

Creative Giftedness and Dyslexia

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Abstract: Empirical studies of the relationships between dyslexia and creativity are inconsistent. While some anecdotal evidence suggests that there is a positive association between the two, some research suggests that such associations emerge in adulthood rather than in childhood or adolescence, usually as the result of adverse life experiences. The aim of this study was to examine whether adolescents with dyslexia possess superior creativity, measured through a standardised test battery, the Torrance Tests of Creative Thinking (TTCT), in comparison to age peers. Participants were additionally assessed on a modified version of the Wisconsin Association Talent and Gifted Guide (WATG). The participants in this study were students diagnosed with dyslexia (N=38) and asymptomatic students (N=38) aged 13 years four months (average). The members of the group with dyslexia had been previously diagnosed and identified as students with additional educational needs. The participants in the research group were matched with asymptomatic (students without dyslexia) participants for age, socio-economic status, ability and type of school attended. Although there were apparent indications that the adolescents with dyslexia rated themselves as less creative than their asymptomatic counterparts, they performed better on most subscales of the TTCT. However, in this study, despite the slightly higher scores of students with dyslexia, the differences regarding creativity were not statistically significant. Within the limitations of the study, no support was found for the hypothesis that adolescents with dyslexia are highly creative or even perceived themselves to be so.

Keywords: dyslexia, creativity, Torrance Test of Creative Thinking, adolescents

Introduction

The Maltese Education Act amended in 2006 listed the term 'specific learning difficulties' as one of a number of recognised conditions that the State binds itself to address within an inclusive policy. This was the first time that this

term was officially recognised and referred to in any national legislation. However, there is no clear indication of the occurrence of this condition in Malta. Cortiella and Horowitz (2014) reported that in the United States 5% of children has a learning disability. In their report, this term specifically referred to dyslexia, dyscalculia and dysgraphia. Pennington (1990) suggested that 10% of the UK population are potentially estimated to have dyslexia. At the other geographical and linguistic extremity of Europe, only about 3% of the Italian population of school age children were estimated to have dyslexia (Barbiero et al., 2012). Given the bilingual (English and Maltese) situation in Malta the prevalence of dyslexia is likely to lie somewhere between that of Italy and the UK.

Creativity and divergent thinking

Being diagnosed with dyslexia is less stigmatizing than it once was (Elliott, 2005; Elliott & Gibbs, 2008; Elliott & Place 2004; Rice & Brooks, 2004). Some even describe it as a 'gift', often accompanied with creativity, intuition and problem-solving skills (Davis & Braun, 2010). Dyslexia may also be described as an advantage rather than a learning difficulty (Tafti & Faisipour, 2005; Tafti, Hameedy & Baghal, 2009).

In the light of growing evidence of heritability and the complexity of the relationship between this condition and attention deficit hyperactivity disorder (ADHD), specific language impairment, speech-sound disorder, dyspraxia and dyscalculia, dyslexia has attracted much attention within the research community (Williams & O'Donovan, 2006). The International Dyslexia Association defines the condition in the following way and this definition is supported by practitioners and professionals alike (Cain, 2010):

Dyslexia is a specific learning disability that is neurobiological in origin. It is characterized by difficulties with accurate and/or fluent word recognition and by poor spelling and decoding abilities. These difficulties typically result from a deficit in the phonological component of language that is often unexpected in relation to other cognitive abilities and the provision of effective classroom instruction. Secondary consequences may include problems in reading comprehension and reduced reading experience that can impede the growth of vocabulary and background knowledge. (Lyon, Shaywitz, & Shaywitz, 2003, p. 2)

The influential Rose Report (2009) lists other characteristics of individuals with dyslexia, including their increased design, problem-solving, creative, interactive and oral skills. Other studies demonstrate that individuals with dyslexia are overrepresented in art- and design-related disciplines utilising visual-spatial and creative abilities (Symonds, 2005; Winner, Casey, DeSilva & Hayes, 1991; Winner et al., 2001; Wolff, 2011; Wolff & Lundberg, 2002).

Studies that link dyslexia with higher visual-spatial abilities, creativity and artistic talents span over three decades (Galaburda, Sherman, Rosen, Abolitz & Geschwind, 1985; Geschwind & Galaburda, 1987; West, 1999; and Wolf & Lundberg, 2002). Miles (1993) and McLoughlin, Fitzgibbon and Young (1994) cite several cases where adults with dyslexia have been noted to use compensatory creative strategies and become successful in occupations that require creative abilities. Everatt, Steffert and Smythe (1999), as well as Everatt, Weeks and Brooks (2008) support the view that adults with dyslexia are more successful than others in solving tasks that require creativity. Adults with dyslexia are more likely to view themselves as creative than do controls.

Tafti et al. (2009) compared children with dyslexia and asymptomatic Iranian school-age children on the Torrance Test of Creative Thinking (TTCT). They described their research participants as having significantly higher performance in originality and synthesis. Cockcroft and Hartgill (2004) report similar results with school-age children with dyslexia who performed significantly better than the normative group on the fluency subtest of the TTCT. Conversely, Ritchie, Luciano, Hansell, Wright, and Bates (2013) report quite clearly that poor literacy ability in their study was associated with lower, rather than higher scores on all measures of creativity, even when controlling for IQ. Wolff (2011) suggests that there is some evidence, albeit inconsistent, that individuals with superior creative skills constitute a subgroup of the population with dyslexia but that not all of the population with this condition is endowed with high creativity.

Assessment issues

The complex nature of creativity is difficult to assess (Villalba, 2012) but the cognitive-psychometric approach strongly influenced the assessment of creativity within educational contexts (Kozbelt, Beghetto, & Runco, 2010). The Torrance Test of Creative Thinking (TTCT), inspired by Guilford's (1966) SI model, is used in the present study. According to Kim (2006), the TTCT is a valid and reliable measure for assessing creativity in the general population. Creativity as conceived in the TTCT involves innovation, novelty and insightfulness (Wolff, 2011). Torrance (1966) defines creativity as

a process of becoming sensitive to problems, deficiencies, gaps in knowledge, missing elements, disharmonies, and so on; identifying the difficulty; searching for solutions, making guesses, or formulating hypotheses about the deficiencies; testing and retesting these hypotheses and possibly modifying and retesting them; and finally communicating the results. (p. 8)

The TTCT battery has been revised four times since its initial publication in 1966 (Plucker & Makel, 2010) and this constant research and updating has contributed to why it remains so popular and well considered in educational applications (Kim, 2006; Kaufman, Plucker, & Baer, 2008). The TTCT battery

comprises a number of different verbal and non-verbal components. This study uses only the non-verbal components since verbal skills of the students with dyslexia are often affected by their impairment. In addition, the non-verbal component is more suitable for bilingual students, as is the case of the participants in this study (Eisen, 2001). The TTCT non-verbal component includes picture construction, picture completion, and repeated parallel line tasks.

Torrance (1998) reported reliability coefficients of .9 for the TTCT scales and the test has shown high reliability in multicultural settings too (Chavez-Eákle, 2010). Given that the TTCT is concerned mostly with the “process” aspect of creativity, it was deemed appropriate to utilise the non-cognitive dimensions of creativity in order to assess as fully as possible the creative ability of adolescents with and without dyslexia.

Kaufman et al. (2006) suggested that a good way to assess creativity in a classroom setting would be to ask the students to rate themselves, as such self-rating measures are more valid and reliable than is popularly believed (Furnham, 1999; Silvia, Wigert, Reiter-Palmon, & Kaufman, 2012). The questionnaire items used in this study were based on the Wisconsin Association Talent and Gifted Guide (WATG) (2010). Participants were required to appraise their own characteristics and behaviours related to creativity. The original checklist was modified to a five-point Likert scale. The original checklist contained seven typical descriptors of creative behaviour, and the authors added three new items. One item probed participant’s intrinsic motivation to engage in creative behaviour, another directly evaluated the extent to which respondents considered themselves to be creative, and the last item explored the possibility of instances of eminent creativity, sometimes referred to as Big-C (Simonton, 1999). This assessment is being designated as the Creativity Self-Rating Questionnaire (CSRQ).

Creativity in the National Curriculum Framework and the classroom

In the *National Curriculum Framework for All* (2012), creativity is a major cross-curricular theme and creativity and literacy are considered to be equally relevant-outcomes of education. Cropley (2001) notes that while the majority of teachers acknowledge that creativity should be supported in class, they place little value on the personality traits associated with creativity in their own classes. In Malta too, teachers tend to view creativity as an artistic talent more than a thinking process permeating activities practised in class (Pulis Xerxen, 2009). Eysenck’s (1997) typical traits of creative individuals include autonomy and non-conformity among others, suggesting that creative individuals find it hard to adapt to conventional school settings. Vail (1990) subscribes to the notion that divergent thinking is an area in which children with dyslexia typically excel, but usually, it is the cause of discomfort in

schools where teachers see these traits as anarchic qualities rather than evidence of talent. Kaufman, Plucker & Baer (2008) maintain that research has consistently reported that teachers prefer to have intelligent students rather than creative ones in their classes. Such findings suggest that creativity within educational contexts is not always perceived in a way that is consistent with desirable educational goals.

Methods and materials

This study examines the relationship between developmental dyslexia and creative talent in a group of Maltese adolescents. It examines this relationship through two modes of assessment, the objective TTCT and a subjective questionnaire, CSRQ, that seeks to explore participants' perceptions of their creativity. In the tradition of quantitative research, the study is based on the following hypotheses:

H₀1: there is no difference between students with dyslexia and asymptomatic students in their self-reported creative skills as assessed by THE CSRQ,

H₀2: there are no differences between students with dyslexia and asymptomatic students in their performance on the TTCT subscales (Fluency, Originality, Elaboration, Abstractness of Titles and Resistance to Premature Closure).

The study was approved by the institutional research ethics committee and the school administrators.

Participants

In this study, a group of 38 mixed-gender adolescents with dyslexia aged between 12 and 14 years was compared with a matched group of students on aspects of creativity. All 38 participants with dyslexia possessed average intelligence quotients (85-115), this being indicated in their educational needs documentation (statementing). The IQ of the comparison group could not be measured directly through testing but all the members of this group were specifically selected from average groups for English language classes with the help of school administrators who confirmed their status as average achievers. Controlling for ability was necessary to ensure that any differences in the participants' eventual results would not be attributable to differences in intelligence but rather to creative potential. The Suffolk English Reading Comprehension Test Level 2 (Hagley, 2002) with Maltese norms (University of Malta/Access Disability Support Committee & Ministry of Education / Directorate for Quality and Standards in Education, 2010) was used to confirm the presence of reading difficulties in the individuals with dyslexia and to mark the difference between affected and average readers. As expected, the majority of participants with dyslexia scored below the cut-off score of 85 deviation points in their reading comprehension in English (bottom 16% of the population). A few participants who obtained a reading

score between 85 and 90 deviation points (bottom 25% of the population) were also included in the research group in a bid to limit sample attrition. These were paired with matched participants from the designated pool of matched students in terms of age, gender and socio-economic background. All the participants' levels of creativity as defined by the tests used, were assessed through the TTCT and the CSRQ. Participants came from three different colleges in Malta, purposely selected to cover the northern, the central and the southern localities of the island to ensure adequate representation.

Statistical procedures

The TTCT was scored according to published guidelines (Torrance, Ball, & Safter, 2008) and the scoring generated five standard scores as well as a global average score of creativity. The CSRQ generated one raw score. The IBM Statistical Package for the Social Sciences (SPSS) was used for statistical data analysis. The data analysis included assessment of distributions (normality) with the Shapiro-Wilk test. When scores were found to be normally distributed, parametric test analysis could be performed to explore any differences between groups; otherwise corresponding non-parametric tests were adopted in line with Cramer (1998). When the scores were normally distributed, an independent samples *t*-test was used to assess the differences between the two groups in their specific and general abilities in creativity and their self-reported creative abilities. In a few cases where the scores were not normally distributed, the corresponding non-parametric test, the Mann-Whitney U test was adopted (Cramer, 1998).

Results and discussion

Table I contains a summary of the gender distribution of the final sample, mean chronological age and mean reading comprehension scores. The results confirm the expected discrepancy in reading ability between students with dyslexia and the asymptomatic students while the close mean age of the two groups reveals their homogeneity in terms of age.

	Students with dyslexia	Asymptomatic students
Males	N=22	N=22
Females	N=16	N=16
Total	N=38	N=38
Mean age in months (SD)	160 (10.1)	160 (9.6)
Mean score in reading comprehension - Suffolk (SD)	79.1 (8.67)	99.08 (5.98)

Table I Participants' age and literacy scores

The aggregate scores of the TTCT and the CSRQ were assessed for normality. A visual inspection of the respective Q-Q plots (Figure 1) indicated overall normality of distribution.

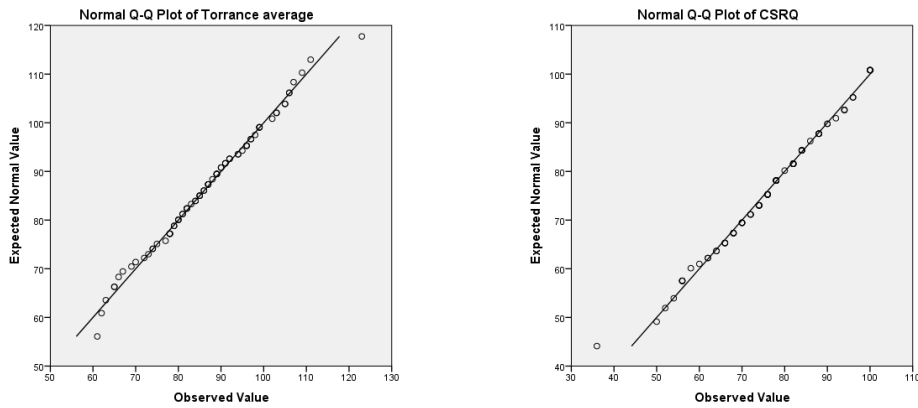


Figure 1 Q-Q plots for TTCT and CSRQ

The Shapiro-Wilk test of normality was used to further assess for normality of distribution in view of the limited sample size of 76 (Shapiro & Wilk, 1965; Cramer, 1998). In this test, values with a probability value of .05 or lower indicate that scores are not normally distributed. On a subtest-by-subtest basis, the majority of the scores were normally distributed, with only two exceptions; Elaboration and Abstractness of Titles. These required analysis through non-parametric tests. Table II presents the results of the test for normality of score distribution.

	Shapiro-Wilk test		
	W statistic	df	Probability
CSRQ	.981	76	.304
TTCT Average	.990	76	.814
TTCT subscales:			
Fluency	.981	76	.324
Originality	.989	76	.760
Elaboration	.939	76	.001
Abstractness of Titles	.960	76	.017
Resistance to Premature Closure	.981	76	.298

Table II Shapiro-Wilk results for normality of distribution

Independent samples *t*-tests were used to compare the mean performance of the research and comparison groups in those subtests having a normal distribution of scores. The Mann-Whitney U test was used to compare the median performance of the two groups for in those subtests not having a normal distribution of scores. These are shown in Table III below.

This study set out to explore the possibility of differences in the creativity profiles of adolescents with dyslexia and those who were average readers. Tasks performed required participants to construct multiple pictures using a pear shape as a stimulus, finish drawings of 10 incomplete figures and produce as many different drawings as possible from sets of parallel lines. These activities tap the ability to find a purpose for something that apparently has no clear definition, the ability to structure and integrate and the ability to disrupt a given structure and order to create something new (Torrance, Ball, & Safter, 2008).

	Students with dyslexia Mean (SD)	Asymptomat ic students Mean (SD)	t-statistic (significance)
CSRQ	73.5 (13.8)	79.2 (12.4)	-1.875 (ns)
TTCT Average	88.6 (12.9)	85.2 (12.7)	1.164 (ns)
TTCT-Fluency	103 (15.2)	98.2 (21.3)	1.064 (ns)
TTCT-Originality	98.8 (15.6)	96.2 (23.7)	.566 (n.s)
TTCT-Resistance to Premature Closure	76.2 (18.0)	68.7 (17.3)	1.838 (n.s) (p=.07)
	Median	Median	U-statistic (significance)
TTCT-Elaboration	84	84.5	708.5 (n.s)
TTCT-Abstractness of Titles	74	72.5	642.5 (n.s)

Table III Independent samples t-test and Mann-Whitney U test results

No evidence was found to support the hypothesis that individuals with dyslexia possessed any superior nonverbal creative skills when matched with the comparison group and null hypotheses H_{01} and H_{02} were supported. Notwithstanding, the research group of adolescents with dyslexia performed slightly better than the comparison (asymptomatic) group in all but one of the subtests in the TTCT, including the TTCT-Average score. On the other hand, the control group rated itself higher on creativity on the CSRQ but the differences were not statistically significant. No significant gender differences were evident on the measures administered and no investigation regarding the gender differences was conducted due to the small numbers of participants in each of the four groups.

The data set points to the conclusion that in the context of this study, having dyslexia is not associated with enhanced non-verbal creativity. Conversely, average readers in this study did not possess significantly higher creativity than their affected matches. This study does not support the results reported by Tafti et al. (2009) even if the measures used were identical and populations were comparable. While Symonds (2005), Winner et al. (1991, 2001) and Wolff and Lundberg (2002) make claims for students with dyslexia being attracted to art and design-related disciplines, these assertions refer to young adults

rather than young adolescents. Furthermore, the reported success of individuals with dyslexia in areas of endeavour requiring creativity, reported by McLoughlin et al. (1994) and Everatt et al. (1999, 2008) is also limited to adults. Could the creativity of such individuals be at least in part, a compensatory mechanism resorted to in later years, which by definition, is not evident before one has tried and failed in establishing one's literacy competencies in an area of occupational pursuit? A second possibility is that a clear endowment in creativity is only evident in real life situations such as art and design and problem management situations. In studies such as this, there is no possibility of placing individuals with dyslexia in such situations, and the only alternative left is anecdotal evidence and self-reporting, which lacks the rigour of a scientific method and in particular, replicability. Even so, in this study, where a self-reporting scale was used, the research group rated itself lower than the comparison group but not significantly so.

Research has the potential to yield unanticipated findings, and this study is no exception. When the mean scores on the TTCT subtests of all the participants in this study were compared to the means published by Torrance, Ball, and Safer (2008), one significant issue emerged. On one measure of creativity, there was a sizeable discrepancy between the average score of the 76 Maltese participants and the published norms based on an American same aged sample. This measure was the *Resistance to Premature Closure* subtest in which the Maltese students obtained only half the raw score indicated in the tables of norms. *Resistance to Premature Closure* requires a person to keep an open mind while processing information (Torrance, 1990). One may surmise that this difference in performance on this subtest is due to cultural differences between the two nations' children. However, Saeki, Fan and van Dusen (2001) do not report any significant differences between American and Japanese youth on this construct. This is unexpected, given that Japanese culture emphasizes conformity, and American culture emphasizes individualism. Based on these differences, one might assume that students receiving their education within one culture would develop different components of creativity from students in other cultures but it does not seem to be the case with the Japanese study. One cannot help but wonder whether in the Maltese case, there are parallels between this readiness to arrive at an early solution and another issue relating to a relative difficulty in interpreting, integrating and evaluating presented information in texts. This was identified through an international literacy survey (PIRLS, 2011) that included the whole of the Maltese school-age population of eight-year-olds (Ministry for Education and Employment, 2013). In this assessment, Maltese children were less able to explore, evaluate and interpret information in the written form than they were able to provide factual answers.

This study assessed only a few aspects of creativity and limited the expression of the skill to paper-and-pencil assessments. Findings are bound

by the specific measures used. With most studies of this type, access to children is restricted and human resources for assessing participants scarce. Moreover, participants in this study opted to be included and this may have had a particularly skewing effect on the selection of the participants with dyslexia in particular. This is frustratingly obvious in this paper where on many of the results achieved, the participants with dyslexia performed at higher levels than the comparison group but not to statistically significant levels. For example, in the *Resistance to Premature Closure* subscale, the difference was statistically significant to the .07 but not the .05 level. Larger numbers could well have resulted in a significant difference.

The results obtained through both the Torrance Test of Creative Thinking and Creativity Self-Rating Questionnaire show that adolescents with dyslexia in this study have slightly higher scores but the differences are not statistically significant. One subscale of the TTCT *Resistance to Premature Closure* holds promise for further investigation with a larger population than has been possible in this study because it may well identify a creative construct in which individuals with dyslexia possess an endowment.

References

- Barbiero C, Lonciari I, Montico M, Monasta L, Penge R, Vio, C., Tressoldi, P.E., Ferluga, V., Bigoni, A., Tullio, A., Carrozzi, M., & Ronfani, L. (2012) The Submerged Dyslexia Iceberg: How Many School Children Are Not Diagnosed? Results from an Italian Study. *PLoS ONE*, 7(10), 1-9.
- Cain, K. (2010). *Reading Development and Difficulties*. Chichester: British Psychological Society and Blackwell Publishing.
- Chávez-Eakle, R. A. (2010). The relevance of Creativity in Education. *New Horizons for Learning* 7(1). Retrieved from <http://education.jhu.edu/PD/newhorizons/Journals/spring2010/contents/index.html>
- Cockcroft, K. & Hartgill, M. (2004). Focusing on the abilities in learning disabilities: Dyslexia and creativity. *Education as Change*, 8(1), 61-79.
- Cortiella, C. & Horowitz, S. H. (2014). *The State of Learning Disabilities* (3rd ed.). New York: National Center for Learning Disabilities.
- Cramer, D. (1998). *Fundamental Statistics in Social Research*. London: Routledge.
- Cropley, A. J. (2001). *Creativity in Education and Learning*. New York: Routledge.
- Davis, R.D. & Braun, E.M. (2010). *The gift of dyslexia -updated*. New York: Perigee.
- Education (Amendment) Act, 2006. Valletta, MT: Department of Information.
- Eisen, M. L. (2001). Assessing differences in children with learning disabilities and normally achieving students with a new measure of creativity. *Journal of Learning Disabilities*, 22(7), 462-464.
- Elliott J. (2005). Dyslexia: Diagnoses, debates and diatribes. *Special Child*, 169, 19-23.
- Elliott, J. G. & Gibbs, S. (2008). Does dyslexia exist? *Journal of Philosophy of Education*, 42, 475-491.
- Elliott J. & Place M. (2004). *Difficulties in children*. London: Routledge.
- Everatt, J., Steffert, B. & Smythe, I. (1999). An eye for the unusual: Creative thinking in dyslexics. *Dyslexia*, 5, 24-46.

- Everatt, J., Weeks, S. & Brooks, P. (2008). Profiles of strengths and weaknesses in dyslexia and other learning difficulties. *Dyslexia*, 14, 16-41.
- Eysenck, H. J. (1997). Creativity and Personality. In M. A. Runco (Ed.), *The creativity Research Handbook* (Vol. 1, pp. 41-66). Creskill, NJ: Hampton Press.
- Furnham, A. F. (1999). Personality and creativity. *Perceptual and Motor Skills*, 88, 407-408.
- Galaburda, A.M., Sherman, G.F., Rosen, G.D., Abolitiz, F., & Geschwind, N. (1985). Developmental dyslexia: Four consecutive cases with cortical anomalies. *Annals of Neurology*, 18, 222-233.
- Geschwind, N. & Galaburda, A. M. (1987). *Cerebral lateralisation: Biological mechanisms, associations, and pathology*. Cambridge, MA: MIT Press.
- Guilford, J.P. (1966). Measurement and Creativity. *Theory into Practice*, 5(4), 186-189, 202.
- Hagley, F. J. (2002). *Suffolk Reading Scale: Version 2*. London: Granada Learning Group.
- Kaufman, J. C., Plucker, J. A., Dow, G. T., Baer, J., Andrews, C. J., Mitchell, E. R., & Kaufmann, A. B. (2006). Creativity and the Special Education Student. In *The Special Education Almanac* (pp. 369-390).
- Kaufman, J. C., Plucker, J. A., & Baer, J. (2008). *Essentials of Creativity Assessment*. New Jersey: John Wiley and Sons.
- Kim, K. H. (2006). Can we trust Creativity Tests? A review of the Torrance Test of Creative Thinking (TTCT). *Creativity Research Journal*, 18(1), 3-14.
- 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.
- Lyon, G. R., Shaywitz, S. E., & Shaywitz, B. A. (2003). A definition for Dyslexia. *Annals of Dyslexia*, 53, 1-14.
- McLoughlin, D., Fitzgibbon, G. & Young, V. (1994). *Adult dyslexia: Assessment, counselling and training*. London: Whurr.
- Miles, T.R. (1993). *Dyslexia: The pattern of difficulties* (2nd ed.). London: Whurr.
- Ministry of Education and Employment. (2012). A National Curriculum Framework for All. Retrieved from <https://education.gov.mt/en/Documents/A%20National%20Curriculum%20Framework%20for%20All%20-%202012.pdf>
- Ministry of Education and Employment. (2013). PIRLS 2011 Progress in International Reading Literacy Study - Malta Report. Retrieved from <https://researchanddevelopment.gov.mt/en/Documents/PIRLS%202011-%20Malta%20Report.pdf>
- Pennington B F, (1990). The Genetics of Dyslexia. *Journal of Child Psychology and Psychiatry*, 31(2), 193-201.
- Plucker, J. A., & Makel, M. C. (2010). Assessment of creativity. In J. C. Kaufman & R. J. Sternberg (Eds.), *The Cambridge Handbook of creativity* (pp. 48-73). New York, NY: Cambridge University Press.
- Pulis Xerxen, S. (2009, March). *Creativity in Schools: A Maltese Perspective*. Paper presented at the First International Conference on Strategic Innovation and Future Creation of the Edward de Bono Institute for the Design and Development of Thinking. Malta.
- Rice M. & Brooks, G. (2004). *Developmental dyslexia in adults: A research review*. London, National Research and Development Centre. Retrieved from: http://dera.ioe.ac.uk/22476/1/doc_166.pdf

- Ritchie, S., Luciano, M., Hansell, N., Wright, M., & Bates, T. (2013). The relationship of reading ability to creativity: Positive, not negative associations. *Learning and Individual Differences, 26*, 171–176.
- Rose, J. (2009). *Identifying and teaching children and young people with dyslexia and literacy difficulties*. Retrieved from: <https://www.education.gov.uk/publications/eOrderingDownload/00659-2009DOM-EN.pdf>
- Saeki, N., Fan, X. & van Dusen, L. (2001). A Comparative Study of Creative Thinking of American and Japanese College Students. *Journal of Creative Behavior, 35*(1), 24-36.
- Shapiro, S. S. & Wilk, M.B. (1965). An analysis of variance test for normality (complete samples). *Biometrika, 52*, 591-611.
- Silvia, P. J., Wigert, B., Reiter-Palmon, R., & Kaufman, J. C. (2012). Assessing creativity with self-report scales: A review and empirical evaluation. *Psychology of Aesthetics, Creativity, and the Arts, 6*, 19–34.
- Simonton, D. K. (1999). *Origins of genius: Darwinian perspectives on Creativity*. New York: Oxford University Press.
- Symonds, H. (2005). *Designing effective curriculum for dyslexic students within art and design in higher education*. London: London College of Communication, University of the Arts.
- Tafti, M. & Faizipour, H. (2005). *Dyslexia as a gift*. Tehran: Alzahra University Publications.
- Tafti, M., Hameedy, M. & Baghal, N. (2009). Dyslexia, a deficit or a difference: Comparing the creativity and memory skills of dyslexic and nondyslexic students in Iran. *Social Behavior & Personality: An International Journal, 37*(8), 1009–1016.
- Torrance, E. P. (1966). *The Torrance Tests of Creative Thinking-Norms-Technical Manual Research Edition-Verbal Tests, Forms A and B-Figural Tests, Forms A and B*. Princeton, NJ: Personnel Press.
- Torrance, E. P. (1990). The Torrance tests of creative thinking norms—technical manual figural (streamlined) forms A & B. Bensenville, IL: Scholastic Testing Service, Inc.
- Torrance, E. P. (1998). *Torrance Test of Creative Thinking. Norms-technical manual-figural (Streamlined) Forms A and B*. Bensenville, IL: Scholastic Testing Service.
- Torrance, E. P., Ball, O. E., & Safter, H. T. (2008). *Torrance Tests of Creative Thinking: Streamlined Scoring Guide for Figural Forms A and B*. Bensenville, Illinois: Scholastic Testing Service.
- University of Malta/Access Disability Support Committee & Ministry of Education/Directorate for Quality and Standards in Education. (2010). *Reading Comprehension and Spelling Tests in Maltese and English*.
- Vail, P. (1990). Gifts, Talents and the Dyslexias. *Annals of Dyslexia, 40*(1), 1-17.
- Villalba, E. (2012). Searching for the holy grail of measuring creativity. *Creativity Research Journal, 24*(1), 1–2. DOI: 10.1080/10400419.2012.649235
- West, T. (1999). The abilities of those with reading disabilities: focusing on the talents of people with dyslexia. In D.D. Duane (Ed.), *Reading and attention disorders – neurobiological correlates* (pp.213–141). Baltimore: York Press.
- Williams, J. & O'Donovan, M.C. (2006). The genetics of developmental dyslexia. *European Journal of Human Genetics, 14*, 681–689.
- Winner, E., Casey, M., DeSilva, D. & Hayes, R. (1991). Spatial abilities and reading deficits in visual art students. *Empirical Studies of the Arts, 9*(1), 51–63.

- Winner, E., von Karolyi, C., Malinsky, D., French, L., Seliger, C., Ross, E. & Weber, C. (2001). Dyslexia and visual-spatial talents: Compensation vs deficit model. *Brain and Language*, 76(2), 81-110.
- Wisconsin Association for Talented and Gifted. (2010). *Indicators of Potential Creative Talent - Parent/Student Information Form*. Retrieved from <http://www.watg.org/creativity-guide.html>
- Wolff, U. (2011). Artistic talents and dyslexia: A genuine connection? In N. Alexander-Passe (Ed.), *Dyslexia and creativity: Investigations from differing perspectives* (pp.65-77). New York: Nova Science Publishers.
- Wolff, U. & Lundberg, I. (2002). The prevalence of dyslexia among art students. *Dyslexia*, 8(1), 34-42.