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Creativity myths: Prevalence and correlates of misconceptions on creativity

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ABSTRACT

Myths about creativity keep contributing to its mysterious aura despite our increasing scientific understanding of this complex phenomenon. This study examined the prevalence of known creativity myths across six countries from diverse cultural backgrounds and explored why some people believe in them more than others. Results revealed persistent, wide-spread biases in the public conception of creativity, such as attributing creative achievements to spontaneity and chance rather than persistence and expertise. Firmer belief in creativity myths was related to lower education, stronger reliance on undependable sources, and personality traits reflecting the willingness to accept questionable notions and to rely on opinions of others. The findings highlight the need for better communication of evidence-based knowledge to enable more effective support for creativity.

"*For every complex problem there is an answer that is clear, simple and wrong*".

(Henry L. Mencken)

1. Introduction

A common challenge to the effective realization of creativity is knowing too little about it, but it may be even worse when we assume to know but are wrong. Creativity myths—popular beliefs about creativity that are not supported by scientific evidence—keep contributing to the mystery associated with creativity. Over the last few decades, research has increasingly demystified this complex phenomenon, arriving at the conclusion that creativity can be understood as the "extraordinary result of ordinary processes" (Sternberg & Lubart, 1996, p. 681). Yet, misconceptions about creativity are still commonly encountered, suggesting that scientific findings have not sufficiently penetrated public perceptions, which may undermine attempts to foster creativity in education or at work (Baas et al., 2015; Boden, 2004). To better understand the extent of and reasons for beliefs in creativity myths, this study examined their current prevalence across a culturally diverse sample and explored predictors of why some people believe in them more than others.

Research has identified various myths and misconceptions commonly held by popular psychology (Furnham & Horne, 2021; Lilienfeld et al., 2010). Known misconceptions regarding creativity refer to all aspects of the construct including its definition, the creative process, characteristics of creative people, and how to foster creative performance (Cropley, 2016; Gilhooly, 1999; Kaufman, 2015; Kim, 2019). For example, creativity is sometimes seen as synonymous with arts, ignoring the fact that creativity can be expressed in virtually any domain, such as in science, social relationships, or even crime (Glăveanu, 2014). Regarding the creative process, creative thinking is commonly considered as uncontrollable and subject to spontaneous inspiration, whereas research increasingly highlights the strategic and controllable aspects of creative cognition (Benedek & Jauk, 2019; Silvia, 2018). There are mixed misconceptions regarding the characteristics of creative people.

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On the one hand, creativity is sometimes viewed as a rare, divine gift reserved for a few geniuses, with creative genius being linked to madness (Dietrich, 2014; Kaufman, 2014). On the other hand, it is also popular to consider children as most creative, especially before they have to subordinate to the leveling powers of school education. Both accounts ignore the crucial role of persistence and expertise in the development of creativity (Weisberg, 1986). Finally, there are outdated assumptions on how to increase creativity, such as that creative ideation is improved under the influence of drugs (Benedek and Zöhrer, 2020). Together, these beliefs reflect laypeople conceptions of creativity that are inconsistent with empirical evidence and recent theorizing.

How do creativity myths arise and persist? Some of them seem to have evolved from popular anecdotes about creative geniuses (Weisberg, 1986). Condensed narratives about famous creators tend to focus on dramatic aspects like moments of sudden inspiration or bouts with insanity, which easily sear into memory. Alternatively, creativity myths can result from uninformed interpretations or simplifications of complex scientific findings. This appears to be a particular issue in the context of neuroscientific findings, which have inspired popular neuromyths such as we only use 10% of our brain (Howard-Jones, 2014). Whether based on anecdotes or scientific evidence, creativity myths typically rely on a grain of truth that gets distorted or overgeneralized when ignoring base-rates or contextual information. For example, the assumption that creativity exclusively resides in the right hemisphere of the brain seems to be seeded from indirect evidence such as brain lateralization for language and perception but has not been supported by neuroscientific investigations of creative performance (Abraham, 2018). Together, this may explain why the general population typically has a different conception, or implicit theory, about psychological constructs compared to most experts (Sternberg, 1985). One may assume that such misconceptions will get revised once they are debunked by science. Yet this revision may not occur when accurate information is hard to discern from the masses of non-authoritative information on creativity, or when it is inaccessible to non-experts such as being restricted to publications in scientific journals. Importantly, misbeliefs about creativity can have serious practical consequences. Right brain views of creativity have informed ineffective approaches on how to nurture creativity in personal and professional contexts (e.g., Edwards, 1982). Moreover, attributing creativity to genius makes people think that their creativity is fixed and cannot be developed (Karwowski et al., 2020). Accurate knowledge about the development and conditions of creativity thus can be considered crucial to effectively support the realization of creative potential.

While a few studies have begun to examine specific creativity myths in more detail such as the arts bias, the mad genius stereotype, and putative facilitating conditions (e.g., Baas et al., 2015; Kaufman et al., 2006; Patston et al., 2018), it seems that our knowledge on creativity myths largely relies on anecdotal evidence itself. To obtain a more systematic understanding of current (mis)conceptions on creativity, this study examined the prevalence of known creativity myths in a sample from six countries with diverse cultural backgrounds. Moreover, we explored potential predictors for believing in creativity myths such as individual differences in education level, typical sources of knowledge, and personality, which have proven relevant in research on neuromyths (Dekker et al., 2012; Krammer et al., 2019).

2. Materials and methods

2.1. Participants

A convenience sample of 1417 people from six countries in three continents participated in this study. We excluded 156 participants who reported a different nationality than the target country, were less than 18 years old, failed to answer all attention checks correctly, or identified themselves as professionally engaged with creativity research. The final sample encompassed 1261 adults, including subsamples from Austria ($n = 227$), China ($n = 208$), Georgia ($n = 245$), Germany ($n = 140$) Poland ($n = 241$), and USA ($n = 200$). The selection of countries enabled us to test the prevalence of creativity myths across diverse cultural backgrounds (cf. Howard-Jones, 2014). A post-hoc power computation indicated that this sample size ensures high power (1-$\beta = 95\%$) to detect small effects ($r = .1$) in the total sample and moderate effects ($r = .3$) at the level of each country. The age of the participants ranged from 18 to 75 years ($M = 29.7$; $SD = 10.3$); 48.1% were females, 51.0% were males, 0.9% reported diverse/intersexual gender identity. An overview of the sample characteristics for each country is given in Table A.1 in the Appendix A. Participants were recruited to take part in an online survey on "learning, creativity, and the brain", using announcements via social media as well as professional sites (USA: Prolific). In exchange for participation, they were offered feedback on correct responses (Austria, Germany, Poland, China), partial course credits (Georgia) or a small financial remuneration (USA). The work described has been carried out in accordance with The Code of Ethics of the World Medical Association (Declaration of Helsinki) for experiments involving humans.

2.2. Procedure

The online survey was completed via survey platforms operating in the respective countries (Austria, Germany, Poland, and USA: LimeSurvey; China: Sojump; Georgia: Google Forms). Participants obtained general information about the content and duration of study and gave informed consent. Then they provided basic demographic information (age, gender, education), completed the myths/facts questionnaire, and answered questions on their knowledge sources. In the German survey (Austria/Germany), they also completed several personality questionnaires.

2.3. Materials

2.3.1. Myths/facts

The creativity myths/facts questionnaire was developed by the authors on the basis of a comprehensive screening of the literature for popular myths on creativity. This search yielded 15 commonly held beliefs about creativity that are incorrect according the current state of science. To account for potential systematic answer tendency effects, we also included 15 correct statements that represent well-established findings in creativity research. In sum, the questionnaire thus encompassed 30 statements (half correct, half incorrect) concerning the definition of creativity, the creative process, characteristics of creative people, and ways to affect creative performance. The full creativity myths/facts questionnaire is shown in Table A.2 in the Appendix A; exemplary scientific evidence for each statement is provided in the supplementary data in Appendix B.

The questionnaire further included 10 statements (5 myths and 5 facts; see Table A.3 in the Appendix A) referring to the neuroscience of learning that have been commonly used in previous research on neuromyths (Howard-Jones, 2014; Krammer et al., 2019). The inclusion of these statements increased the conceptual diversity of questions and enabled us to explore relationships between beliefs in creativity myths and neuromyths.

Consistent with previous research on neuromyths (Howard-Jones, 2014), participants had to decide whether they considered each statement as "correct" or "incorrect", or answer "don't know". Two attention check items were also included that asked to give a specific response (e.g., "This is a control question. Please answer with the option 'Incorrect'."). All items were presented in an individually randomized fashion. The responses were transformed to a quantitative approval rating by assigning "correct" = 1, "incorrect" = 0 and "don't know" = 0.5 (reflecting the chance level of guessing). Based on item-level approval, we computed average approval rates for each statement (across participants) as well as for each participant (across items, separately for creativity myths and facts as well as neuromyths and facts).

2.3.2. Sources of knowledge

Participants were asked to what extent their knowledge on psychology and science relies on either scientific journals, lectures/workshops, books/magazines, television, internet/social media, and friends. Items were presented in a randomized fashion. Answers were given on a 5-point rating scale ("not at all, rather little, intermediate, rather much, very much"). An exploratory factor analysis (principal components method with oblimin rotation) revealed that the six sources can be attributed to two factors explaining 58% of variance. The first factor reflected reliance on authoritative sources of knowledge (i.e., journals, lectures, books); the second factor reflected reliance on popular sources of knowledge (i.e., TV, social media, friends). The two factors showed a small positive correlation ($r = .10$, $p = .003$) suggesting that reliance on one source of knowledge does not necessarily preclude reliance on the other. These data were available for the entire sample except for the sample from Georgia.

2.3.3. Personality and creativity measures

Personality and self-reported creativity were measured in the German speaking sub-samples (Austria and Germany). Big-five personality traits (openness, conscientiousness, extraversion, agreeableness, neuroticism) were assessed with the 21-item short version of the Big-Five-Inventory (Rammstedt & John, 2005). Need for cognition was assessed with a 4-item short scale (Beißert et al., 2014). Authoritarianism was assessed with the 9-item short scale (Beierlein et al., 2014). Belief in paranormal phenomena was assessed with the 26-item revised paranormal belief scale (Tobacyk, 2004). Self-reported creative self-efficacy and identity were assessed with the 11-item Short Scale of Creative Self (Karwowski et al., 2018). Finally, self-reported everyday creativity was assessed across nine creative domains and in general (e.g., "Compared to people of my age, how creative are you in the domain of literature?"; Benedek et al., 2020).

2.3.4. Language versions

After creating an English master version of the survey, translations to Chinese, German, Georgian, and Polish were created and checked for consensus by two native speakers of the target language with expertise in creativity research.

This study has not been preregistered. We provide access to data and analysis scripts via the Open Science Framework: https://osf.io/n79ep/ (doi: 10.17605/OSF.IO/N79EP).

3. Results

3.1. Prevalence of creativity myths

Creativity myths were approved on average by 50% of people (see Fig. 1). The highest approval was observed for "Brainstorming in groups generates more ideas than if people were thinking alone" (80%). People further substantially endorsed that "One is most creative when with total freedom in one's action" (70%), "Children are more creative than adults" (68%), and "Most people would not be able to distinguish abstract art from abstract children's drawings" (63%). Moreover, people tended to agree that "Creative ideas are naturally a good thing" (59%), "Creativity cannot be measured" (58%), "Creative accomplishments are usually the result of a sudden inspiration" (58%), and that "Creative thinking mostly happens in the right hemisphere of the brain" (54%). The other creativity myths had approval rates below 50%; people disagreed most strongly with the notion that "People have a certain amount of creativity and cannot do much to change it" (20%).

3.2. Prevalence of creativity knowledge

Creativity facts were correctly approved by 68% of people on average, with twelve out of 15 creativity facts showing approval rates above 50% (see Fig. 2). Close to unanimous approval was observed for the notion "When stuck on a problem, it is helpful to continue working on it after taking a break" (97%). People further strongly endorsed the notions that "Creative people are usually more open to new experiences" (87%), "Creative ideas are typically based on remembered information that is combined in new ways" (83%), and "Whether or not something is viewed as creative depends on zeitgeist and social norms" (81%). In sum, this suggests decent knowledge about several well-established findings on creativity. Approval rates below 50% were observed for creativity facts "The first idea someone has is often not the best one" (49%), "To be considered creative, something has to be both novel and useful or appropriate" (46%), and "Achieving a creative breakthrough in a domain (i.e., publishing a successful novel) typically requires at least 10 years of deliberate practice and work" (37%).[1]

3.3. Reasons for believing in creativity myths

We examined why some people believe in creativity myths more than others. To this end, we computed the individual total approval of the 15 creativity myths and related it to relevant individual differences factors including demographic variables, knowledge about creativity and neuroscience, sources of knowledge, and personality traits. A multi-level model (MLM) regression approach was used to account for the fact that person data were nested in different countries and to explore the unique variance of each predictor. We z-standardized the continuous predictors for the MLM analyses so that the MLM yields standardized regression weights. First, we computed an empty model to assess how much variance the hierarchical data accounted for. The random intercepts for countries improved the model significantly (LL-ratio = 22.83, $p < .001$). Country affiliation explained 3% of the variance in creativity myths, indicating that there are no substantial systematic differences in creativity myths between countries. Then, we added the predictors in three steps as some data was available only for a subset of countries (Block 1: demographic factors, endorsement of neuromyths, and knowledge on creativity and neuroscience; block 2: sources of knowledge; Block 3: personality and creativity measures). This three-step procedure allowed us to gauge the influence of each set of predictors relative to the others and to use as much data as possible at each step, as some data was only available for a subset of countries (e.g., personality). Finally, we tested whether adding random slopes for the individual predictors improved the model fit. This was not the case, suggesting that predictor effects generalized across country. Therefore, we report the results without random slopes. Correlations and regression coefficients of all predictors are displayed in Table 1.

3.3.1. Demographic factors, neuromyths, and knowledge

Belief in creativity myths was related to neither age nor gender (both $\beta s = .00$, ns.), but to fewer years of education ($\beta = -.21$, $p < .001$). People who endorsed creativity myths also endorsed neuro-myths more often ($\beta = .23$, $p < .001$). Interestingly, endorsement of creativity myths was further related to higher approval of creativity facts ($\beta = .14$, $p < .001$).

3.3.2. Sources of knowledge

People endorsed creativity myths more often when their knowledge in this domain relied more on popular sources like TV, social media and friends ($\beta = .11$, $p < .001$) and less on more authoritative sources like journals, lectures, and books ($\beta = -.10$, $p = .002$; note that the latter effect was only significant when accounting for other predictors; see Table 1).

3.3.3. Personality

People who believed more in creativity myths were characterized by

[1] Approval rates of neuromyths and neuro-facts are presented in the appendix (Fig. A.1).

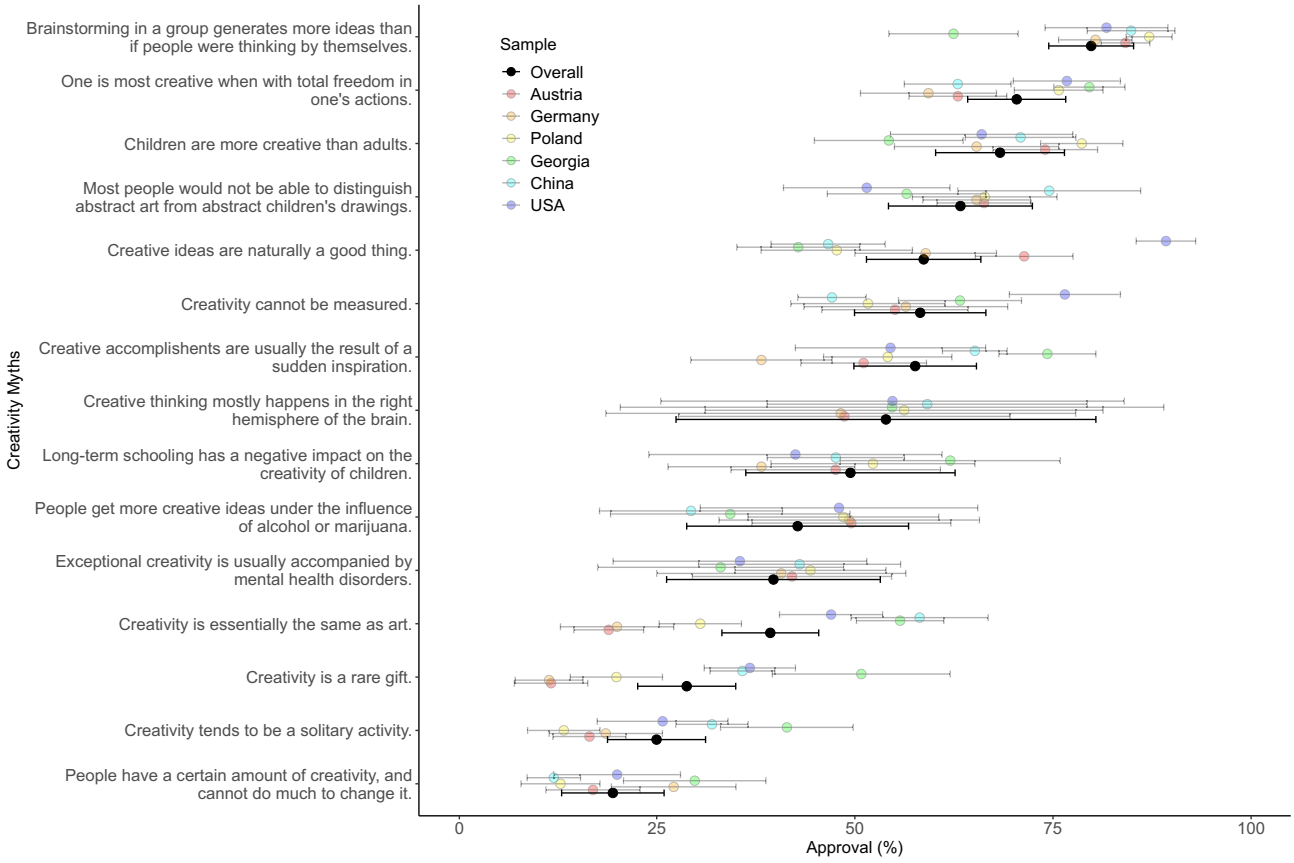

Fig. 1. Creativity myths ranked by average approval (black markers). Colored markers indicate approval for different samples (i.e., countries). Error bars represent relative frequency of "Don't know" responses.

higher neuroticism ($\beta = .16$, $p < .001$), conscientiousness ($\beta = .12$, $p = .038$), authoritarianism ($\beta = .14$, $p < .001$), and belief in paranormal phenomena ($\beta = .11$, $p < .001$), as well as by lower creative self-identity ($\beta = -.24$, $p < .001$). Belief in creativity myths was also related to a lower need for cognition in terms of zero-order correlation, but it predicted no unique variance beyond the other personality measures. No statistically significant relationships were observed for the other personality traits (see Table 1).[2]

4. Discussion

This study examined how prevalent creativity myths are and explored what individual factors predict belief in them. We found that creativity myths were endorsed on average by 50% of people, highlighting their persistence. The consistent international popularity of many myths suggests a global dimension to these beliefs. Approval rates differed, however, substantially across statements and people, and analyses revealed certain patterns that we discuss in the following.

As a first theme, lay conceptions of creativity were characterized by an overestimation of chance and child-like behavior and by underrating the role of control and expertise. In fact, children were seen as more creative than adults by nearly 70%. Moreover, high approval was also given to the claims that most people would not be able to distinguish abstract art from abstract children's drawings, and creative accomplishments are usually the result of sudden inspiration; at the same time the majority rejected the notion that a creative breakthrough in a domain typically requires more than ten years of deliberate practice and work. These beliefs stand in contrast to theory and empirical evidence highlighting the importance of education for the development of cognitive abilities and of extensive training to acquire domain-specific skills necessary for making important creative contributions to a field (Preckel et al., 2020; Simonton, 2014). Moreover, they do not align with the extensive evidence emphasizing strategic and controlled aspects of creative thought (Benedek & Fink, 2019; Silvia, 2018).

Such a "naivety" conceptualization of creativity is problematic for two reasons: First, relating creativity to child-like behavior and chance implies low appreciation for the hard work behind creative achievements. Second, it externalizes relevant factors in the development of creativity. Emphasizing the role of inspiration rather than active engagement may undermine creativity by suggesting we need to wait until creativity hits us with a 'Eureka'-experience. Interestingly, most people rightly rejected the notions that creativity is a rare gift and unchangeable. This indicates that current lay conceptions of creativity, at least, are no longer limited to notions of genius and eminence but instead acknowledge its ubiquity and malleability (cf. Karwowski et al., 2020).

The findings further revealed an undifferentiated conceptualization of creativity. There was strong support for the claim that creativity cannot be measured, suggesting that it is seen as elusive phenomenon. Assessing creativity is undoubtedly challenging, but the field is well equipped with dependable measures of creativity at the levels of ideas, products, and people (Barbot & Reiter-Palmon, 2019; Plucker et al., 2019). Maybe this mindset will change when the assessment of creative thinking becomes a focus topic in the upcoming PISA tests in 2022 (OECD, 2019). Moreover, about a third of people equated creativity with arts. This arts bias can have serious negative consequences such as unnecessarily limiting creativity in education to art classes (Beghetto, 2010; Patston et al., 2018). Finally, consistent with previous work (Baas

[2] Additional MLM analyses examining predictors of the approval of creativity facts are presented in Table A.5 in the appendix.

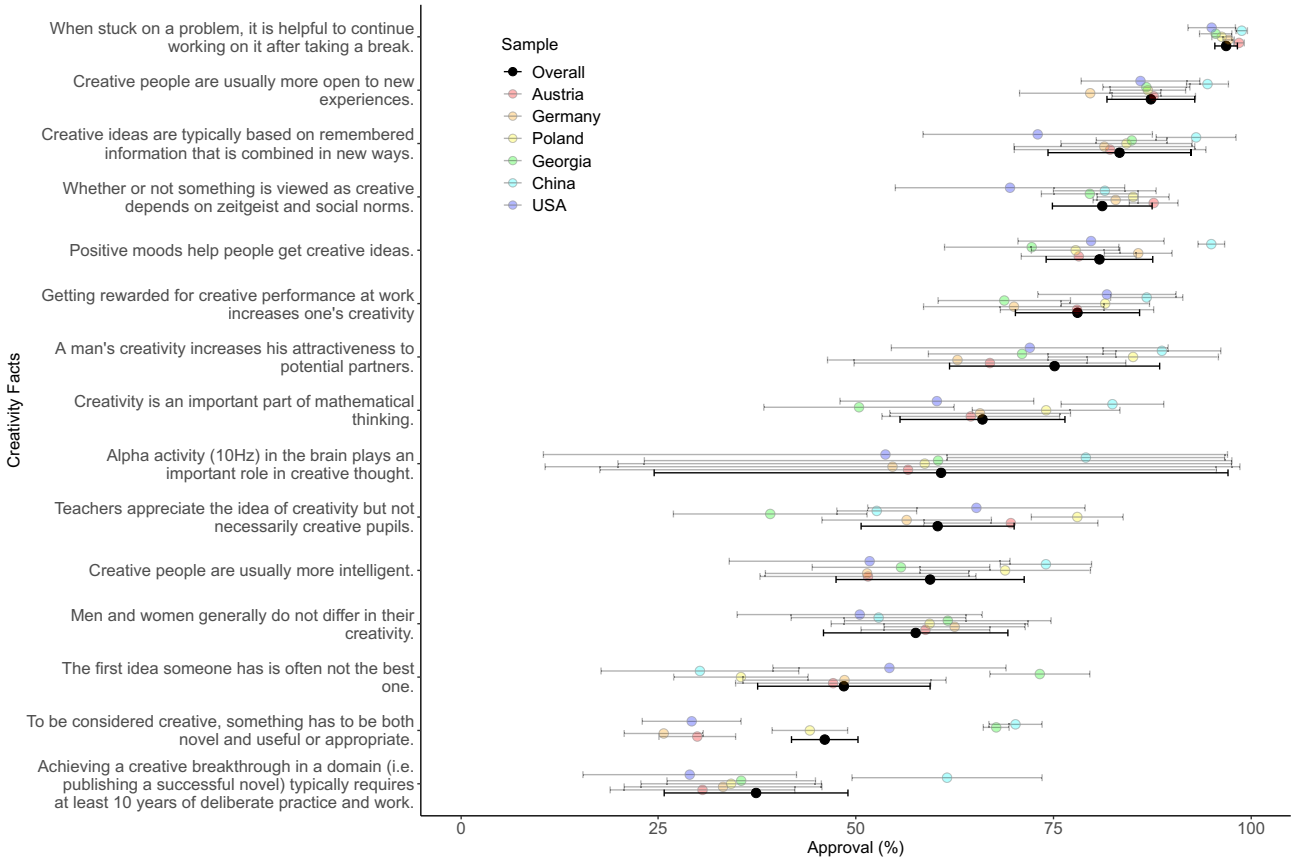

Fig. 2. Creativity facts ranked by average approval (black markers). Colored markers indicate approval for different samples (i.e., countries). Error bars represent relative frequency of "Don't know" responses.

Table 1
Predicting approval of creativity myths: correlations and standardized coefficients from multi-level model analysis.

	r	*p*	β	*p*
Block 1				
Age	−.05	.073	.00	.993
Gender	.04	.179	.00	.913
Education years	−.21	<.001	−.21	<.001
Creativity facts	.14	<.001	.14	<.001
Neuro myths	.19	<.001	.23	<.001
Neuro facts	−.01	.670	−.01	.575
Block 2				
Sources 1 (articles, books, talks)	−.05	.105	−.10	.002
Sources 2 (TV, social media, friends)	.14	<.001	.11	<.001
Block 3				
Openness	.01	.776	.11	.097
Conscientiousness	.10	.095	.12	.038
Extraversion	−.11	.059	−.02	.749
Agreeableness	−.09	.103	−.04	.445
Neuroticism	.27	<.001	.16	.006
Self-rated creativity	−.02	.736	.12	.098
Creative self-identity	−.16	.004	−.24	.003
Need for cognition	−.17	.004	−.01	.918
Authoritarianism	.26	<.001	.14	.008
Paranormal beliefs	.22	<.001	.11	.032

Note. Predictors were entered as fixed factors to the MLM in three blocks; Block 1 included age, gender, education years, approval of creativity facts/neuro myths/neuro facts ($n = 1244$); block 2 added reliance on scientific and unscientific sources of knowledge ($n = 999$); block 3 added all remaining personality predictors ($n = 300$). N per block represents sample size after listwise exclusion of missing data. Gender was considered as binary variable (female = 0/male = 1) after excluding 11 people reporting diverse gender identity. The full models for each step are provided in the Appendix A (Tables A.4.1–A.4.3).

et al., 2015), results also indicated considerable uncertainty about what conditions are conducive for creativity. On the one hand, most people think that brainstorming in groups is effective to generate more ideas, despite extensive empirical evidence that nominal groups outperform interacting groups due to various cognitive, social, and affective process losses (e.g., Diehl & Stroebe, 1987). On the other hand, people are well aware of the benefits of positive moods and taking a break when stuck.

While this study highlighted persistent biases and inaccuracies in the lay conception of creativity, it is important to acknowledge that the definition of a myth is never fully clear-cut itself. First, myth statements usually must be kept short and general, and thus are never nuanced enough to do justice to the complexity of the matter. Second, even experts do not always agree on what can be considered a myth, and it is a strength of science that it remains open to reconsider its assumptions in the face of novel evidence. Therefore, a limitation of research like this study is that it commonly resorts to brief statements and only offers binary response options. Future research may explore the differentiation of lay conceptions by assessing the level of agreement or confidence in a more graded fashion and by studying the sensitivity of judgements to variations of how nuanced the information is presented.

Why do some people believe more in creativity myths than others? One factor explaining endorsement of creativity myths was lower education, and reliance on popular sources of knowledge like TV, social media and friends—the latter effect was small but robust independent of education. These findings indicate that popular media may play a role in keeping creativity myths alive, and education plays a role in debunking them. Moreover, people with higher creative self-identity endorsed creativity myths less often, suggesting that personal identification with creativity increases discernment for information about creativity.

Belief in creativity myths was further related to stronger belief in neuromyths and paranormal phenomena, and, interestingly, to higher

approval of creativity facts. A similar association between approving myths and facts has been previously observed in the context of neuromyths (Dekker et al., 2012; Krammer et al., 2019). This pattern indicates that belief in creativity myths does not simply reflect the absence of creativity knowledge but rather a tendency to endorse plausible or scientific-sounding statements, which decreases correct rejections but also increases hits. This explanation is in line with the observation that belief in creativity myths was related to higher authoritarianism and lower need for cognition—traits that reflect the willingness to rely on the opinions of others or on simple heuristics rather than critically reflect on new information.

The identified predictors of belief in creativity myths were not moderated by nationality, suggesting broad generalizability of these findings across different cultural backgrounds. This raises the question of what can be done to enable more accurate public knowledge about creativity. Education is certainly an important means to leverage evidence-based knowledge. It requires that scientific information should not only be communicated within experts but made easily accessible to educators and practitioners. The present work serves as a first step towards this goal by identifying areas of particular incongruency between what is known and unknown about creativity and exploring individual factors contributing to the development of misconceptions.

CRediT authorship contribution statement

MB, MK, RHG, GK, IZ, and JCK have contributed to the design of the study; MB, MK, IL, PJS, KNC, YL, WH, and KM have contributed to data collection; MB, MK, SMC, and GK have contributed to data analysis; all authors have contributed to preparation of the article.

Declaration of competing interest

None.

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Appendix A

Table A.1
Demographic information of the sample per country.

	n	Gender [%female/male/intersexual]	Age [M (SD)]	Years of education [M (SD)]
Austria	227	74.9/23.8/1.3	27.5 (10.3)	17.0 (3.4)
Germany	140	46.4/53.6/0.0	37.8 (10.2)	18.3 (3.6)
Poland	241	65.6/34.4/0.0	27.7 (8.2)	16.2 (3.2)
Georgia	245	19.6/80.4/0.0	24.9 (8.5)	15.4 (2.0)
China	208	26.4/73.6/0.0	29.5 (6.2)	17.3 (3.2)
USA	200	55.5/40.5/4.0	35.0 (12.6)	15.3 (2.5)
Total	1261	48.1/51.0/0.9	29.7 (10.3)	16.5 (3.2)

Table A.2
15 myths and 15 facts concerning the definition of creativity, the creative process, the creative person and ways to stimulate creativity.

Creativity myths	Creativity facts
Definition	
Creativity cannot be measured	To be considered creative, something has to be both novel and useful or appropriate
Creativity is essentially the same as art	Teachers appreciate the idea of creativity but not necessarily creative pupils
Creative ideas are naturally a good thing	Whether or not something is viewed as creative depends on zeitgeist and social norms
Most people would not be able to distinguish abstract art from abstract children's drawings	Creativity is an important part of mathematical thinking
Process	
Creative accomplishments are usually the result of a sudden inspiration	Creative ideas are typically based on remembered information that is combined in new ways
Creative thinking mostly happens in the right hemisphere of the brain	The first idea someone has is often not the best one
Creativity tends to be a solitary activity	Alpha activity (10 Hz) in the brain plays an important role in creative thought
Person	
Creativity is a rare gift	Creative people are usually more open to new experiences
People have a certain amount of creativity, and cannot do much to change it	Creative people are usually more intelligent
Children are more creative than adults	Achieving a creative breakthrough in a domain (i.e. publishing a successful novel) typically requires at least 10 years of deliberate practice and work
Exceptional creativity is usually accompanied by mental health disorders	Men and women generally do not differ in their creativity
	A man's creativity increases his attractiveness to potential partners
Stimulation	
People get more creative ideas under the influence of alcohol or marijuana	When stuck on a problem, it is helpful to continue working on it after taking a break
Long-term schooling has a negative impact on the creativity of children	Positive moods help people get creative ideas
	Getting rewarded for creative performance at work increases one's creativity

(*continued on next page*)

Table A.2 (*continued*)

Creativity myths	Creativity facts
Brainstorming in a group generates more ideas than if people were thinking by themselves	
One is most creative when with total freedom in one's actions	

Note. Exemplary (counter-) evidence for each statement is given in Supplemetary data in Appendix B.

Table A.3
List of neuromyths and neurofacts.

Neuromyths	Neurofacts
Individuals learn better when they receive information in their preferred learning style (e.g., auditory, visual, kinesthetic)	We use our brains 24 h a day
Short bouts of co-ordination exercises can improve integration of left and right hemispheric brain function	Extended cognitive training can change the shape and structure of some parts of the brain
Children are less attentive after sugary drinks and snacks	The brains of boys are generally larger than those of girls
Differences in hemispheric dominance (left brain or right brain) can help to explain individual differences amongst learners	Learning occurs through modification of the brains' neural connections
We mostly only use 10% of our brain	Normal development of the human brain involves the birth and death of brain cells

2

Table A.4.1
Predicting approval of creativity myths with factors of block 1 (N = 1244; df = 1232). Correlations and standardized coefficients from multi-level model analysis.

	r	*p*	*β*	*p*
Intercept			.00	.97
Age	−.05	.073	.00	.99
Gender	.04	.179	.00	.97
Education years	−.21	<.001	−.21	<.001
Creativity facts	.14	<.001	.14	<.001
Neuro myths	.19	<.001	.23	<.001
Neuro facts	−.01	.670	−.01	.57

Table A.4.2
Predicting approval of creativity myths with factors of block 1 + 2 (N = 999; df = 986). Correlations and standardized coefficients from multi-level model analysis.

	r	*p*	*β*	*p*
Intercept			.05	.58
Age	−.05	.073	−.03	.41
Gender	.04	.179	−.03	.41
Education years	−.21	<.001	−.19	<.001
Creativity facts	.14	<.001	.13	<.001
Neuro myths	.19	<.001	.23	<.001
Neuro facts	−.01	.670	.00	.98
Sources 1 (articles, books, talks)	−.05	.105	−.10	.002
Sources 2 (TV, social media, friends)	.14	<.001	.11	<.001

Table A.4.3
Predicting approval of creativity myths with factors of block 1 + 2 + 3 (N = 300; df = 280). Correlations and standardized coefficients from multi-level model.

	r	*p*	*β*	*p*
Intercept			−.23	.001
Age	−.05	.073	.02	.770
Gender	.04	.179	.00	.998
Education years	−.21	<.001	−.10	.043
Creativity facts	.14	<.001	.11	.058
Neuro myths	.19	<.001	.12	.015
Neuro facts	−.01	.670	.03	.477
Sources 1 (articles, books, talks)	−.05	.105	−.10	.106
Sources 2 (TV, social media, friends)	.14	<.001	.11	.205
Openness	.01	.776	.11	.097
Conscientiousness	.10	.095	.12	.038

(*continued on next page*)

Table A.4.3 (*continued*)

	r	*p*	*β*	*p*
Extraversion	−.11	.059	−.02	.749
Agreeableness	−.09	.103	−.04	.445
Neuroticism	.27	<.001	.16	.006
Self-rated creativity	−.02	.736	.12	.098
Creative self-identity	−.16	.004	−.24	.003
Need for Cognition	−.17	.004	−.01	.918
Authoritarianism	.26	<.001	.14	.008
Paranormal beliefs	.22	<.001	.11	.032

Complemental MLM analyses examining predictors of the approval of creativity facts

Table A.5
Predicting approval of creativity facts: Correlations and standardized coefficients from multi-level model analysis.

	r	*p*	*β*	*p*
Block 1				
Age	−.08	.003	−.05	.091
Gender	.09	.002	.04	.159
Education years	.05	.081	.05	.091
Creativity myths	.14	<.001	.14	<.001
Neuro myths	.12	<.001	.04	.136
Neuro facts	.18	<.001	.16	<.001
Block 2				
Sources 1 (articles, books, talks)	.26	<.001	.16	<.001
Sources 2 (TV, social media, friends)	.04	.215	−.06	.055
Block 3				
Openness	.18	.002	−.02	.737
Conscientiousness	−.10	.086	−.18	.002
Extraversion	−.01	.820	−.07	.236
Agreeableness	−.03	.595	−.02	.655
Neuroticism	.07	.235	.00	.983
Self-rated creativity	.13	.020	−.03	.610
Creative self-identity	.22	<.001	.23	.006
Need for cognition	.15	.008	.08	.161
Authoritarianism	−.15	.012	−.06	.311
Paranormal beliefs	−.03	.499	−.05	.407

Predictors were entered as fixed factors to the MLM in three incremental blocks. Block 1 included Age, Gender, Education years, approval of creativity facts/neuro myths/neuro facts (n = 1244); block 2 added reliance on scientific and unscientific sources of knowledge (n = 999); block 3 added all remaining personality predictors (n = 300). N per block represents sample size after listwise exclusion of missing data. Gender was considered as binary variable (female = 0/male = 1) after excluding 11 people reporting diverse gender identity.

Table A5 shows that higher approval of creativity facts is related to higher endorsement of creativity myths (as shown before) and neuro facts as well as higher reliance on authoritative sources of knowledge, lower conscientiousness, and higher creative self-identity. Hence, despite the positive correlation between creativity myths and facts, these measures showed evidence of discriminant validity in terms of distinct correlation patterns with predictors (see Table 1 and A5). For example, the reliance on authoritative sources of knowledge and creative self-identity were negatively related to creativity myths but positively to creativity facts.

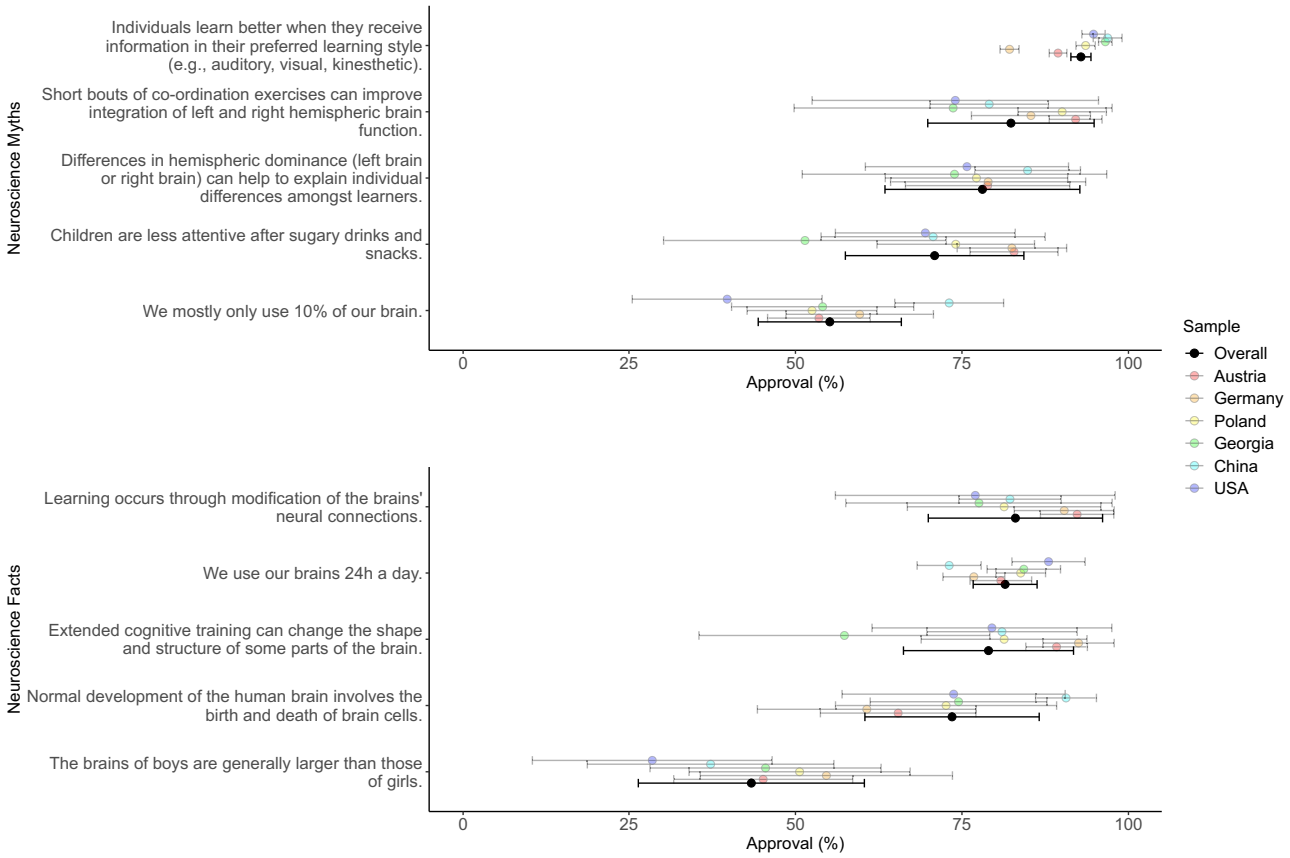

Fig. A.1. Neuro myths and facts ranked by average approval (black markers). Colored markers indicate approval for different nations. Error bars represent relative frequency of "Don't know" responses.

Appendix B. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.paid.2021.111068.

References

Abraham, A. (2018). *The neuroscience of creativity*. Cambridge University Press.

Baas, M., Koch, S., Nijstad, B. A., & De Dreu, C. K. W. (2015). Conceiving creativity: The nature and consequences of laypeople's beliefs about the realization of creativity. *Psychology of Aesthetics, Creativity, and the Arts, 9*, 340–354. https://doi.org/10.1037/a0039420.

Barbot, B., & Reiter-Palmon, R. (2019). Creativity assessment: Pitfalls, solutions, and standards. *Psychology of Aesthetics, Creativity, and the Arts, 13*(2), 131–132. https://doi.org/10.1037/aca0000251.

Beghetto, R. A. (2010). Creativity in the classroom. In J. C. Kaufman, & R. Sternberg (Eds.), *The Cambridge handbook of creativity* (pp. 447–463). Cambridge University Press.

Beierlein, C., Asbrock, F., Kauff, M., & Schmidt, P. (2014). *Die Kurzskala Autoritarismus (KSA-3): ein ökonomisches Messinstrument zur Erfassung dreier Subdimensionen autoritärer Einstellungen*. Mannheim: GESIS - Leibniz-Institut für Sozialwissenschaften. https://nbn-resolving.org/urn:nbn:de:0168-ssoar-426711.

Beißert, H., Köhler, M., Rempel, M., & Beierlein, C. (2014). *Eine deutschsprachige Kurzskala zur Messung des Konstrukts Need for Cognition: Die Need for Cognition Kurzskala (NFC-K)*. Leibniz-Institut für Sozialwissenschaften. https://nbn-resolving.org/urn:nbn:de:0168-ssoar-403157.

Benedek, M., Bruckdorfer, R., & Jauk, E. (2020). Motives for creativity: Exploring the what and why of everyday creativity. *The Journal of Creative Behavior, 54*(3), 610–625.

Benedek, M., & Fink, A. (2019). Toward a neurocognitive framework of creative cognition: The role of memory, attention, and cognitive control. *Current Opinion in Behavioral Sciences, 27*, 116–122.

Benedek, M., & Jauk, E. (2019). Creativity and cognitive control. In J. Kaufman, & R. Sternberg (Eds.), *Cambridge handbook of creativity* (pp. 200–223). Cambridge: Cambridge University Press. https://doi.org/10.1017/9781316979839.012.

Benedek, M., & Zöhrer, L. (2020). Creativity on tap 2: Investigating dose effects of alcohol on cognitive control and creative cognition. *Consciousness and Cognition, 83*, Article 102972.

Boden, M. A. (2004). *The creative mind: Myths and mechanisms*. Psychology Press.

Cropley, A. (2016). The myths of heaven-sent creativity: Toward a perhaps less democratic but more down-to-earth understanding. *Creativity Research Journal, 28*(3), 238–246. https://doi.org/10.1080/10400419.2016.1195614.

Dekker, S., Lee, N. C., Howard-Jones, P. A., & Jolles, J. (2012). Neuromyths in education: Prevalence and predictors of misconceptions among teachers. *Frontiers in Psychology, 3*, 1–8. https://doi.org/10.3389/fpsyg.2012.00429.

Diehl, M., & Stroebe, W. (1987). Productivity loss in brainstorming groups: Toward the solution of a riddle. *Journal of Personality and Social Psychology, 53*(3), 497–509.

Dietrich, A. (2014). The mythconception of the mad genius. *Frontiers in Psychology, 5*, 79.

Edwards, B. (1982). *Drawing on the right side of the brain*. Fontana.

Furnham, A., & Horne, G. (2021). Myths and misconceptions about intelligence: A study of 35 myths. *Personality and Individual Differences, 181*, Article 111014. https://doi.org/10.1016/j.paid.2021.111014.

Gilhooly, K. J. (1999). Creative thinking: Myths and misconceptions. In S. Sala (Ed.), *Mind myths: Exploring popular assumptions about the mind and brain* (pp. 138–155). Wiley.

Gläveanu, V. P. (2014). Revisiting the "art bias" in lay conceptions of creativity. *Creativity Research Journal, 26*(1), 11–20.

Howard-Jones, P. A. (2014). Neuroscience and education: Myths and messages. *Nature Reviews Neuroscience, 15*(12), 817–824. https://doi.org/10.1038/nrn3817.

Karwowski, M., Czerwonka, M., Lebuda, I., Jankowska, D. M., & Gajda, A. (2020). Does thinking about Einstein make people entity theorists? Examining the malleability of creative mindsets. *Psychology of Aesthetics, Creativity, and the Arts, 14*(3), 361–366. https://doi.org/10.1037/aca0000226.

Karwowski, M., Lebuda, I., & Wiśniewska, E. (2018). Measurement of creative self-efficacy and creative role-identity. *The International Journal of Creativity & Problem Solving, 28*(1), 45–57.

Kaufman, J. C. (Ed.). (2014). *Creativity and mental illness*. Cambridge University Press.

Kaufman, J. C. (2015). Creativity is more than silly, more than art, more than good: The diverse career of Arthur Cropley. *Creativity Research Journal, 27*(3), 249–253. https://doi.org/10.1080/10400419.2015.1063879.

Kaufman, J. C., Bromley, M. L., & Cole, J. C. (2006). Insane, poetic, lovable: Creativity and endorsement of the. *"Mad Genius" stereotype. Imagination, Cognition and Personality, 26*(1), 149–161.
Kim, K. H. (2019). Demystifying creativity: What creativity isn't and is? *Roeper Review, 41*(2), 119–128.
Krammer, G., Vogel, S. E., Yardimci, T., & Grabner, R. H. (2019). Neuromythen sind zu Beginn des Lehramtsstudiums prävalent und unabhängig vom Wissen über das menschliche Gehirn. *Zeitschrift für Bildungsforschung, 9*(2), 221–246.
Lilienfeld, S. O., Lynn, S. J., Ruscio, J., & Beyerstein, B. L. (2010). *50 great myths of popular psychology: Shattering widespread misconceptions about human behavior*. John Wiley & Sons.
OECD. (2019). *PISA 2021 creative thinking framework*. OECD Publications.
Patston, T. J., Cropley, D. H., Marrone, R. L., & Kaufman, J. C. (2018). Teacher implicit beliefs of creativity: Is there an arts bias? *Teaching and Teacher Education, 75*, 366–374.
Plucker, J., Makel, M., & Qian, M. (2019). Assessment of creativity. In J. C. Kaufman, & R. Sternberg (Eds.), *The Cambridge handbook of creativity* (pp. 44–68). Cambridge University Press.
Preckel, F., Golle, J., Grabner, R., Jarvin, L., Kozbelt, A., Müllensiefen, D., … Worrell, F. C. (2020). Talent development in achievement domains: A psychological framework for within-and cross-domain research. *Perspectives on Psychological Science, 15*, 1745691619895030.
Rammstedt, B., & John, O. P. (2005). Kurzversion des big five inventory (BFI-K). *Diagnostica, 51*(4), 195–206.
Silvia, P. J. (2018). Creativity is undefinable, controllable and everywhere. In R. J. Sternberg, & J. C. Kaufman (Eds.), *The nature of human creativity*. Cambridge University Press.
Simonton, D. K. (2014). Creative performance, expertise acquisition, individual differences, and developmental antecedents: An integrative research agenda. *Intelligence, 45*, 66–73.
Sternberg, R. J. (1985). Implicit theories of intelligence, creativity, and wisdom. *Journal of Personality and Social Psychology, 49*, 607–627.
Sternberg, R. J., & Lubart, T. I. (1996). Investing in creativity. *American Psychologist, 51*(7), 677–688.
Tobacyk, J. J. (2004). A revised paranormal belief scale. *International Journal of Transpersonal Studies, 23*(1), 94–98. https://doi.org/10.24972/ijts.2004.23.1.94.
Weisberg, R. (1986). *Creativity: Genius and other myths*. WH Freeman.