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The Antecedents and Outcomes of Creative Cognition

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A Brief Introduction to the Empirical Study of Creativity in Psychology

In determining the factors that aid or impede creativity, the emphasis in psychological research has predominantly been directed at uncovering the manner in which a range of variables, both individual and environmental, increases the propensity for creative potential or the likelihood of creative achievement. Other perspectives are concerned with the degree to which creative potential or creative engagement predicts other post-cognitive outcomes. While the bulk of this research has focused on the value of creativity as a predictor of academic success, over and above measures of intelligence, other outcomes such as wellbeing have also been examined, albeit to a far lesser degree. The aim of this chapter is to give a concise summary of the antecedents and outcomes that are associated

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with creative potential and creative achievement, and also the outcomes of creative practice and engagement with the arts.

Within the literature, creativity is defined as the ability to produce something that is both novel or original, and useful or of value (Runco and Jaeger 2012). Of course, the magnitude of creativity may vary considerably, and the levels of creativity are often divided into Big-C and little-c creativity, where Big-C creativity involves significant and singular creative achievement recognised by society, and little-c refers to the everyday creativity which is a capacity that every individual can engage (Kozbelt et al. 2010). Kaufman and Beghetto (2009) have added intermediate categories of Pro-C and mini-C creativity to this model, where Pro-C refers to the output, for example, of professional artists, and mini-c is creativity that is subjective and meaningful to the individual, such as seen in young children. The assessment of creativity may focus on creative achievement, or the outputs or products of creative activity. The Consensual Assessment Technique (CAT; Amabile 1982) is an example of an assessment of creative achievement, which combines the independent subjective assessments made by an appropriate group of judges to arrive at an overall rating of creativity of a product. The Creative Achievement Questionnaire (Carson et al. 2005) is a self-report questionnaire which assesses achievement across ten domains of artistic and scientific creativity. An alternative approach is to look at creative potential, by studying aspects of personality, intelligence and cognitive processes that are associated with creative achievement.

Within this approach, Guilford (1967) described two key processes involved in creative cognition: divergent thinking and convergent thinking. Convergent thinking is the process involved in finding the single correct solution to a problem, and divergent thinking involves generating many possible alternative solutions (Cropley 2006). Convergent creative thinking is most commonly tested using the remote associates test (RAT; Mednick 1962). Divergent creative thinking can be tested in a number of ways (Abraham and Windmann 2007), and responses are commonly evaluated based on fluency or the number of ideas generated, originality or the uncommonness of those ideas, flexibility or the number of different categories of responses, and elaboration or the level of details associated with an idea. The Alternate Uses Task (Guilford 1967) is an example

of a divergent thinking task in which participants generate different uses for a common object such as a newspaper. A helpful theoretical framework within which to contextualise different approaches to the study of creativity are the "four Ps" which reflect the process, product, person, and place/press (i.e. environment) (Rhodes 1961; Runco 2004). The first part of this chapter will focus on the latter two of these, to explore how they contribute to creative cognition. The second part of the chapter will consider outcomes associated with creative cognition and creative practice that are particularly relevant to young people in education.

Individual or Dispositional Factors

This section will discuss individual or dispositional factors that may contribute to the individual's creative potential or achievement, focusing on intelligence, personality, and executive functions, finishing with a brief analysis of neuroscientific research into creativity. As the discussion will show, understanding the creative mind requires an understanding of the complex interplay of cognitive, personality and physiological factors.

Intelligence

Debate about the relationship between creativity and intelligence has a long history within Psychology, specifically in terms of whether creativity is an aspect of intelligence, or a separate construct. Guilford's (1967) Structure of Intelligence model proposed that creativity was a facet of intellectual functioning, as did the Cattell-Horn-Carroll (McGrew 2009) model of intelligence where it is a component of fluid reasoning (J. C. Kaufman 2009). Threshold theory (Barron 1961; Guilford 1967) proposes that there is a relationship between creativity and intelligence up to a particular level or threshold, corresponding to an IQ score of 120, but above that level it is possible to be highly intelligent without being commensurately highly creative. However, a meta-analysis by Kim (2005) of 21 studies which included children and adults found that the relationship between creativity and IQ scores was negligible and the evidence did

not lend support even to a threshold criterion of 120. Kim's meta-analysis also found differences in the relationship between creativity and IQ scores across different creativity tests. The manner in which an activity is framed may therefore affect creative performance.

Jauk et al. (2013) suggested that the relationship between intelligence and creativity depends on the type of creativity measure being evaluated. For ideational fluency in creativity, a significant positive relationship was found but only up to an IQ score threshold of 86. However, for ideational originality in creativity, the threshold was found to be higher at 104 points for creative potential when measured by the originality of each participant's self-selected top 2 ideas, and 119.60 points when measured by average originality of all their ideas. A longitudinal study by Karwowski et al. (2017) investigating the relationship between intelligence at 11 years of age and creative achievement 41 years later at age 52, supported the idea that high creative achievement is unlikely with low intelligence, but highlighted that intelligence is a necessary-but-not-sufficient condition for creative achievement. They suggested other potential moderators and mediators, such as personality, motivational and social factors, need to be taken into account when considering the relationship between creativity and intelligence, and that these factors may operate differently in the artistic, scientific and everyday domains. It is therefore reasonable to conclude that while there is an association between intelligence and creativity, the type and extent of the association depends on which aspect of creativity is being measured. There is also the necessity to concomitantly consider other relevant individual and environmental factors that play a role in the context.

Personality

Alongside the evidence for threshold theory in their study, Jauk et al. (2013) also found that personality variables were a factor in the relationship, specifically, two aspects of the Big Five model (Costa and McCrae 1992) – openness and conscientiousness. Openness to experience refers to imagination, intellectual curiosity and willingness to consider new ideas, whereas conscientiousness refers to self-discipline, control,

efficiency and organisation. While openness to experience predicted creative potential in the sample of participants above the IQ score threshold of 104 points, creative potential was associated with lower levels of conscientiousness at lower IQ levels. This largely fits with the broader consideration of the influence of personality on creativity. Using all dimensions of the Big Five personality model, Feist (1998) examined the creative personality in artists and scientists in a meta-analysis and found "the largest effect sizes… on openness, conscientiousness, self-acceptance, hostility and impulsivity" (p. 290). A second-order meta-analysis by da Costa et al. (2015) found a positive correlation between creativity and openness, extraversion, and to some extent emotional stability, and a slightly negative relationship with conscientiousness and agreeableness.

The relationship between creativity and openness to experience is among the most consistent findings in the literature (Feist 2010). Kandler et al. (2016) suggested that openness supports creativity in three ways; by allowing more information into the focus of attention, by allowing new and unusual information and experiences to feed into the creative combining processes, and by enabling development of knowledge and expertise. S. B. Kaufman et al. (2016) showed that the two aspects of openness, openness to experience, and intellect, are differentially associated with domains of creative enterprise. Here, 'openness to experience' refers to cognitive engagement with fantasy, perception, aesthetics and emotions, and 'intellect' refers to cognitive engagement with abstract and semantic information. They found that openness to experience predicted achievement in the arts domain, whereas intellect predicted achievement in the science domain. Kirsch et al. (2016), on the other hand, confirmed the importance of openness for creative potential in the general population, that is, for everyday creativity, but not for artists and scientists. Hong et al. (2014) with a group of adolescents examined the relationship between creative activities and accomplishments and two aspects of personality (openness and conscientiousness), two motivation constructs (creative self-efficacy and intrinsic motivation), and perceived intellectual ability. The domains under study were music, visual arts, creative writing, science and technology. Openness was related to creative activities in all the arts domains but not to science and technology. Creative self-efficacy was related in all the domains apart from technology, whereas intrinsic

motivation was related to creative activities in the visual arts and science and technology. Conscientiousness and perceived intellectual ability were not related to creative activities in any domain.

So the general picture thus far is that openness to experience is consistently linked to high creativity but the specifics regarding its impact on domain-general and domain-specific creativity are less clear. Indeed, Batey and Furnham (2006) commented that the study of the relationship between creativity and personality is complicated by the diverse range of measures that have been used to assess both. Their conclusion is that the fulfilment of creative potential depends not just on particular personality traits but also on other cognitive and situational variables, such as intelligence and the social environment, and on the domain in which it is expressed.

Executive Functions

Executive functions describe a set of goal-directed mental processes of which the primary operations include inhibitory control, working memory and cognitive flexibility (Diamond 2013). Inhibitory control refers to the ability to control thoughts, attention, behaviour and emotions, and to resist interference during goal-directed thought. Working memory is the ability to hold information in one's mind and to manipulate it in service of a goal. Cognitive flexibility reflects the ability to shift perspectives and adjust to new demands or rule sets. Executive functions begin developing early in life, are sensitive to environmental factors, and can be improved at any age (Diamond 2013).

These primary operations of executive functions have been examined in relation to their impact on creative potential and achievement. Nusbaum and Silvia (2011) conducted a study into the role of executive switching and intelligence on creativity and reported a mediating effect of executive switching on the relationship between intelligence and creativity. De Dreu et al. (2012) looked at creative insight problems, musical improvisation, and original ideation and found that working memory predicts insight and originality as well as fluency, beyond general intelligence, and suggested that it does so because it enables persistence, rather than cognitive flexibility.

Of all the executive functions, inhibitory control has been most widely studied with regard to creativity (Martindale 1999). Three different views have been suggested about the relationship between creativity and inhibition (Benedek et al. 2012): firstly, that divergent thinking is related to higher cognitive control and the ability to suppress an obvious response (↑ creativity, ↑ inhibition); secondly, that creative people are characterised by a lack of inhibition (↑ creativity, ↓ inhibition), and thirdly, that creative people may be able to flexibly focus or defocus their attention (↑ creativity, ↑ & ↓ inhibition). Their evidence supported the first view with a positive correlation between inhibition and self-report measures of creativity as well as ideational fluency and flexibility in divergent thinking (↑ creativity, ↑ inhibition). They suggested that the ability to suppress interference from salient ideas and responses that have already been produced facilitates the fluency of new ideas.

Carson et al. (2003), on the other hand, reported evidence for the second view (↑ creativity, ↓ inhibition). They investigated the relationship between creativity, intelligence, and latent inhibition (LI). Latent inhibition is the ability to ignore information that is irrelevant to the current goal, and has been associated with individuals with or susceptible to schizophrenia. They found that high creativity, in terms of high scores on the CAQ and high originality scores from a DT task, was associated with low LI. They suggested that high IQ may moderate the effects of low LI in such a way that rather than being expressed as a deficit in attention, it facilitates creativity. Radel et al. (2015) also found confirmation of this view as the experimental induction of disinhibition was accompanied by greater ideational fluency. Still others have highlighted that the relationship between inhibition and creativity is best conceived of in terms of an inverted-U function and needs to take into account discrepancies in contextual factors that are elicited across creativity tasks (Abraham 2014a, b). The literature therefore suggests that the relationship between inhibition and creativity is a complex one as it is influenced by the type of inhibition and the aspects of creativity being tested. Indeed, the dual pathway to creativity model suggests that there are multiple routes to creativity via cognitive flexibility and/or cognitive persistence as a function of dispositional and situational factors (Nijstad et al. 2010).

The complexity of charting the information processing mechanisms of creativity from a psychological perspective is also reflected in investigations of the same from a neuroscientific perspective (Abraham 2018). Global/brain network approaches to understanding of neuroscientific brain functions in individuals reveal that two expansive brain networks, the default mode network and the central executive network that are typically engaged in processes of internal imaginative mentation (e.g., daydreaming) and goal-directed cognition (e.g., working memory) respectively, are jointly recruited during creative ideation. Moreover, local/brain region approaches that examined specific creative cognitive operations such as creative imagery, insight and conceptual expansion among others, reveal that the engagement of the brain regions within these and other brain networks are differentially recruited as a function of the type of operation in question. There is, therefore, a demonstrable need for investigations of creativity in relation to individual or dispositional factors (personality, cognition and physiology) to move beyond simple linear examinations of circumscribed variables if the aim is to arrive at an accurate understanding of the creative mind.

Environmental or Situational Factors and Motivation

The need to consider the role of environmental factors on creativity has been highlighted by several theorists. Sternberg and Lubart's investment theory (1992), for instance, proposes that a creative idea is one that is out of sync with the prevailing ideas and is therefore likely to be undervalued. The reception of the creative idea is therefore influenced by the environmental factors and its creator must work to 'sell' the idea to others. In addition to intelligence, knowledge, thinking styles (specifically the desire to see things in new ways), personality, and motivation, environment was outlined as one of the six resources that are essential for creativity. The environment should be conducive to the generation of new ideas, supportive, and provide evaluation and correction. This section will consider motivation, the effect of factors in the environment on motivation, and other aspects of the environment that may affect creativity.

Intrinsic and Extrinsic Motivation

Teresa Amabile has argued that the considerable focus on individual personality differences in the study of creative behaviour has overlooked the influence of the environment on that creative behaviour (Amabile 1996). Intrinsic motivation, or the desire to perform an activity for its own sake, is an important aspect that explains individual differences in relation to creativity. Initial research suggested that intrinsic motivation is positively related to creativity whereas extrinsic motivation, which is motivated by reward, evaluation or competition, is negatively related to creativity. A study of intrinsic and extrinsic motivation in children (Hennessey and Amabile 1988) found that children who were promised a reward for a story-writing task produced stories that were rated as less creative than the children in the no-reward condition.

However, later research has revealed a more complicated relationship between extrinsic motivation and creativity. Although it might be anticipated that the expectation of evaluation would undermine creativity, research suggests that the effect may differ for the technical and creative aspects of the performance, in that technical aspects may be enhanced by the expectation of evaluation, whereas creative aspects may be negatively affected. The effects of evaluation may also depend on certain individual differences, initial interest in the activity and skill level, and whether the evaluation is expected to be informational or critical (Amabile 1996). There is also evidence of gender differences in relation to these effects. Baer (1998), for instance, studied middle school children and showed declines in creative performance among girls in a collage-making task when an extrinsic motivator was introduced in the form of an evaluation or a reward whereas the creativity of the boys was unaffected.

Amabile (1996) also makes a distinction between algorithmic and heuristic aspects of creative performance. Algorithmic tasks have a clear goal and require following a linear or incremental path to finding the solution. Heuristic tasks, in contrast, often require defining the goal of the task itself and the problem solving process is non-incremental, and are often associated with divergent thinking processes and insight. Extrinsic factors, such as reward and the expectation of evaluation, may enhance algorithmic aspects of performance, but have a negative or neu-

tral effect on heuristic aspects. Indeed, Amabile (1979) found that the creative aspects of a collage-making task were more affected by the expectation of evaluation than the technical aspects. Ariely et al. (2009) reported a similar effect of reward on performance. When faced with a mechanical task, performance was better under conditions of high compared to low financial incentives. However, the reverse pattern was true in the case of a cognitive task.

Similarly, the effect of an external reward on creative performance is a complex one. The effects of reward on creative performance may differ if the participant has a choice of whether to do the task, and how to do it. It may also depend on the salience of the reward, and whether the reward is perceived as more enabling or informational about competence, than controlling (Amabile 1996). It is therefore too simplistic to conclude that intrinsic motivation has a positive relationship with creativity and extrinsic motivation a negative one. The direction of the association varies as a function of the nature of the task and is influenced by individual differences as well as by conditions of reward and evaluation.

Family, School and Culture

Although the effects of reward on creative performance have been extensively studied, other factors that have been found to reduce creativity include a range of constraints such as the setting of deadlines, surveillance, competition and evaluation (Hennessey 2015). Hennessey has argued that although explanations of the effects of these constraints has tended to focus on the individual, the expression and effect of these differences depends on the local and larger cultural setting, in terms of the values and norms of the culture.

Dai et al. (2012) have suggested that traits that are important for creativity are nurtured in early childhood and affected by the social and educational environment in adolescence. They suggested that children growing up in a high socio-economic status (SES) environment may have the opportunity to participate in a variety of intellectual activities, and be encouraged to express personal characteristics relevant to creativity, through school and parental influences. Their study found higher diver-

gent thinking scores in 8th grade students from a school in a high SES neighbourhood in the USA, when compared to students at a school in a lower SES urban neighbourhood with higher proportion of students living in poverty. They suggested therefore that parental and school investment has the potential to enhance the development of creativity. Deng et al. (2016) evaluated how the effects of environmental variables may vary by culture across groups of American and Chinese college students. Creative achievement for both groups of students was predicted by having parents who valued independence, happiness and openness in raising their children alongside a high school environment which encouraged creativity. However, the effects of environmental factors were mediated by different individual difference variables for the American and Chinese students. Creative attitudes and divergent thinking mediated the effects of parental values on creative achievement for American students, and openness mediated the effect of high school environment for Chinese students. These studies suggest that the school, neighbourhood and cultural context can affect the development and expression of creativity and that it is possible to enhance them by investing in these aspects of environment.

Understanding the creative mind requires getting to terms with the complex interplay between cognitive, personality and physiological factors. Creative behaviour may also be influenced by the presence of motivating factors in the environment and enhanced by the family, school and other social contexts. The next section will consider why we should be concerned with the enhancement of creativity, by looking at the positive outcomes that are associated with it. In doing so, an overview of the outcomes of creativity will be provided from two standpoints: the outcomes that are associated with measured levels of creative potential or achievement, and the outcomes of engagement in creative activity or practice.

Outcomes of Creative Cognition

This section will focus on two key outcomes that are relevant to young people in education, firstly, the association between creativity and academic achievement, and secondly, wellbeing.

Academic Achievement

When considering positive outcomes associated with higher levels of creativity in children and young people, academic performance is of special interest. Gajda et al. (2017) have suggested that creativity and academic achievement are related because creativity and learning are related, and both involve change; specifically, that aspects of creative cognition such as fluency, flexibility, originality, and imagination contribute to learning. Their meta-analysis found a modest but significant positive association between creativity and academic achievement, and this relationship was stronger when creativity was measured by creativity tests rather than self-report measures, and when academic achievement was measured by standardised scholastic aptitude tests rather than grade point average (GPA). The authors postulated that the strength of the relationship may have been limited by the predominant use of divergent thinking measures, which tap into only select parts of the construct of creativity, and that the weaker relationship with GPA scores reflects the consideration that features of the classroom environment and teacher expectations may subtly discourage the expression of creativity. They also found a larger effect size for the relationship between creativity and academic achievement in middle-school students compared to both elementary students, and high school and university students. The authors suggested that these differences may be explained by the development of thinking skills in children of middle-school age, and the increasing specialisation of learning in higher education.

Berlin et al. (2016) explored some of the factors raised in Gajda et al.'s (2017) meta-analysis, specifically, exploring the associations between different types of creativity and actual grades by subject (awarded by the teachers in school) as well as performance on a national school test in the 9th grade (14–15 year olds, in a French suburban secondary school). Creative potential was measured using divergent-exploratory and convergent-integrative thinking tasks in two domains, verbal and graphical. There was a negative relationship between verbal divergent thinking and most subject grades, but a positive one between graphical divergent thinking and grades in science subjects. Moreover, both verbal and graphical convergent thinking had a moderate positive effect on the

probability of passing the final secondary exam. Taken together, these studies suggest that there is a clearer relationship between creativity and academic achievement in relation to standardised scholastic aptitude tests rather than GPA, as the latter is associated with conflicting findings, and that it is informative to use a broader measurement of creativity.

Wellbeing

Another vital outcome for the individual is wellbeing. Subjective wellbeing is a term used to describe an individual's evaluation of their life experience. Within the literature (Huppert and So 2013; Keyes 2006; Ryff 2014), a distinction is made between two forms of wellbeing, hedonic and eudaimonic. Hedonic wellbeing comprises a cognitive appraisal of wellbeing or satisfaction with life and positive and negative affect. Eudaimonic wellbeing, on the other hand, is concerned with fulfilment of one's potential and positive psychological functioning, and is also referred to as psychological wellbeing (Diener 1984; Huppert and So 2013; Lindert et al. 2015). Just as is the case with creativity, there are many different ways in which to measure wellbeing. N. Park et al. (2004) found only a weak positive association between creativity and life satisfaction, when measuring creativity as a personality character-strength whereas H. Park et al. (2015) found a stronger positive association between a creative personality profile and higher levels of life satisfaction. Tamannaeifar and Motaghedifard (2014) measured divergent creative thinking and three components of subjective wellbeing – emotional (reflecting positive feelings about life), social (reflecting satisfaction with social relationships), and psychological. They found that creativity predicted subjective wellbeing overall, and that there was a positive relationship between creativity and the subscales of social and psychological wellbeing, but a negative relationship with emotional wellbeing. Gostoli et al. (2017) examined the relationship between creative personality traits and psychological wellbeing and found that creativity was a significant predictor of the personal growth factor in psychological wellbeing. So the evidence suggests a positive relationship between creativity and wellbeing that is limited to particular aspects of wellbeing.

Forgeard and Elstein (2014) suggested that creativity contributes to wellbeing through enhancing psychological flexibility, helping to solve problems, and achieving personal potential. Rasulzada (2014) construed creative ability as a coping mechanism that allows people to tackle and adapt to constantly changing work environments, reducing stress and thereby contributing to wellbeing. Little is known about the mechanisms that underlie the relationship between creativity and wellbeing or indeed about the nature of this relationship in children and young people of school age.

Outcomes of Creative Practice

Many people choose to engage in creative activities purely for their own pleasure. However, there is a considerable body of literature that describes the benefits of creative pursuits beyond personal enjoyment. Moran (2010) identified two roles for creativity in society, improvement and expression. The improvement role is viewed from the perspective of groups within society which evaluate creative output for its contribution to progress in problem-solving and innovation. The expression role is viewed from the perspective of the individual, with a goal of finding meaning, personal development and individuality, and is related to the aforementioned mini-c and little-c levels of creativity. The second of these roles offers a potentially useful perspective from which to consider the outcomes of engaging in creative activity.

Participation in creative activities is typically associated with the arts and it often extends also to wellbeing. In the UK, the All Party Parliamentary Group on Arts Health and Wellbeing's (APPGAHW) report, "Creative Health: The Arts for Health and Wellbeing" (2017) has provided a comprehensive review of research into the benefits that the arts can bring to health and wellbeing. The report cites studies where the arts have been used to reduce acute pain in children, improve rehabilitation from brain injury such as stroke, help to regulate chronic conditions, reduce stress anxiety and depression in parents and children, and improve physical and mental function in people with Parkinson's, respiratory conditions, cystic fibrosis, heart disease and cancer. In older people, it can

increase function in dementia patients and quality of life in them and their carers. As well as improving outcomes for people with physical and mental health conditions, the report also argues for the importance of the arts for general wellbeing, particularly in deprived communities, and cites a number of programmes which have achieved positive results in improving wellbeing.

In the context of education, it is useful to consider particularly the benefits of arts programmes for children and young people. The APPGAHW (2017) report highlights studies which have been shown to improve learning and development, readiness for school and help older young people in the transition to adulthood. Programmes have demonstrated improved outcomes in engagement with learning, life skills, emotional wellbeing and healthy behaviours, and reduced emotional and behavioural problems in children and young people who were struggling to engage with learning.

Although creative practice has been widely used to support wellbeing, the potential mechanisms underlying the same are unclear. Evans (2007) suggested that creative activities improve wellbeing by building abilities which increase feelings of self-efficacy. Leckey (2011) suggested that participation in arts therapy increases wellbeing by building social networks and improving self-esteem. Bujacz et al. (2016) found that engagement in creative tasks improved positive mood, when compared to non-creative tasks, although only by a small degree. The effect was mediated by feelings of autonomy, and absorption in the task. Participants in the creative task had higher autonomy through more choice and opportunity for self-expression, and this led to a higher level of positive emotions. This suggests that creative activities support the need for autonomy and self-expression, which in turn increases positive emotions. More research into the mechanisms by which arts programmes achieve their results can help improve understanding and promote the development of more targeted programmes.

In addition to improving health and wellbeing, research suggests that the arts can lead to improvements in learning and development. Burnard and Dragovic (2015) found that group learning of creative instrumental music has the potential to enhance the wellbeing of schoolchildren through empowerment and engagement. A thorough review of the

empirical evidence for the impact of music on the development of children and young people suggests that engagement with music has a positive impact on language development, literacy, numeracy, measures of intelligence and academic achievement, and on personal and social development including confidence and self-esteem, social skills, teamwork, and self-discipline (Hallam 2010).

Mariale Hardiman has studied the effects of an arts-integrated curriculum on learning outcomes in schools. Rinne et al. (2011) describe two arguments that have been used to justify arts integration in education; firstly, that it enables the transfer of knowledge and skills to non-arts domains, citing evidence that arts students outperform others on measures of academic achievement, and that artistic practice improves certain cognitive abilities; and secondly, that participation in the arts leads to improvements in disposition that lead to success. The authors suggested however that arts integration may operate in a third way, by improving retention of content in long-term memory, through a range of effects such as elaborative rehearsal (which can increase motivation), semantic elaboration, generation, oral production, effort after meaning, emotional arousal, pictorial representation and enactment. Indeed, arts-integrated teaching showed significantly higher retention in a retest 8 weeks later when compared to a standard teaching approach, and the biggest gains were seen in students who showed the lowest level of reading proficiency before the start of the study (Hardiman et al. 2014). This suggests that an arts-integrated curriculum may particularly benefit students with poorer reading ability. In summary, there is empirical support for the idea that creative practice has physical and mental health benefits, can improve outcomes for children and young people in education, and enhance learning and development.

Conclusion

This chapter has discussed the complex interplay of factors such as intelligence, personality, executive functions, motivation and the environment, as well as the domain of expression (such as arts and sciences) and the way in which creativity is measured. The development and expression

of creativity in children and young people is affected by factors in the environment such as socioeconomic status, the classroom environment and culture, and the development of creative cognition itself may be influenced by the developmental trajectory of different cognitive processes which contribute to creative potential (see, e.g. Barbot et al. 2016; Torrance 1968). Several models, such as the aforementioned Sternberg and Lubart's investment theory, have recognised this complexity. For example, in Csikszentmihalyi's (1988) systems model, creativity occurs at the intersection of the individual, the domain, and the field, which provides the social validation of the creative contribution. Amabile's (1996) componential theory of creativity sees creativity as the confluence of domain-relevant knowledge and skills, and creativity-relevant skills and task motivation, which is affected by the social environment. Barbot et al. (2016) have proposed a complex optimal-fit theory of creativity with an interaction between personality, motivation, environment and domain.

In the UK, the National Advisory Council on Creative and Cultural Education (1999) argued that creative education has the ability to unlock everyone's creative potential, and that this would benefit not just the students' self-esteem and achievement, but also, more broadly, economic prosperity and social cohesion. The research discussed in this paper has shown how an education policy that recognises the value of and encourages creativity can help to improve outcomes such as academic achievement and wellbeing, and to deliver the benefits of creative practice for the individual and for society. It would therefore be useful to further explore the dynamics that underlie the interplay of the factors which predict creative potential and creative achievement, the positive outcomes associated with creativity and creative practice, and the mechanisms by which those outcomes are achieved.

References

Abraham, A. (2014a). Is There an Inverted-U Relationship Between Creativity and Psychopathology? *Frontiers in Psychology, 5*(750). https://doi.org/10.3389/fpsyg.2014.00750.

Abraham, A. (2014b). Neurocognitive Mechanisms Underlying Creative Thinking: Indications from Studies of Mental illness. In J. C. Kaufmann

(Ed.), *Creativity and Mental Illness* (pp. 79–101). Cambridge: Cambridge University Press.

Abraham, A. (2018). The Forest Versus the Trees: Creativity, Cognition and Imagination. In R. E. Jung & O. Vartanian (Eds.), *Cambridge Handbook of the Neuroscience of Creativity*. Cambridge: Cambridge University Press.

Abraham, A., & Windmann, S. (2007). Creative Cognition: The Diverse Operations and the Prospect of Applying a Cognitive Neuroscience Perspective. *Methods, 42*(1), 38–48. https://doi.org/10.1016/j.ymeth.2006.12.007.

All-Party Parliamentary Group on Arts Health and Wellbeing. (2017). *Creative Health: The Arts for Health and Wellbeing* (2nd ed.). London. Retrieved from http://www.artshealthandwellbeing.org.uk/appg-inquiry/

Amabile, T. M. (1979). Effects of External Evaluation on Artistic Creativity. *Journal of Personality and Social Psychology, 37*(2), 221–233. https://doi.org/10.1037/0022-3514.37.2.221.

Amabile, T. M. (1982). Social Psychology of Creativity: A Consensual Assessment Technique. *Journal of Personality and Social Psychology, 43*(5), 997–1013. https://doi.org/10.1037//0022-3514.43.5.997.

Amabile, T. M. (1996). *Creativity in Context*. Boulder: Westview.

Ariely, D., Gneezy, U., Loewenstein, G., & Mazar, N. (2009). Large Stakes and Big Mistakes. *The Review of Economic Studies, 76*(2), 451–469.

Baer, J. (1998). Gender Differences in the Effects of Extrinsic Motivation on Creativity. *Journal of Creative Behavior, 32*(1), 18–37.

Barbot, B., Lubart, T. I., & Besançon, M. (2016). "Peaks, Slumps, and Bumps": Individual Differences in the Development of Creativity in Children and Adolescents. *New Directions for Child & Adolescent Development, 2016*(151), 33–45. https://doi.org/10.1002/cad.20152.

Barron, F. (1961). Creative Vision and Expression in Writing and Painting. In D. W. MacKinnon (Ed.), *The Creative Person* (pp. 237–251). Berkeley: Institute of Personality Assessment Research, University of California.

Batey, M., & Furnham, A. (2006). Creativity, Intelligence, and Personality: A Critical Review of the Scattered Literature. *Genetic, Social, and General Psychology Monographs, 132*(4), 355–429.

Benedek, M., Franz, F., Heene, M., & Neubauer, A. C. (2012). Differential Effects of Cognitive Inhibition and Intelligence on Creativity. *Personality and Individual Differences, 53*, 480–485. https://doi.org/10.1016/j.paid.2012.04.014.

Berlin, N., Tavani, J.-L., & Besançon, M. (2016). An Exploratory Study of Creativity, Personality and Schooling Achievement. *Education Economics, 24*(5), 536–556.

Bujacz, A., Dunne, S., Fink, D., Gatej, A. R., Karlsson, E., Ruberti, V., & Wronska, M. K. (2016). Why Do We Enjoy Creative Tasks? Results from a Multigroup Randomized Controlled Study. *Thinking Skills and Creativity, 19*, 188–197. https://doi.org/10.1016/j.tsc.2015.11.002.

Burnard, P., & Dragovic, T. (2015). Collaborative Creativity in Instrumental Group Music Learning as a Site for Enhancing Pupil Wellbeing. *Cambridge Journal of Education, 45*(3), 371–392. https://doi.org/10.1080/0305764X.2014.934204.

Carson, S. H., Peterson, J. B., & Higgins, D. M. (2003). Decreased Latent Inhibition Is Associated with Increased Creative Achievement in High-Functioning Individuals. *Journal of Personality and Social Psychology, 85*(3), 499–506.

Carson, S. H., Peterson, J. B., & Higgins, D. M. (2005). Reliability, Validity, and Factor Structure of the Creative Achievement Questionnaire. *Creativity Research Journal, 17*(1), 37–50. https://doi.org/10.1207/s15326934crj1701_4.

Costa, J. P. T., & McCrae, R. R. (1992). Four Ways Five Factors Are Basic. *Personality and Individual Differences, 13*, 653–665. https://doi.org/10.1016/0191-8869(92)90236-I.

Cropley, A. (2006). In Praise of Convergent Thinking. *Creativity Research Journal, 18*(3), 391–404. https://doi.org/10.1207/s15326934crj1803_13.

Csikszentmihalyi, M. (1988). Society, Culture, Person: A Systems View of Creativity. In R. J. Sternberg (Ed.), *The Nature of Creativity* (pp. 325–339). Cambridge: Cambridge University Press.

da Costa, S., Páez, D., Sánchez, F., Garaigordobil, M., & Gondim, S. (2015). Personal Factors of Creativity: A Second Order Meta-Analysis. *Journal of Work and Organizational Psychology, 31*(3), 165–173. https://doi.org/10.1016/j.rpto.2015.06.002.

Dai, D. Y., Tan, X., Marathe, D., Valtcheva, A., Pruzek, R. M., & Shen, J. (2012). Influences of Social and Educational Environments on Creativity During Adolescence: Does SES Matter? *Creativity Research Journal, 24*(2–3), 191–199.

De Dreu, C. K. W., Nijstad, B. A., Baas, M., Wolsink, I., & Roskes, M. (2012). Working Memory Benefits Creative Insight, Musical Improvisation, and Original Ideation Through Maintained Task-Focused Attention. *Personality*

& Social Psychology Bulletin, 38(5), 656–669. https://doi.org/10.1177/0146167211435795.

Deng, L., Wang, L., & Zhao, Y. (2016). How Creativity Was Affected by Environmental Factors and Individual Characteristics: A Cross-Cultural Comparison Perspective. *Creativity Research Journal, 28*(3), 357–366. https://doi.org/10.1080/10400419.2016.1195615.

Diamond, A. (2013). Executive Functions. *Annual Review of Psychology, 64*(1), 135–168 134p. https://doi.org/10.1146/annurev-psych-113011-143750.

Diener, E. (1984). Subjective Well-Being. *Psychological Bulletin, 95*(3), 542–575. https://doi.org/10.1037/0033-2909.95.3.542.

Evans, J. E. (2007). The Science of Creativity and Health. In I. A. Serlin, J. Sonke-Henderson, R. Brandman, J. Graham-Pole, I. A. Serlin, J. Sonke-Henderson, R. Brandman, & J. Graham-Pole (Eds.), *Whole Person Healthcare Vol 3: The Arts and Health* (pp. 87–105). Westport: Praeger Publishers.

Feist, G. J. (1998). A Meta-Analysis of Personality in Scientific and Artistic Creativity. *Personality & Social Psychology Review, 2*(4), 290–309.

Feist, G. J. (2010). The Function of Personality in Creativity: The Nature and Nurture of the Creative Personality. In J. C. Kaufman & R. J. Sternberg (Eds.), *The Cambridge Handbook of Creativity* (pp. 113–130). Cambridge: Cambridge University Press.

Forgeard, M. J. C., & Elstein, J. G. (2014). Advancing the Clinical Science of Creativity. *Frontiers in Psychology, 5*, 613. https://doi.org/10.3389/fpsyg.2014.00613.

Gajda, A., Karwowski, M., & Beghetto, R. A. (2017). Creativity and Academic Achievement: A Meta-Analysis. *Journal of Educational Psychology, 109*(2), 269–299. https://doi.org/10.1037/edu0000133.

Gostoli, S., Cerini, V., Piolanti, A., & Rafanelli, C. (2017). Creativity, Bipolar Disorder Vulnerability and Psychological Well-Being: A Preliminary Study. *Creativity Research Journal, 29*(1), 63–70. https://doi.org/10.1080/10400419.2017.1263511.

Guilford, J. P. (1967). *The Nature of Human Intelligence*. London: McGraw-Hill.

Hallam, S. (2010). The Power of Music: Its Impact on the Intellectual, Social and Personal Development of Children and Young People. *International Journal of Music Education, 28*(3), 269–289.

Hardiman, M., Rinne, L., & Yarmolinskaya, J. (2014). The Effects of Arts Integration on Long-Term Retention of Academic Content. *Mind, Brain, and Education, 8*(3), 144–148.

Hennessey, B. A. (2015). Creative Behavior, Motivation, Environment and Culture: The Building of a Systems Model. *Journal of Creative Behavior, 49*(3), 194–210.

Hennessey, B. A., & Amabile, T. M. (1988). Story-Telling: A Method for Assessing Children's Creativity. *Journal of Creative Behavior, 22*, 212–227.

Hong, E., Peng, Y., & O'Neil, H. F., Jr. (2014). Activities and Accomplishments in Various Domains: Relationships with Creative Personality and Creative Motivation in Adolescence. *Roeper Review, 36*(2), 92–103.

Huppert, F. A., & So, T. T. C. (2013). Flourishing Across Europe: Application of a New Conceptual Framework for Defining Well-Being. *Social Indicators Research, 110*(3), 837–861.

Jauk, E., Benedek, M., Dunst, B., & Neubauer, A. C. (2013). The Relationship Between Intelligence and Creativity: New Support for the Threshold Hypothesis by Means of Empirical Breakpoint Detection. *Intelligence, 41*, 212–221. https://doi.org/10.1016/j.intell.2013.03.003.

Kandler, C., Riemann, R., Angleitner, A., Spinath, F. M., Borkenau, P., & Penke, L. (2016). The Nature of Creativity: The Roles of Genetic Factors, Personality Traits, Cognitive Abilities, and Environmental Sources. *Journal of Personality and Social Psychology, 111*(2), 230–249.

Karwowski, M., Kaufman, J. C., Lebuda, I., Szumski, G., & Firkowska-Mankiewicz, A. (2017). Intelligence in Childhood and Creative Achievements in Middle-Age: The Necessary Condition Approach. *Intelligence, 64*, 36–44. https://doi.org/10.1016/j.intell.2017.07.001.

Kaufman, J. C. (2009). *Creativity 101*. New York: Springer.

Kaufman, J. C., & Beghetto, R. A. (2009). Beyond Big and Little: The Four C Model of Creativity. *Review of General Psychology, 13*(1), 1–12. https://doi.org/10.1037/a0013688.

Kaufman, S. B., Quilty, L. C., Grazioplene, R. G., Hirsh, J. B., Gray, J. R., Peterson, J. B., & Deyoung, C. G. (2016). Openness to Experience and Intellect Differentially Predict Creative Achievement in the Arts and Sciences. *Journal of Personality, 84*(2), 248–258. https://doi.org/10.1111/jopy.12156.

Keyes, C. L. M. (2006). Subjective Well-Being in Mental Health and Human Development Research Worldwide: An Introduction. *Social Indicators Research, 77*(1), 1–10.

Kim, K. H. (2005). Can Only Intelligent People Be Creative? A Meta-Analysis. *Journal of Secondary Gifted Education, 16*(2–3), 57–66.

Kirsch, C., Lubart, T., & Houssemand, C. (2016). Comparing Creative Profiles: Architects, Social Scientists and the General Population. *Personality and*

Individual Differences, 94, 284–289. https://doi.org/10.1016/j.paid.2016.01.035.

Kozbelt, A., Beghetto, R. A., & Runco, M. A. (2010). Theories of Creativity. In J. C. Kaufman & R. J. Sternberg (Eds.), *The Cambridge Handbook of Creativity* (pp. 20–47). Cambridge: Cambridge University Press.

Leckey, J. (2011). The Therapeutic Effectiveness of Creative Activities on Mental Well-Being: A Systematic Review of the Literature. *Journal of Psychiatric and Mental Health Nursing, 18*(6), 501–509. https://doi.org/10.1111/j.1365-2850.2011.01693.x.

Lindert, J., Bain, P. A., Kubzansky, L. D., & Stein, C. (2015). Well-Being Measurement and the WHO Health Policy Health 2010: Systematic Review of Measurement Scales. *European Journal of Public Health, 25*(4), 731–740. https://doi.org/10.1093/eurpub/cku193.

Martindale, C. (1999). Biological Bases of Creativity. In R. J. Sternberg (Ed.), *Handbook of Creativity* (pp. 137–152). Cambridge: Cambridge University Press.

McGrew, K. S. (2009). CHC Theory and the Human Cognitive Abilities Project: Standing on the Shoulders of the Giants of Psychometric Intelligence Research. *Intelligence, 37*(1), 1–10.

Mednick, S. (1962). The Associative Basis of the Creative Process. *Psychological Review, 69*(3), 220–232. https://doi.org/10.1037/h0048850.

Moran, S. (2010). The Roles of Creativity in Society. In J. C. Kaufman & R. J. Sternberg (Eds.), *The Cambridge Handbook of Creativity* (pp. 74–90). Cambridge: Cambridge University Press.

National Advisory Committee on Creative and Cultural Education. (1999). *All Our Futures: Creativity, Culture and Education*. London: DfEE.

Nijstad, B. A., De Dreu, C. K. W., Rietzschel, E. F., & Baas, M. (2010). The Dual Pathway to Creativity Model: Creative Ideation as a Function of Flexibility and Persistence. *European Review of Social Psychology, 21*(1), 34–77. https://doi.org/10.1080/10463281003765323.

Nusbaum, E. C., & Silvia, P. J. (2011). Are Intelligence and Creativity Really So Different? Fluid Intelligence, Executive Processes, and Strategy Use in Divergent Thinking. *Intelligence, 39*(1), 36–45. https://doi.org/10.1016/j.intell.2010.11.002.

Park, N., Peterson, C., & Seligman, M. E. P. (2004). Strengths of Character and Well-Being. *Journal of Social and Clinical Psychology, 23*(5), 603–619. https://doi.org/10.1521/jscp.23.5.603.50748.

Park, H., Suh, B. S., Kim, W. S., Lee, H.-K., Park, S.-C., & Lee, K. (2015). Character Profiles and Life Satisfaction. *Comprehensive Psychiatry, 58*, 172–177. https://doi.org/10.1016/j.comppsych.2014.12.013.

Radel, R., Davranche, K., Fournier, M., & Dietrich, A. (2015). The Role of (Dis)Inhibition in Creativity: Decreased Inhibition Improves Idea Generation. *Cognition, 134*, 110–120. https://doi.org/10.1016/j.cognition.2014.09.001.

Rasulzada, F. (2014). Creativity at Work and Its Relation to Well-Being. In E. Shiu & E. Shiu (Eds.), *Creativity Research: An Inter-Disciplinary and Multi-Disciplinary Research Handbook* (pp. 171–190). New York: Routledge/Taylor & Francis Group.

Rhodes, M. (1961). An Analysis of Creativity. *Phi Delta Kappan, 42*, 305–310.

Rinne, L., Gregory, E., Yarmolinskaya, J., & Hardiman, M. (2011). Why Arts Integration Improves Long-Term Retention of Content. *Mind, Brain, and Education, 5*(2), 89–96.

Runco, M. A. (2004). Creativity. *Annual Review of Psychology, 55*, 657–687.

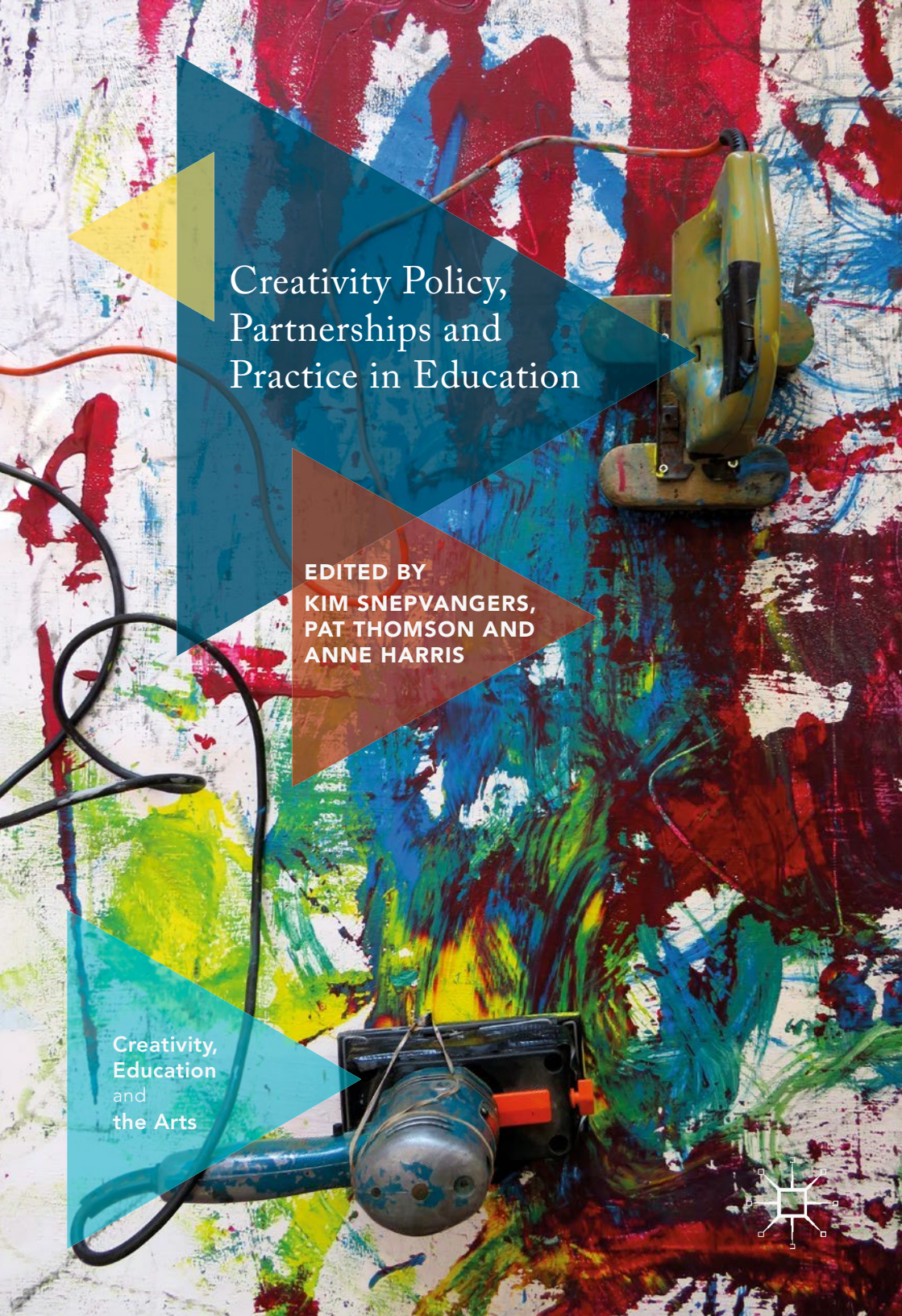
Runco, M. A., & Jaeger, G. J. (2012). The Standard Definition of Creativity. *Creativity Research Journal, 24*(1), 92–96. https://doi.org/10.1080/10400419.2012.650092.

Ryff, C. D. (2014). Psychological Well-Being Revisited: Advances in the Science and Practice of Eudaimonia. *Psychotherapy and Psychosomatics, 83*(1), 10–28.

Sternberg, R. J., & Lubart, T. I. (1992). Buy Low and Sell High: An Investment Approach to Creativity. *Current Directions in Psychological Science, 1*(1), 1–5. https://doi.org/10.1111/1467-8721.ep10767737.

Tamannaeifar, M. R., & Motaghedifard, M. (2014). Subjective Well-Being and Its Sub-Scales Among Students: The Study of Role of Creativity and Self-Efficacy. *Thinking Skills and Creativity, 12*, 37–42. https://doi.org/10.1016/j.tsc.2013.12.003.

Torrance, E. P. (1968). A Longitudinal Examination of the Fourth Grade Slump in Creativity. *Gifted Child Quarterly, 12*(4), 195–199.



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