

INTERPLAY AMONG NOVELTY-MEANING TYPES OF CREATIVITY, PERSONALITY AND COGNITIVE STYLES

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ABSTARCT

Creativity is a modern-day term that refers to novel and useful product. It had been into research since human spiritual sense was into practice only. Through this small paper of research it has been tried to come up with personality domains (including intelligence as a domain of personality) and cognitive styles associated with creativity. The inconclusive results of previous research lead to the formulation of the idea that there might be more than one type of creativity i.e. novelty and meaning types of creativity (Stark, 1965) and relationship among personality domains – Neuroticism, Extraversion, Openness to experience, Agreeableness, Conscientiousness, and Intelligence, Novelty and Meaning types of Creativity and Field-dependent/independent cognitive styles have been explored. For this purpose (N=200), a sample size of two hundred students (male and female, GNDU Amritsar) was selected and tests used are: Torrance Test of Creative Thinking (TTCT) (Torrance, 1961), NEO-Five Factor Inventory (NEO-FFI) (Costa and McCrae, 1992), Embedded Figures Test, the short form of Witkin's embedded figures test (Jackson, 1956) and Rorschach Ink-Blot Test (Rorschach, 1921). Results indicate that creativity is related to personality dimensions, field-independent cognitive style, and intelligence. Meaning type of creativity is related to openness to experience and field independence, and novelty type of creativity is positively and significantly related to neuroticism, intelligence and field independence.

INTRODUCTION

Creativity is the act of turning new and imaginative ideas into reality. It is characterised by the ability to perceive the world in new ways, to find hidden patterns, to make connections between seemingly unrelated phenomena, and to generate solutions. Creativity involves two processes: thinking and producing (Naiman, 17 February, 2014). Creativity refers to a product or behaviour that satisfies criteria of originality and appropriateness (Barron, 1988). The definition clarifies a difference between creative potential (psychological attributes that enable originality) and

expressed creativity (or creative behaviour). Creativity means thinking about new and original ideas, ideas which are meaningful, surprising, has beauty, utility and finally that idea should leave a quest – a quest for knowing about it more and more, and going beyond what is being expressed by that idea, and finally putting that idea into action.

Creative individuals can be described as motivated, persevering, intellectually inquisitive, having a need for self-actualisation, independent in thought and deed, confident, self-aware, and open to external and internal stimulation. Further, they are typically attracted to and stimulated by uncertainties and complexities, and are usually sensitive to and have a great capacity for emotional involvement (Ryhammar & Brolin, 1999). These lines explain the personality mark-up of creative individuals. The previous research focused on different personality dimensions and cognitive aspects of creativity, considering creativity as unitary and one-faceted phenomenon and consequently found inconsistent and inconclusive results regarding the correlation between personality dimensions and creativity, and between creativity and cognitive factors. These findings resulted into the reassessment of the concept of creativity that stimulated the development of multifaceted concept of creativity.

The inconclusive research and multifaceted nature, delineated by different researchers of creativity led to the development of the thought that there are possibilities of correlations between types of creativity, dimensions of personality, and cognitive styles i.e., novelty and meaning types of creativity, intelligence, neuroticism, extraversion, openness to experience, agreeableness and conscientiousness (personality dimensions), and field-dependent-independent cognitive styles. As research indicates that intelligence is a less predictor of creativity (as per threshold theory) than personality, intelligence has been taken into consideration as the part of personality in the present research.

The previous research shows that creativity had been studied a unitary and uni-dimensional phenomenon (e.g., Clapham, 1998; Heausler & Thompson, 1988; Hocevar, 1979; Runco & Mraz, 1992) but later research reveals that it is a multidimensional phenomenon (Poreh & Whiteman, 1991; Baer, 1994; Sternberg & Lubart, 1995; and Amabile, 1996). Multidimensional approach has been reflected in the early works of Guilford (1977), Mackinnon (1978) and Torrance (1979), who agreed that the phenomenon of creativity was anything but (except) one-dimensional and multifaceted nature of creativity has been expressed in a number of factors such as personality traits, cognitive abilities, cognitive styles, and motivation (Amabile

1996; Eysenck 1993; Mumford and Gustafson 1988). Three possible models for the creativity have been suggested: the existence of different kinds of creativity each associated with specific types of psychopathology, creativity operating as a continuum, and creativity as a single entity.

Dimensions of Creativity

Various researchers have dichotomized creativity differently:

- C.P. Snow (1962) has given theory of "two cultures" - artistic and scientific.
- Barron (1957) & Suler (1980) have linked artistic creativity to primary process thinking and scientific creativity to secondary process thinking.
- Simonton (1974) 'Discursive communication factor' - a verbal factor and 'presentational form factor' - a nonverbal factor.
- Rossman and Horn (1972) rule oriented vs intuitive orientation associated with distinction between scientific and artistic creativity.
- Torrance and Hall (1980) - Rational and Supra rational creativities.
- Samples (1987) proposed cognitive creativity and affective creativity. Cognitive creativity includes fluency, flexibility, originality and elaboration whereas affective creativity involves curiosity, risk-taking, imitation and tolerance for complexity.
- Heinzen (1994) - proactive creativity and reactive creativity.
- Stark (1965, a, b, c, 1966) has delineated two relatively independent context of creativity, namely novelty context as in originality (Mackworth, 1965) or scientific invention (Barron, 1957), meaning context, as in dramatic dreaming (Dement, 1965).
- Carson et al. (2005) found two types of creativity: (i) the Arts (Drama, writing, human, music, visual arts, and dance), and (ii) Science (invention, science and culinary).

Various researchers have dichotomized creativity differently and the crux of which is **Artistic creativity (Meaning type)** and **Scientific creativity (Novelty type)** (Snow, 1962; Barron, 1957 & Suler, 1980; Simonton, 1974; Rossman and Horn, 1972; Torrance and Hall, 1980; Samples, 1987; Heinzen, 1994; Stark, 1965, a, b, c, 1966; Mackworth, 1965; Barron, 1957; Dement, 1965 and Carson et al. 2005). Prof. Stark (1965) delineated two types of creativity:

A. The meaning context of creativity is related to

- 1) Phenomenology of life and experience
- 2) Thinking about unanswerable philosophical and social questions, and

3) Imaginations (involving primary process thinking) related to different segments of life.

B. *The novelty context of creativity* is related to the practice or learning, correctness, custom, habit, orthodoxy, prescription, propriety, regularity, respectability, tradition, usage, etc., and is characterized by one or more of the following:

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| 1) Recusancy (Recusant - one who refuses to accept or obey established authority) and/or Contrarianism. | 3) Adventurousness, Resourcefulness and Self-reliant. |
| 2) Breakthrough, Excitement, Originality, Surprise and Newness. | 4) Revolutionary, Shocking and Irritating and |
| | 5) Discoverer, liberator, pioneer, reformer, shaker, etc. (Stark, 1965). |

CREATIVITY AND PERSONALITY

The latest trend shows that the Big Five has become a prominent model for describing broad personality traits (Goldberg, 1993; & John, & Srivastava, 1999). The Big Five trait of openness to experience has been theoretically and empirically defined as a general disposition for creativity (McCrae, 1987). On average, artists and scientists are more open to experience than non-artists and non-scientists (Feist, 1998), and openness is related to criteria such as the number of creative activities reported by college students (King, Walker, & Broyles, 1996), playing musical instruments (Paunonen, 2003), and self-reported involvement in visual, literary, performing, and domestic arts (Griffin & McDermott, 1998). Dispositional or situational variables may influence creativity through either their effects on flexibility or persistence. It has been proposed that approach-related traits (e.g., openness to experience, extraversion, positive affectivity, and power-motivation) may lead to greater creativity because they link to enhanced cognitive flexibility, whereas avoidance-related traits (e.g., negative affectivity and neuroticism) under the right circumstances may lead to greater creativity because they link to enhanced cognitive persistence (Baas et al., 2013). A relationship has been established between creativity and high openness, low agreeableness, low conscientiousness and high neuroticism (Batey, 2007) and disagreeableness (Eysenck, 1995; and Gelade, 2002). Feist (2010) and King et al., (1996) found a positive correlation between creativity and openness to experience where as openness also influences crystallized intelligence via the path of fluid intelligence found by Ziegler et al., (2012). Cognitive ability had a small relationship to either index of creativity:

Divergent Thinking (DT) and Creative Personality (CP) where as strong relationships were found between personality traits, including trait emotional intelligence (Sánchez-Ruiz, 2011). After long research of 60 years the relationship between creativity and intelligence is not clear but it can be said that constructs of intelligence and creativity are related (Kaufman and Plucker, 2011). According to threshold hypothesis about the relationship between creativity and intelligence there is a significant positive relationship below the threshold, no significant correlation above it, and a significant difference between both (Guilford, 1967). Jauk, Benedek & Neubauer (2013) also found relationship between intelligence and creativity.

CREATIVITY AND FIELD-DEPENDENT-INDEPENDENT COGNITIVE STYLES

The concept of Field dependence-independence has been developed by Witkin et al. (1962). The concept has its roots in the theory of psychological differentiation. Differentiation is a phenomenon that employs segregation of self from the immediate world (environment), particularly other people, formation of articulated sub-system within the organism, capable of carrying-out specific functions in specialized fashion. Field-independence "the extent to which a person perceives part of a field as discrete from the surrounding field as a whole, rather than embedded in the field; or... the extent to which the person perceives analytically" (Witkin et al., 1977). Cognitive styles are the "...psychological dimensions that represent the consistencies in an individual's manner of acquiring and processing information" (Ausburn and Ausburn, 1978). Creative thinking requires, conscious restructuring situation or problem, such restructuring allows new insight to emerge (Wertheimer, 1945) and requires perceptual openness "which allows an object to be approached repeatedly from varied perspectives" (Schachtel, 1959). Even some researchers think of creativity in terms of cognitive styles, that is, as a way of approaching the environment cognitively and of resolving and dealing with the problems by it (Finke et al. 1992 and Boden, 1996).

A link between novelty-meaning contexts of creativity and field-dependence/independence can be established considering the perceptual skills, social sensitivity, social competencies, cognition involved, disembedding, and restructuring abilities. The present piece of research focuses on the personality dimensions (neuroticism, extraversion, openness, agreeableness, conscientiousness, and intelligence), field-dependent/independent cognitive style, and novelty and meaning types of creativity, a dichotomy of creativity proposed by Stark (1965).

OBJECTIVE

1. To study the interplay between personality, field dependent-independent cognitive styles, and novelty and meaning types of creativity.

HYPOTHESIS

The following hypothesis was formulated:

1. There will be significant inter-correlations among personality dimensions, field-dependent/independent cognitive styles, and meaning and novelty types of creativity.

METHODOLOGY

Sample

A sample of 200 subjects with age group between 20 to 25 years had been selected for different psychological tests. Convenient (incidental) sampling technique has been employed for the purpose.

Psychological Tests

- Torrance Test of Creative Thinking (Torrance, 1961) – This test has been used to assess novelty type of creativity.
- NEO-Five Factor Inventory (Costa and McCrae, 1992) – This test has been employed to assess personality.
- Embedded Figures Test (the short form of Witkin's embedded figures test, Jackson, 1956) – has been used to assess Field-dependent/independent cognitive styles.
- Rorschach Ink-Blot Test (Rorschach, 1921) - has been employed to assess meaning type of creativity (% of movement scores) and intelligence (% of whole responses).

Statistical Techniques

The data obtained was divided in to high-low groups for novelty type of creativity and meaning type of creativity, using quartile method. First and third quartiles were selected for the respective purposes. Finally the data was subjected to necessary and appropriate statistical techniques (mean, standard deviation and factor analysis).

RESULT AND DISCUSSION

Factor Analysis

Principal component method of factor analysis have been used to find the latent factors from the inter-correlation matrix and following Kaiser (1958) the extraction of factors was

stopped when the value of the latent root (eigen value) came out to be 1.00. The factors, thus, obtained were rotated using the varimax rotation method. A factor loading of 0.30 or above has been considered to be significant. The rotated factors account for 54.8% of variance.

Factor-I accounts for 28.2% of variance, has positive loadings on extraversion, agreeableness and conscientiousness, and negative loadings on neuroticism which explains that an increase in neuroticism leads to decrease in extraversion, agreeableness and conscientiousness and vice-versa (Table 1).

Factor-II accounts for 26.9% of variance (Table 1) and states that components of novelty type of creativity: elaboration and originality, and meaning type of creativity have positive relationship with each other and also with field independent cognitive style indicating both types of creativities influence each other and are influenced by field independent cognitive style which includes internal referents, quality of finding discrete and fine elements of sheer importance for the idea or problem at hand. Individuals with such qualities tend to be high on novelty type of creativity and also high on meaning type of creativity and vice-versa. McManus and Furnham (2006) found similar results.

Table 1: Showing Factor Loadings of Factor I & II

Factor I		Factor II	
Variable	Loading	Variable	Loading
Neuroticism	-0.694	Elaboration	0.842
Extraversion	0.684	Originality	0.687
Conscientiousness	0.659	Meaning type of creativity	0.467
Agreeableness	0.600	Field dependent-independent cognitive style	-0.492

Factor - III has negative loadings on all the variables of novelty type of creativity except elaboration that is on originality, fluency, flexibility, intelligence, and field-dependence-independence (Table 2). The factor explains 24.7% of the variability. Low creativity means lower extreme of the creativity continuum i. e., the decrease in one of these variables will lead to decrease in other variables and consequently will lead to low creativity because flexibility,

fluency and originality are the very important components of novelty type of creativity, and Torrance (1961) found similar results.

Factor - IV has positive loadings on intelligence, openness and meaning type of creativity (Table 2) and has negative loading on field-dependent-independent cognitive style. Factor loadings indicate that there is positive correlation amongst intelligence, openness to experience, Furnham et al., (2009) found similar results, meaning type of creativity and field-independent cognitive style. This factor states that meaning type of creativity is influenced by openness to experience which includes active imagination, aesthetic sensitivity, and attentiveness to inner feelings, preference for variety, intellectual curiosity, originality and independence of judgement. It also explains that meaning type of creativity has been influenced by intelligence and field-independent cognitive style; field-independence is associated with focusing on the task at the hand, finding fine and discrete factors of the task and working on the problem or the idea rather than relying on the external sources of information. Rushton (1990) found similar results, that IQ and creativity are related (at least up to an IQ of 120). Factor II and factor IV proves the hypothesis that there are inter-correlations among personality dimensions, field-dependent/independent cognitive styles, and meaning and novelty types of creativity.

Table 2: Showing Factor Loadings of Factor III & IV

Factor III		Factor IV	
Variable	Loading	Variable	Loading
Flexibility	-0.831	Intelligence	0.695
Fluency	-0.766	Openness	0.608
Originality	-0.436	Meaning type of creativity	0.440
		Field dependent-independent cognitive styles	-0.389

CONCLUSION

It can be concluded that creativity is related to personality dimensions, field-independent cognitive style, and intelligence. Meaning type of creativity is related to openness to experience. Comparatively high meaning type creative individuals are more open to experience than low meaning type creative people and high novelty type creative people are high on neuroticism as

compare to individuals low on novelty type of creativity. High novelty and meaning creativity types are related to field independent cognitive style.

REFERENCES

- Amabile, T.M. (1996). *Creativity in context: Update to the social psychology of Creativity*. Boulder, CO: Westview Press.
- Andreasen, N. C. (2011). A journey into chaos: Creativity and the unconscious. *Mens Sana Monographs*, 9, 42.
- Ausburn, L. J., & Ausburn, F. B. (1978). Cognitive styles: Some information and implications for instructional design. *Educational Communications and Technology Journal*, 26, 337-354.
- Baas, M., Roskes, M., Sligte, D., Nijstad, B. A., & De Dreu, C. K. (2013). Personality and creativity: The dual pathway to creativity model and a research agenda. *Social and Personality Psychology Compass*, 7(10), 732-748.
- Barron, F. (1957). Originality in relation to personality and intellect. *Journal of Personality*, 25, 730-742.
- Barron, F. (1988). Putting creativity to work. In R. J. Sternberg (Ed.). *The nature of creativity: Contemporary psychological perspectives* (pp. 76-98). Cambridge, England: Cambridge University Press.
- Batey, M. D. (2007). *A Psychometric Investigation of Everyday Creativity*. Unpublished doctoral thesis. University of London.
- Boden, M.A. (2004). *The creative mind: Myths and mechanisms* (2nd ed.). London, England: Routledge.
- Boden, M. A. (1996). What is creativity? In M. A. Boden (Ed.), *Dimensions of creativity* (75–117). London: MIT Press.
- Booker, B. B., Fearn, M., & Francis, L. J. (2002). The personality profile of artists. *Irish Journal of Psychology*, 22, 277–281.
- Carlsson, I., Wendt, P. E., & Risberg, J. (2000). On the neurobiology of creativity: Differences in frontal activity between high and low creative subjects. *Neuropsychologia*, 38, 873–885.
- Carson, S. H., Peterson, J. B., & Higgins, D. M. (2005). Reliability, validity, and factor structure of the creative achievement questionnaire. *Creativity Research Journal*, 17, 37–50.

- Clapham, M. M. (1998). Structure of Figural Forms A and B of the Torrance Tests of Creative Thinking. *Educational & Psychological Measurement*, 58, 275–283.
- Costa, P. T., McCrae, R. R. (1992). NEO PI-R Professional Manual: Revised NEO Personality Inventory (NEO PI-R) and NEO Five-Factor Inventory (NEO-FFI). *Psychological Assessment Resources*, Odessa, FL.
- Dement, W. (1965). An essay on dreams. In TM New Comb (Ed.), *New Directions in Psychology: II*. New York. Holt, Rinehart and Winston, 135-257.
- Eysenck, H.J. (1995). *Genius: The Natural History of Creativity*. Cambridge: Cambridge University Press.
- Feist, G. J. (1998). A meta-analysis of personality in scientific and artistic creativity. *Personality and social psychology review*, 2(4), 290-309.
- Feist, G. J. (1998). A meta-analysis of the impact of personality on scientific and artistic creativity. *Personality and Social Psychological Review*, 2, 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*, Cambridge University Press, New York, 113–130.
- Finke, R. A., Ward, T. B., & Smith, S. M. (1992). *Creative Cognition: Theory, Research and Applications*. Cambridge, MA: MIT Press.
- Furnham, A., von Stumm, S., Makendrayogam, A., & Chamorro-Premuzic, T. (2009). The taxonomy of self-estimated human performance. *Journal of Individual Differences*, 30, 188–193.
- Gelade, G. (2002). Creative style, personality and artistic endeavour. *Genetic, Social and General Psychology Monographs*, 128, 213–234.
- George, J. M., & Zhou, J. (2001). Openness to experience and conscientiousness are related to creative behavior: An interactional approach. *Journal of Applied Psychology*, 86, 513–524.
- Glazer, E. (2009). Rephrasing the madness and creativity debate: What is the nature of the creativity construct? *Personality and Individual Differences*, 46, 755-764.
- Goldberg, L. R. (1993). The structure of phenotypic personality traits. *American psychologist*, 48(1), 26.

- Griffin, M., & McDermott, M. R. (1998). Exploring a tripartite relationship between rebelliousness, openness to experience and creativity. *Social Behavior and Personality: an international journal*, 26(4), 347-356.
- Guilford, J. (1967). *The nature of human intelligence*. New York, NY, US: McGraw-Hill
- Guilford, J. P. (1977). *Way Beyond the IQ: Guide to improving intelligence and creativity*. Buffalo, NY: Creative Education Foundation.
- Heausler, N. L., & Thompson, B. (1988). Structure of the Torrance Tests of Creative Thinking. *Educational and Psychological Measurement*, 48, 463–468.
- Heinzen, T. E. (1994). Situational affect: Proactive and reactive creativity. In M.P. Shaw and M.A. Runco (Eds.) *Creativity and Affect: Creativity Research*. Norwood, NJ. Ablex, 127-146.
- Hocevar, D. (1979). The unidimensional nature of creative thinking in fifth grade children. *Child Study Journal*, 9, 273–278.
- Jackson, D. N. (1956). A short form of the Witkin's Embedded Figures Test. *Journal of Abnormal and Social Psychology*, 53, 25, 215 – 255.
- Jauk, E., Benedek, M., & Neubauer, A. C. (2013). The Road to Creative Achievement: A Latent Variable Model of Ability and Personality Predictors. *European Journal of Personality*.
- John, O. P., & Srivastava, S. (1999). The Big Five trait taxonomy: History, measurement, and theoretical perspectives. *Handbook of personality: Theory and research*, 2(1999), 102-138.
- Kaufman, J. C. & Plucker, J. A. (2011). Intelligence and creativity. In R.J. Sternberg, S.B. Kaufman (Eds.), *The Cambridge handbook of intelligence*, Cambridge University Press, Cambridge, 771–783.
- King, L. A., Walker, L. M., & Broyles, S. J. (1996). Creativity and the five-factor model. *Journal of research in personality*, 30(2), 189-203.
- King, L. A., Walker, L. M. & Broyles, S. J. (1996). Creativity and the five-factor model. *Journal of Research in Personality*, 30, 189–203.
- Mackinnon, D. W. (1978). In search of human effectiveness. *Identifying and Developing Creativity*. Buffalo, NY: Bearly Limited.
- Mackworth, N. H. (1965). Originality. *American Psychologist*, 20, 51-66.

- McCrae, R. R. (1987). "Creativity, divergent thinking, and openness to experience". *Journal of Personality and Social Psychology*, 52 (6): 1258–1265.
- McCrae, R. R. (1987). Creativity, divergent thinking, and openness to experience. *Journal of personality and social psychology*, 52(6), 1258.
- McManus, I., & Furnham, A. (2006). Aesthetic activities and aesthetic attitudes: Influences of education, background and personality on interest and involvement in the arts. *British Journal of Psychology*, 97, 555–587.
- Mumford, M. D., & Gustafson, S. B. (1988). Creativity syndrome: Integration, application and innovation. *Psychological Bulletin*, 103, 27–43.
- Naiman, L. (17 Feb., 2014). *What is Creativity? (And why is it a crucial factor for business success?)*. Retrieved on 20/03/2018 from: <https://www.creativityatwork.com/2014/02/17/what-is-creativity/>
- Paunonen, S. V. (2003). Big Five factors of personality and replicated predictions of behavior. *Journal of personality and social psychology*, 84(2), 411.
- Poreh, A. M. and Whiteman, R. D. (1991). Creative cognitive processes and hemispheric specialization. *Journal of Creative Behaviour*, 25, 169-179.
- Rorschach, H. (1921). *Psychodiagnostic*. Bern: Bircher.
- Rossmann, B. B., & Horn, J. L. (1972). Cognitive, motivational and temperamental indicants of creativity and intelligence. *Journal of Educational Measurement*, 9, 265–286.
- Runco, M. A., & Mraz, W. (1992). Scoring divergent thinking tests using total ideational output and a creativity index. *Educational and Psychological Measurement*, 52, 213–221.
- Rushton, J. P. (1990). Creativity, intelligence and psychoticism. *Personality and Individual Differences*, 11, 1291–1298.
- Ryhammar, L. & Brolin, C. (1999). Creativity research: Historical considerations and main lines of development. *Scandinavian Journal of Educational Research*, 43(3), 259-273.
- Samples, B. (1987). *Openmind/wholemind*. Rolling Hills Estate, CA: Jalmar press.
- Sánchez-Ruiz, M. J., Hernández-Torrano, D., Pérez-González, J. C., Batey, M. & Petrides K. V. (2011). The relationship between trait emotional intelligence and creativity across subject domains. *Motivation and Emotion*, 35, 461-473.
- Schachtel, E. C. (1959). *Metamorphosis*. New York: Basic Books.

- Silvia, P. J. (2008). Another look at creativity and intelligence. Exploring higher order models and probable confounds. *Personality and Individual Differences*, 4, 1012–1021.
- Simonton, D.K. (1974). *The social psychology of creativity: An Archival Data Analysis*. Unpublished Doctoral Dissertation, Harvard University.
- Snow, C. P. (1962). *The two cultures and the scientific revolution*. New York: Cambridge University Press.
- Stark, S. (1965a). An essay on romantic genius, Rorschach movement and definition of creativity. *Perceptual and Motor Skills*, 20, 409-418
- Stark, S. (1965b). Toward a psychology of knowledge: hypotheses regarding Rorschach movement and creativity. *Perceptual and Motor Skills*, 21, 839-859.
- Stark, S. (1965c). Rorschach movement responses and psycho-surgery: cautionary note. *Perceptual and Motor Skills*, 21, 329-330
- Stark, S. (1966). Rorschach movement, fantastic daydreaming, and Freud's concept of primary process: interpretive commentary. *Perceptual and Motor Skills*, 22, 523-532.
- Sternberg, R. J., & Lubart, T. I. (1995). *Defying the crowd*. New York: Free Press.
- Suler, J. R. (1980). Primary process thinking and creativity. *Psychological Bulletin*, 88, 144-165.
- Torrance, E. P. (1961). *Torrance tests of creative thinking; verbal forms A & B*. Princeton, N.J.: Personal Press, 360-378.
- Torrance, E. P. (1967). The Minnesota studies of creative behavior: National and international extensions. *Journal of Creative Behavior*, 1, 137-154.
- Wertheimer, M. (1945). *Productive Thinking*. New York: Harper.
- Witkin, H. A., Dyk, R. B., Faterson, H. F., Goodenough, D.R., & Karp,S.A. (1962). *Psychological Differentiation*, New York: Wiley.
- Witkin, H. A., Moore, C. A., Goodenough, D. R., &Cox, P. W. (1977). Cognitive styles and their educational implications. *Review of educational research*, 47, 1-64.
- Woody, C., & Claridge, G. S. (1977). Psychoticism and thinking. *British Journal of Social Clinical Psychology*, 16, 241–248.
- Ziegler, M. Danay, E. Heene, M. Asendorpf, J. & Bühner, M. (2012). Openness, fluid intelligence, and crystallized intelligence: Toward an integrative model. *Journal of Research in Personality*, 46, 173–183.