Perceived value	→ Creativity	.19**	.46	–	4%
Hypothesized direct effects					
H1	Need satisfaction → Perceived value	.09	.07	–	1%–6%
H2	Intrinsic motivation → Creativity	.12	.19	–	1%–4%
H3	Need satisfaction → Creativity	.02	.47	–	0%–1%
Hypothesized indirect effects					
H1	Need satisfaction → Perceived value	.26***	.05	[.18, .37]	7%–11%
H2	Intrinsic motivation → Creativity	.10**	.04	[.03, .18]	1%–3%
H3	Need satisfaction → Creativity	.13**	.05	[.05, .25]	2%–3%

Note. *R*² values for hypothesized mediations are reported in intervals between the most conservative and maximum possible estimates (de Heus, 2012).

** $p < .01$, *** $p < .001$

Discussion

SDT examines how social and cultural conditions promote the inherent human capacities for psychological growth and engagement, both in general and specific domains and endeavors (Ryan & Deci, 2017). EVT explains how individuals' personal values and perceptions of the importance of outcomes directly influence their motivation and decision-making, impacting various aspects of their lives, from education to career choices (Eccles & Wigfield, 2020; Wigfield et al., 2016; 2017). The current study investigated the effect of satisfaction of basic psychological needs (autonomy, competence, and relatedness) on creative performance, while considering two distinct motivational constructs: intrinsic motivation stemming from SDT and the perceived value of creativity stemming from EVT. Employing a sample of university students, the study was built on previous findings according to which intrinsic motivation mediates the effect of need satisfaction on creative

performance (Devloo et al., 2014; Klaijnsen et al., 2017) and the value of creativity together with intrinsic motivation jointly predicts creative performance (Kasof et al., 2007).

Traditionally, intrinsic motivation has been conceptualized as a manifestation of satisfaction of basic psychological needs (Ryan & Deci, 2000). Once individuals feel free to make their own choices, feel competent in their endeavors, and feel close to their peers, intrinsic motivation spontaneously emerges. The link between need satisfaction and perceived values was described more recently (Eccles & Wigfield, 2002). Ryan and Deci (2017) argue that perceived values (both imagined satisfaction and costs) drive individual actions and that it is the dynamics between individual motivation and value beliefs that most practically informs behavior change. In the present study, a mediational structural equation model was designed to test the association of need satisfaction with (a) motivational constructs (intrinsic motivation and perceived value of creativity) and, subsequently, with (b) creative performance. Based on the results, two major conclusions can be drawn.

Need Satisfaction is Translated into Motivation and Then into Creative Performance

In this study, the cross-sectional findings suggest that satisfaction of basic psychological needs predicted both intrinsic motivation ($R^2 = 27\%$) and perceived value of creativity ($R^2 = 12\%$), but intrinsic motivation almost completely mediated the relationship between need satisfaction and perceived value of creativity. These findings support the conclusion of Ryan and Deci (2017), who claim that once a specific behavior is intrinsically motivated, individuals attribute value to this behavior and this value becomes part of their belief system.

Furthermore, considering the joint role of both motivational constructs, the model shows that intrinsic motivation and the perceived value of creativity jointly mediate 88% of the total effect of need satisfaction on creative performance. In other words, the effect of need

satisfaction on creative performance is completely mediated when taking into account the joint effect of both motivational constructs.

These findings highlight the importance of satisfaction of basic psychological needs: it contributes directly to intrinsic motivation and indirectly to the perceived value of creativity, and ultimately leads to more creative performance. Satisfaction of basic psychological needs is a fundamental factor in enhancing motivation and creative disposition among university students. When their basic psychological needs are met, students are not only more intrinsically motivated but also recognize the value of creative solutions and perform more creatively. These results provide additional support to calls for an environment that satisfies the basic psychological needs, and by doing so enables and encourages creative behavior (Tuhkala et al., 2021).

While our findings emphasize the significance of intrinsic motivation and the perceived value of creativity as mediators in the relationship between need satisfaction and creative performance, it is important to acknowledge the potential for alternative causal pathways, especially in light of the cross-sectional nature of our study. One such pathway that warrants exploration is whether creative individuals are more likely to have their basic psychological needs met. For instance, creative thinkers may possess a natural inclination towards seeking opportunities for autonomy, competence, and relatedness, which in turn could contribute to their intrinsic motivation and creative expression. Creative individuals often thrive in environments that encourage experimentation, autonomy, and self-expression. These environments may align closely with the fulfillment of their basic psychological needs, leading to a positive feedback loop where creativity fosters need satisfaction, and need satisfaction, in turn, fuels creativity. This potential bidirectional relationship between creativity and need satisfaction represents an intriguing avenue for future research.

Investigating the causal dynamics between creative disposition and basic need fulfillment would provide a deeper understanding of the mechanisms that underpin creative performance.

Intrinsic Motivation and Perceived Value of Creativity Are Equally Important for Creativity

Kasof et al. (2007) view intrinsic motivation and perceived values as two distinct motivational constructs, both equally important for creative performance. The authors state that

people who are guided solely by intrinsic motivation would scarcely sustain a line of activity as bleak or torturous as the creative process is for many who succeed at it. Consider, for example, the brief career of comedic songwriter Tom Lehrer, who wrote “purely for fun”, neither regarding his songs as important nor willing to write “as a chore”. Predictably, when the going got less fun, Lehrer quit songwriting and returned full-time to his mathematical work, which he had always considered more important, although not necessarily fun (Kasof et al., 2007, p. 106).

In other words, the authors stress the importance of the joint role of intrinsic motivation and perceived values for creative performance: when people fail to recognize the value of creative activity after an intrinsically motivated initiation, they abandon it for other activities they consider more valuable. The present study supports the expectations mentioned above. Creative performance exhibited moderate relationships with both intrinsic motivation ($R^2 = 5\%$) and the perceived value of creativity ($R^2 = 7\%$). However, once both motivational constructs were introduced into the model, the direct effect of intrinsic motivation became non-significant: intrinsic motivation was translated into the perceived values. A closer examination of the mediation leads to but one caveat: the perceived value of creativity mediated only 45% of the total effect of intrinsic motivation, which implies that both

motivational constructs play an important role for creative performance. The perceived value of creativity does not replace the effect of intrinsic motivation.

Alternatively, future studies may explore the role of perceived value of creativity as a moderator of the relationship between intrinsic motivation and creativity. Although the present study found no interaction between intrinsic motivation and perceived value, and the correlation between these two motivational constructs was very strong ($r = .54$), it may be possible to explore creative performance in individuals who exhibit low intrinsic motivation and still perceive the high value of creativity in the real-world scenarios.

Future Directions: Need Satisfaction Interventions for Creative Performance

Results of the present study corroborate the assumption that a supportive environment enhances intrinsic motivation, values, and creativity. These ramifications hold important information for stakeholders and decisionmakers invested in enhancing students' academic skills and creativity in the complex educational environment. Organizational autonomy support for teachers and teacher motivation are empirically connected, and institutional policies have a significant impact on what school administrators prioritize. It is therefore crucial to introduce policies that would create a classroom climate in which both teachers' and students' basic psychological needs of autonomy, competence, and relatedness are met (Deci & Ryan, 2000; Ryan & Deci, 2016). Instructors who are themselves creative and who feel empowered increase the likelihood of their students becoming engaged (Ryan & Deci, 2017).

Several interventions (Hulleman et al., 2010; Weidinger et al., 2022; Wigfield et al., 2017) have previously targeted perceived values in educational settings and improved students' motivation primarily with respect to mathematics and reading. Guthrie et al. (2000) and Wigfield et al. (2016) proposed a more complex classroom intervention to foster

students' reading engagement and comprehension: their proposal targeted both need satisfaction and perceived values. Their proposed intervention aimed at emphasizing the importance (attainment value) and affording relevance (intrinsic value), enabling students to experience success (competence), supporting the role of the individual (autonomy) in conjunction with team collaboration (relatedness). In the context of creativity research, however, similar interventions are still missing.

This study has shown that students whose basic psychological needs are met are more intrinsically motivated, attribute higher value to creativity, and ultimately perform more creatively. Still, it should be noted that the findings of this study are limited to correlational evidence. Cross-sectional data do not allow drawing conclusions about the causal nature of the relationships presented in this study (O'Laughlin et al., 2018). Future prospective or experimental studies therefore ought to examine the directionality of these findings (Cheng, 2011; Gralewski & Karwowski, 2012).

Working with a sample of university students, this study focused on the satisfaction of basic psychological needs and motivation exhibited in educational settings, but future research may investigate need satisfaction, motivation, and perceived values as expressed in personal life (i.e., investigating everyday need satisfaction and motivation to create) or professional settings (i.e., investigating need support and perceived values in companies striving for innovation; see Kaufman & Beghetto, 2009).

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