

16. Creativity and personality

*Rosa Aurora Chávez-Eakle, M.D., Ph.D.
(Washington International Center for
Creativity and The Johns Hopkins University)*

Abstract

The aim of this paper is to review the multiple relations between creativity and personality, including:

- (a) an introduction to the main measurement instruments that have been used to evaluate personality in the field of creativity;*
- (b) specific personality characteristics and traits found in highly creative and successful scientists and artists studied at the National Institute of Psychiatry Ramon de la Fuente in Mexico City, and how these personality traits and behaviours were associated to differences in brain activation and molecular genetic variations in neurotransmitters systems;*
- (c) a review of the impact of personality in the realisation of the creative potential, and the impact of creativity in personality growth; and*
- (d) an overview of developmental events critical for both personality formation and creativity maturation, highlighting how these events should be considered when designing strategies, programs and policies in order to achieve quality education for all children.*

Introduction

Why is it important to develop creativity? Creative thinking and creative problem-solving not only enhance our ability to adapt to our environment and circumstances but also allow us to transform them. Creativity provides the foundation for art, science, philosophy, and technology. The creative process involves the integration of several mental functions and also involves all the components of the life experience. Personality involves the everyday ways of feeling, thinking and acting of an individual involving two overlapping components: temperament, the biological, inheritable traits; and character, the traits acquired by cultural and social interaction (Cloninger, 2002, De la Fuente, 1959, 1992). These components are closely related; recent genetic research has shown that genetic factors have an impact in the way we experience our environment, and the environment has an impact on how genes are expressed at a given time (Plomin, 2003). It is importance to notice that personality is structured after adolescence is completed; however, there are temperament traits that are evident early in life. The aim of this article is to review the multiple relations between creativity and personality including the personality traits present in highly creative individuals, the effects of personality on the realisation of the creative potential, the effects of creative potential in personality development, and the critical events during development that impact both personality development and the realisation of the creative potential.

Personality assessment instruments used in the field of creativity

This section summarises some of the most used personality assessment instruments in the field of creativity. These instruments have been created by psychologists, psychiatrists and by creativity researchers. Some of these instruments were developed to identify highly creative individuals, others were created to assess personality but have also been used in creativity research, and there are instruments that evaluate styles or preferences in creative thinking and behaviour, as shown in Table 1.

TABLE 1: PERSONALITY ASSESSMENT INSTRUMENTS USED IN THE FIELD OF CREATIVITY

Instrument	Theoretical background and purpose	Structure	Administration	Age range	Reference
<i>Adjective Checklist (ACL)</i>	Adjectives describe a person's attributes, 'actual' & 'ideal' self; identification of potentially creative persons	300 item list of adjectives measures 37 traits	Self-assessment or by observers, 10 to 15 minutes	Widely used in adults	Gough & Heilbrun, 1983
<i>Khatena-Torrance Creative Perception Inventory</i>	Measures artistic inclination, intelligence, individuality, sensitivity, initiative, and self-strength; imagination, appeal to authority, self-confidence, inquisitiveness, and awareness of others	Comprises two tests: Something About Myself (SAM) What Kind of Person Are You? (WKOPAY)	Self report 20–40 minutes	12 years and older	Khatena & Torrance, 1976
<i>Myers-Briggs Type Indicator</i>	Uses the Jungian dichotomies of introversion/extroversion, sensing/intuiting, thinking/feeling, perceiving/judging	16 different personality types	166 multiple choice items	14 years and older	Myers & McCaulley, 1985
<i>Kirton Adaptation Innovation Inventory (KAI)</i>	Evaluates differences in preferred styles of problem-solving and creativity: adaptors improve things; innovators do things differently	Adaptation/ Innovation continuum	32 items	Teens and adults	Kirton, 1994
<i>Buffalo Creative Process Inventory (BCPI)</i>	Identifies problem-solving styles based on the three stages of the creative problem-solving model (CPS)	Styles: the clarifier or collector; the ideator; the developer; and the executor	36 items	Teens and adults	Puccio, 1999
<i>Minnesota Multiphasic Personality Inventory (MMPI)</i>	Identifies personality structure and psychopathology based on the assumption that psychopathology is a homogenous condition that is additive	Clinical, validity, content and temperament scales	1 to 2 hours	Adults MMPI-A for use with teens	Nassif & Quevillon, 2008
<i>Rorschach inkblot test</i>	Psychological assessment of the personality function and psychotic/non-psychotic thinking	Designed to elicit perceptions	Ten ink blots	Adults	Created by Hermann Rorschach in 1921 Reference: Gregory, 2000

TABLE 1: PERSONALITY ASSESSMENT INSTRUMENTS USED IN THE FIELD OF CREATIVITY (CONTINUED)

Instrument	Theoretical background and purpose	Structure	Administration	Age range	Reference
<i>Temperament and Character Inventory (TCI)</i>	Based on Cloninger, Svrakic & Przybeck psychobiological model	Temperament: novelty seeking, harm avoidance, reward dependence and persistence Character: self-directedness, cooperativeness, self-transcendence	240 Items	Adults, there is a new junior TCI for children and teens	Cloninger, Svrakic & Przybeck, 1993 Svrakic, et al., 2002
<i>Overexcitability Questionnaire II (OEQII)</i>	Based on Dabrowski's theory of positive disintegration	Emotional, sensual, intellectual, imaginal and psychomotor overexcitabilities	50 items	Children, teens, adults	Falk, Yakmaci-Guzel, Chang & Chávez-Eakle, 2007

Temperament and character traits present in highly creative individuals

Scientific data result of research projects conducted at the National Institute of Psychiatry Ramon de la Fuente in Mexico City is presented in this section (Chavez-Eakle, Lara & Cruz, 2006). In these projects three groups of individuals were evaluated: Group I was composed of 30 individuals with high creative achievement, dedicated to full-time scientific and/or artistic creation, who had won national prizes in art or science, and who were members of the National System of Researchers or the National System of Creators in Mexico; Group II, the control group, was composed of 30 healthy individuals; Group III consisted of 30 psychiatric outpatients of the National Institute of Psychiatry 'Ramon de la Fuente.' All the procedures were performed in compliance with the relevant laws and institutional guidelines and were approved by the National Institute of Psychiatry 'Ramón de la Fuente' Ethics Committee.

The *Torrance Tests of Creative Thinking* (TTCT) figural and verbal (Torrance, 1990) were administered to all the participants. The TTCT are the most widely used instruments that assess creative potential. These tests have been used for identification of the creatively gifted and are reliable in multicultural settings. The TTCT provide a creativity index (CI) and scores for the following dimensions: flexibility, fluency, originality, elaboration, resistance to premature closure, and abstractness of titles. Additional points are added to the final score for emotional expressiveness, storytelling

articulatness, movement or action, expressiveness of titles, synthesis of incomplete figures, unusual visualisation, internal visualisation, extending or breaking boundaries, humour, richness of imagery, colourfulness of imagery, and fantasy (Torrance and Safter, 1999). The TTCT have shown high reliability and high predictive validity for future career image, and for academic, and style-living creative achievements in 22 and 30-year follow-up studies (Torrance, 1988, Torrance, 1990, Torrance, 1993). Further, the TTCT have been used in more than 2 000 research projects and translated into 30 languages (Cramond, 1999).

The *Temperament and Character Inventory* (TCI) was also administered to the participants in our projects. We found that the personality profile associated with a high creativity index included the following traits: high exploratory excitability, low harm avoidance, high persistence, high self-directedness, and high cooperativeness. This means that highly creative individuals display exploratory behaviour when encountering novelty, are optimistic, they are tolerant of uncertainty, they pursue goals with intensity against adversity; display responsibility, are directed to their goals, are able to utilise resources, are self-accepting and congruent, and they display empathy, tolerance, and integrated consciousness (Chavez-Eakle, Lara & Cruz, 2006). In addition, there were strong negative correlations between creativity and psychopathology; flexibility, abstraction, premature closure resistance, emotional expressiveness, imagination, humour, fantasy were the most affected by the presence of psychopathology (Chavez-Eakle, Lara & Cruz, 2006).

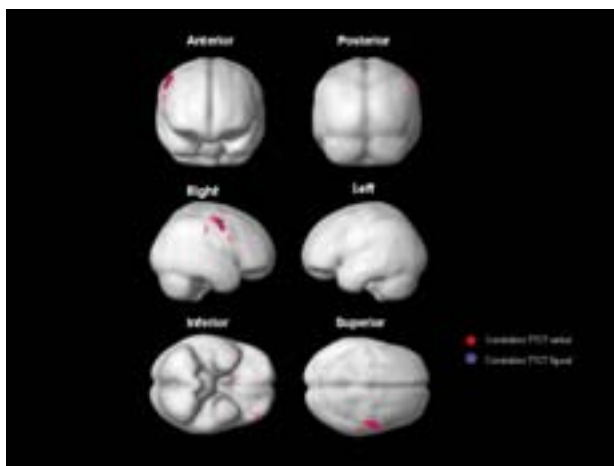


Figure 1: Correlation regions between cerebral blood flow and creativity index obtained with the Torrance Tests of creative thinking, figural and verbal (reproduced with permission of the editor).

Using the *Overexcitability Questionnaire II* (OEQII) we found that highly creative individuals present significantly higher scores on sensual, intellectual and imaginal overexcitabilities (Chavez, 2004). There are five types of overexcitabilities: emotional, sensual, intellectual, imaginal and psychomotor and these patterns of intense responses have been found to be indicators of creative potential and giftedness (Dabrowski, Kawczak & Piechowski, 1970). According to Dabrowski some people have a strong potential for development and the overexcitabilities are critical components of this potential which allows a person to become authentic and autonomous. The OEQII is a 50 item instrument that evaluates the five overexcitabilities, it has been used in cross-cultural studies involving China, Mexico, Spain, Turkey and the US (Falk, Yakmaci-Guzel, Chang & Chávez-Eakle, 2007).

As demonstrated in this research, personality has an impact in the realisation of the creative potential and creativity also has consequences in personality growth. Highly creative individuals are permanently open to personality reorganisations that make it possible to experience states that, in appearance, could seem to be pathological (Eissler, 1978), they are in constant self-actualisation (May, 1975) and creativity is intimately related to the sense and meaning of being alive (Winnicott, 1971).

Neurobiological findings

In related research, when studying fine molecular variations associated with high creative potential and high creative achievement we found a significant association between the serotonin transporter gene 5'SLC6A4 and the temperament traits harm avoidance and novelty seeking in highly creative individuals (Chavez et al., 2003) and an association between the dopamine receptor DRD4 gene and the creativity index (Chavez, 2004, Chavez-Eakle, 2007). To our knowledge, this was the first molecular genetics study evaluating creativity. In addition, we evaluated differences in brain cerebral blood flow (CBF) between highly creative individuals using Single Photon Emission Computerised Tomography (SPECT) and statistical parametric mapping. Subjects with a high creative performance showed greater CBF activity in the right precentral gyrus, right culmen, left and right middle frontal gyrus, right frontal rectal gyrus, left frontal orbital gyrus, and left inferior gyrus (BA 6, 10, 11, 47, 20), and cerebellum, confirming activation of both brain hemispheres at the same time. These structures have been involved in cognition, emotion, working memory, novelty response, imagery, multimodal processing and sexual arousal (Chávez-Eakle, Graff-Guerrero, García-Reyna, Vaugier, & Cruz-Fuentes, 2007).

Developmental events critical for both personality formation and creativity maturation

Creativity can be present at any age but it is related to first life experiences which are critical for the formation of a healthy personality and for the fulfilment of creative potential. Caregivers' attunement and adaptations to the child's needs produce in the child the illusion of an exterior reality that corresponds with their own capacity to create, allowing children to experience their feelings as their own (Winnicott, 1971). If the adult is attuned and involved, children will be able to experience their emotions within manageable boundaries, to make meaning and regulate them; children will learn to feel comfortable about their own impulses therefore they will become able to build and use their internal resources and to develop their intuition (Bion, 1967; Rayner, Joyce, Rose, Twyman & Clulow, 2005). The adult provides the context to explore the inner impulses as coming from the self, therefore, children become able to relate to the self, the caregiver and the world in a benign, creative way. However, if the experience is negative all the frustrations that the child cannot handle become impingements, individuality and creativity remain hidden in a false self-organisation and impulses are experienced 'as a clap of thunder from elsewhere' not as part of the self (Winnicott, 1960). Caregivers act as a mirror where the child can find a coherent, creative sense of the self; what is seen by the child in this mirror is what the child becomes able to see in the self (Fonagy, 1999; Winnicott, 1960, Rayner, Joyce, Rose, Twyman & Clulow, 2005). The experience of shame at early stages of development can lead to future blockages in the creative process.

Play, fantasy, the experiences of control and ownership over the own body, role imitation of adults, early literacies broadly defined (Eakle, 2007), and socialisation are other developmental experiences critical for both personality formation and creativity development. Play is especially important because it involves the basic components of the creative process such as combining and generating new possibilities, experimentation, exploration of the limits of reality and fantasy. A good session of play leaves a child calmer and satisfied, whereas disrupted play can leave a child in deep distress. An over strict climate where playing is devaluated can prevent play from happening. A terrified child is unable to play. If play is disrupted the child feels full of frustrations that are torturing the self; therefore such a child can begin to torture others, an develops ruthless play that involves sadistic, unempathic, cold, and even cruel behaviours (Rayner, 2005). These ruthless games can continue into adult life, for instance, in malevolent creativity, empire building, or criminal behaviour (Rayner, Joyce, Rose, Twyman & Clulow, 2005). That is why it is fundamental to re-evaluate education policies regarding play.

Conclusions

Creativity and personality have multiple and multidimensional relations. All the tests reviewed in this article have been used for research in diverse cultural settings; the tests assessing temperament traits (e.g. the JrTCI or the OEQ-II) are useful with younger individuals because these traits are present very early in life. The TTCT are creativity assessment instruments that have been useful to identify creative potential in children and adults from different cultural backgrounds and from under-represented populations due to the neutrality of the test stimuli that can elicit creative responses in multiple and diverse cultures. Using these instruments, there have been documented personality traits that are present in highly creative individuals; deeper knowledge of these traits could be helpful in understanding the behaviour of highly creative individuals in educational settings. It is important to keep in mind that personality is in continuous development during childhood and adolescence, therefore substantial changes in education strategies and policies could have an impact in the development and consolidation of the children and adolescents personality traits. Furthermore, personality can have an influence on the realisation of the creative potential and the creative potential has lifespan implications for personality development by offering possibilities for personality reorganisation. As it has been illustrated, there are events during development, in particular during childhood that impact both personality formation and the development of the creative potential. The quality of the children's experience with caregivers, their attunement to the child's need, their reactions to the child's 'unusual' behaviours and the availability of free play and play incorporated into learning activities are relevant events that should be carefully considered when developing education programs and policies. Perhaps we should begin to consider personality formation and creativity development as priorities when designing education strategies, programs and policies in order to achieve quality education and wellbeing for all children.

References

- Bion, W. (1967). *Second Thoughts*. London: Heinemann.
- Chávez R. A., Cruz, C., Eakle, A. J., Gómez A., Lara M. C., Lartigue T. (2003). Association Analysis of the Serotonin Transporter Gene Promoter Regulatory Polymorphism, Creativity Index, and Temperament and Character Traits. Cancun, Mexico: Proceedings of the Annual Meeting of the Human Genome Conference.
- Chavez-Eakle, R. A. (2004). On the neurobiology of the creative process, *Bulletin of Psychology and the Arts*, 5, 29-35.
- Chávez, R. A. (2004). Evaluación Integral de la Personalidad Creativa: Fenomenología, Clínica y Genética (Integral Evaluation of the Creative Personality: Phenomenology,

- Clinic and Genetics). Unpublished Dissertation. Facultad de Medicina, National Autonomous University of Mexico UNAM, Mexico City.
- Chavez-Eakle, R. A. (2004). On the neurobiology of the creative process, *Bulletin of Psychology and the Arts*, 5, 29-35.
- Chávez-Eakle, R. A., Lara, M. C., & Cruz, C. (2006). Personality: A possible bridge between creativity and psychopathology? *Creativity Research Journal*, 18(1), 27-38.
- Chávez-Eakle, R. A., Graff-Guerrero, A., García-Reyna, J. C., Vaugier, V., and Cruz-Fuentes, C. (2004). Neurobiology of creativity: Preliminary results of a brain activation study. *Salud Mental*, 27 (3).
- Chávez-Eakle, R. A., Graff-Guerrero, A., García-Reyna, J. C., Vaugier, V., and Cruz-Fuentes, C. (2007). Cerebral blood flow associated with creative performance: A comparative study, *Neuroimage*, 38(3), 519-528.
- Chavez-Eakle, R. A. (2007). On the neurobiology of creativity: DNA and brain blood flow. In Martindale, C., Locher, P. V. and Petrov, V. (Eds.). *Evolutionary and neurocognitive approaches to the arts*. Amityville, NY: Baywood.
- Cloninger, C. R., Svrakic, D. M., and Przybeck, T. R. (1993). A psychobiological model of temperament and character, *Archives of General Psychiatry*, 50, 975-990.
- Cloninger, C. R. (2002). Relevance of normal personality for psychiatrists. In B. J. Ebstein, and R. Belmaker (Eds.), *Molecular Genetics and the Human Personality* (pp.33-42). Washington D.C: American Psychiatric Publishing.
- Cramond, B. (1999). The Torrance Tests of Creative Thinking: Going beyond the scores. In: Fishkin, A. et al. (Eds.), *Investigating creativity in youth*. NJ: Hampton Press.
- Dabrowski, K., Kawczak, A. and Piechowski, M. (1970). *Mental Growth through positive desintegration*. London: Gryf Publications.
- De la Fuente, R. (1992) *Psicología Médica*. México City: Fondo de Cultura Económica. (Original work published in 1959).
- Domino, G., & Giuliani, I. (1997) Creativity in three samples of photographers: a validation of the adjective check list creativity scale, *Creativity Research Journal*, 10, 193-200.
- Eakle, A. J. (2007). Museum literacy, art, and space study. In Lapp, D., Flood, J. and Heath, S. B. (Eds), *Handbook of research on teaching literacy through the communicative and visual arts (2nd Edition)*. Mahwah NJ: Lawrence Erlbaum
- Eissler, K.R. (1978). Creativity and Adolescence—The Effect of Trauma in Freud's Adolescence, *The Psychoanalytic Study of the Child*, 33, 461-517.
- Falk, R. F., Yakmaci-Guzel, B., Chang, A. and Chávez-Eakle, R. A. (2007). Measuring Overexcitability: Replication across Five Countries. In S. Mendaglio (Ed.). *Dabrowski's Theory of Positive Disintegration*. Scottsdale, AZ: Great Potential Press.
- Fonagy, P. (1999). Final remarks. In: Perelberg, R. J. (ed) *Psychoanalytic Understanding of Violence and Suicide*. London: New Library of Psychoanalysis.

- Gough, H. G., & Heilbrun, A. B. (1983). *The Adjective Check List Manual* (1983 ed.). Palo Alto, CA: Consulting Psychologists Press.
- Gregory, R. (2000). Reversing Rorschach, *Nature*, 404, 19.
- Helson, R. (1996). In search of the creative personality, *Creativity Research Journal*, 9, 295-306.
- Helson, R., Jones, C., and Kwan, V. (2002). Personality change over 40 years of adulthood: hierarchical linear modeling analyses of two longitudinal samples, *Journal of Personality and Social Psychology*, 38, 752-766.
- Helson, R., and Pals, J. (2000). Creative potential, creative achievement, and personal growth, *Journal of Personality*, 68, 1-27.
- Joyce, A. (2005). The first six months: the baby getting started. In Rayner, E., Joyce, A., Rose, J., Twyman, M., & Clulow, C. *Human Development: an Introduction to the Psychodynamics of Growth, Maturity and Ageing*. Sussex, England: Routledge.
- Khatena, J. and Torrance, E. P. (1976). *Khatena-Torrance Creative Perception Inventory (KTCP)*. Chicago, IL: Stoelting Company.
- Kirton, M. (1994). *Adaptors and innovators*. London: Routledge.
- Martindale, C., Anderson, K., Moore, K. and West, A. N. (1996). Creativity, oversensitivity, and rate of habituation, *Personality and individual differences*. 20, 423-427
- MacKinnon, D. W. (1962). The nature and nurture of creative talent, *American Psychologist*, 17, 484-95.
- Myers, I. B., and McCaulley, M. H. (1985). *A guide to the development and use of the Myers-Briggs Type Indicator*. Palo Alto, CA: Consulting Psychologists Press.
- Nassif, C. and Quevillon, R. (2008). The development of a preliminary creativity scale for the MMPI-2: The C scale, *Creativity Research Journal*. 20(1), 13–20.
- Plomin, R. (2003). General cognitive ability. In R. Plomin, J. C. Defries, I. W. Craig & P. McGuffin (Eds.), *Behavioral genetics in the postgenomic era* (pp. 183-202). Washington, DC: American Psychological Association Press.
- Puccio, G. J. (1999). Creative problem solving preferences: Their identification and implications, *Creativity and Innovation Management*, 8 (3), 171-178.
- Rayner, E. (2005). Three to five years old. In Rayner, E., Joyce, A., Rose, J., Twyman, M., and Clulow, C. *Human Development: an Introduction to the Psychodynamics of Growth, Maturity and Ageing*. Sussex, England: Routledge.
- Rayner, E., Joyce, A., Rose, J., Twyman, M., and Clulow, C. (2005). *Human Development: an Introduction to the Psychodynamics of Growth, Maturity and Ageing*. Sussex, England: Routledge.
- Svrakic, D. M., Draganic, S., Hill, K., Bayon, C., Przybeck, T. R., and Cloninger, C. R. (2002). Temperament, character, and personality disorders: Etiologic, diagnostic, and treatment issues, *Acta Psychiatrica Scandinavica*, 106, 189-195.

- Torrance, E. P., (1988). The nature of creativity as manifest in its testing. In: Sternberg, R. J. (Ed.), *The nature of creativity*. (pp. 43-75). New York, NY: Cambridge University Press
- Torrance, E. P. (1990). *Torrance tests of creative thinking*. Bensenville, IL: Scholastic Testing Service.
- Torrance, E. P. (1993). The beyonders in a thirty year longitudinal study of creative achievement, *Roepers Review*. 15, 131-135.
- Torrance, E. P. (1999). *Making the creative leap beyond*. Buffalo, NY: Creative Education Foundation Press.
- Winnicott, D. W. (1960). *Ego distortions in terms of the true and false self. In the Maturation Processes and the Facilitating Environment*. London: Hogarth Press and the Institute of Psychoanalysis.
- Winnicott, D. W. (1971). *Playing and reality*. London: Tavistock Publications.
- Zeki, S. (2001). Artistic creativity and the brain, *Science*, 293, 51-52.