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The Specificity of Creativity: Figurative and Scientific

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Abstract

Introduction. This work tackles the question about the nature of creativity as a general vs. domain-specific ability. First we deal with the concept of creativity and then, the main approaches to the debate of generality vs. specificity are exposed

Method. A total of 133 students attending 3rd grade of secondary education in Murcia Region took part in this research. The assessment instruments were the Torrance Test of Creative Thinking to assess general-figurative creativity and the Hu and Adey's Scientific-Creative thinking test to meassure scienific creativity. Also the Diferencial Aptitude Test was used to meassure intelligence. The relationship between figurative-general creativity and scientific creativity was studied from diferent statistical procedures: using correlation analysis, factorial, and using perceptual mapping.

Results. The results point out to the independence between both figurative and scientific creativity; further more, we could talk about a task-specific creativity.

Discussion or **Conclusion.** The debate about the generality vs domain specific creativity does have a great effect on the educational practice. Specifically regarding two issuees: a) the type of assessment to identify the students' creative potential, thus deciding which students could be candidates to enter specific gifted and talented programs; b) regarding to how to teach and foster divergent thinking and creativity in our students.

Keywords: Specificity of creativity; Scientific creativity; Torrance test; Divergent thinking.

Resumen

Introducción. Este trabajo aborda la cuestión sobre la naturaleza de la creatividad como una habilidad general o específica de cada dominio concreto. Se exponen, en primer lugar, las principales definiciones y modelos del constructo; y en segundo lugar, el debate sobre la naturaleza generalista o específica de las habilidades creativas, tema que está siendo fuente de investigación para muchos autores.

Método. Han participado 133 estudiantes de 3º de ESO pertenecientes a Instituto Público de un municipio de la Región de Murcia. Los instrumentos utilizados han sido: el test de creatividad figurativa de Torrance (TTCT), el Test de Pensamiento Científico-Creativo (TPCC), y la Batería de Aptitudes Diferenciales (DAT-5). La relación entre los constructos de creatividad figurativa-general y creatividad científica ha sido estudiada utilizando distintas técnicas estadísticas: correlaciones, análisis factorial y mapeado perceptual elaborado a través del escalamiento multidimensional.

Resultados. Los resultados nos indican la especificidad de ambos constructos, es más, dada las correlaciones entre la tarea “Manzanas” del TPCC y el juego 1 del TTCT, se podría hablar de una especificidad de tarea.

Discusión y conclusiones. El debate sobre la generalidad versus especificidad de la creatividad tiene una repercusión directa en la práctica educativa. Concretamente, esta repercusión se da en dos aspectos muy importantes: a) en el tipo de evaluación necesaria para identificar el potencial creativo, y por tanto, a los alumnos susceptibles de entrar en los programas específicos de atención a la diversidad de las altas habilidades; y b) en cuanto a la trascendencia en cómo enseñar y entrenar el pensamiento divergente y la creatividad de los estudiantes.

Palabras Clave: Especificidad de la Creatividad; Creatividad Científica; Test de Torrance; Pensamiento divergente

Introduction

Along the last couple of years it is being amply debated whether creativity is a general ability or is specific to each domain (Plucker, 2004; Silvia, Kaufman & Pretz, 2009). While there is evidence that people only show creative performance in certain areas, this specific nature could be due to the own characteristics of the domain in question and the required previous knowledge and not so much to the specific character of the creative abilities (Baer, 1998; 1999).

In the school context, the importance of the generality versus the specific nature of creativity is marked by the educational implications which this entails: if creativity is a general ability, then it can be trained in a diverse way, expecting the students to transfer the acquired skills to different areas and domains of their everyday life. If, on the contrary, creativity implies a domain-specific ability, the generic tasks for training thinking would not be effective to foster creativity in science or music, for instance. For this reason, this debate is especially relevant among teachers and educators who want to encourage creative thinking in their students. Because, if creativity is domain-specific, then said thinking cannot be dissociated from the area or field which is intended to be fostered. This discussion not only affects to training creativity, but also to identifying it. This way, the identification of talent in concrete areas could not be assessable with generic tests, independently of the area or domain of interest. The identification of creativity in a given domain will involve tests which are specific to it.

Authors such as Sak and Ayas (2011) review the main works which advocate for the need to utilize measures and models of specific content so as to evaluate creativity, independently of the domain (language, science, arts…). In this debate about the generality or specific nature of creativity, we find three delimited viewpoints: in the first of them, we come across authors who defend the idea of creativity as a general domain; particularly during the beginnings of the scientific study of creativity, authors like Guilford (1950) and Torrance (1962) present creativity as a general and transferable ability (Bermejo, Ruiz, Prieto, Ferrándiz, & Sáinz, 2015); that is, the creative individual is endowed with a series of general skills (independently of the domain), which can, thus, be extrapolated from one domain to another.

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Gabora (2010) tests the hypothesis which states that the individuals' creative style is not used in an exclusive manner nor in a concrete domain, but is instead transferable to other domains. Gabora defends the idea of the generality of creativity based on the existence common abilities between the different domains, but emphasizing the necessity of having specific knowledge within each field. In her study, 7 students of creative writing of the University of British Columbia (Canada) and two assessment tools designed ad hoc were employed: one, in which students were asked to perform a work of plastic arts; the other, based on the perception self-report to value both the work done by them individually as well as the one performed along with other classmates. The results proved that the degree of familiarity that the individual had with their own creative work in a specific domain facilitates the recognition and identification of the creative work of that individual both in their domain as in a different one.

The second stance about creativity as a specific domain has won numerous followers along recent years (Baer, 2012; 2014; Han & Marvin, 2002; Kaufman & Baer, 2004; Reiter-Palmon, Illies, Kobe, Buboltz & Nimps, 2009; Silvia et al., 2009; Tsai, 2014). For instance, Han and Marvin (2002) carried out a work in which the specific nature of creativity depending on the domain and whether this could be predicted stemming from divergent thinking (general) was studied (a sample of 109 students aged between 7 and 8): They used three subtests: a) the subtests for alternative uses and similarities off the Wallach-Kogan creativity test (1962) to assess verbal creativity; b) Real-World Divergent Thinking Test (Okuda, Runco, & Berger, 1991) to measure the creativity in school life problem solving and c) three performance tasks in three different domains (mathematics, literature and making collages). The results obtained backed up the domain-specific stance, since pupils displayed different creative capabilities in different domains (the above mentioned mathematics, literature and making collages) instead of an even creative capacity in all the domains, which proved that there is a considerable intra-individual variation in the creative capacity.

In the work of Kaufman y Baer (2004) the issue is dealt with under the perspective of the self-perception of creativity. Two scales designed ad hoc (Scale of creative personality and a self-report to evaluate creativity in different domains) were given to 241 university students in different academic domains (biology, history, education psychology…). Even though the authors departed from the hypothesis that defended the conception of creativity as a specific ability, their results supported that it is perceived by the participants as a much more general construct. The authors could differentiate by means of the factor analysis three main domains of creativity: 1) interpersonal relationships, 2) manual work and 3) a third one related to mathematics and sciences. Furthermore, it was concluded that participants tended to be consistent in their self-perceptions: if they perceived themselves as generally creative, they would tend to self-mark themselves highly in all the domains, except for the domain of mathematics. The authors explain these results because mathematics are generally seen as an area which does not require expressing creative thoughts.

Tsai (2014) carries out an exploratory study whose participants were 17 Taiwanese students aged 10. Three measures were employed for the study of creative potential: a verbal creativity test (Guilford, 1967), a figurative creativity test (Jellen & Urban, 1986) and a self-report about creative behavior (Runco, Plucker & Lim, 2001). In her work, through the study of correlations and the study of perceptual mapping (elaborated by means of the multidimensional scaling), the specific nature of creativity is confirmed. The results obtained show that verbal and visual creativities can be understood as two different constructs, which leads the author to accept the trend of the theories which support the domain-specific creativity.

Baer (1998; 1999, 2012, 2014) is arguably the author that has studied the specific nature of creativity the longest in many of his works from this era, mainly providing reviews of previous research. This author concludes that the specific nature can be summarized in a very precise way, to the point that the author speaks of micro-domains within the specific domain of it; that is, that within a specific domain of creativity (such as art), we can find in turn different micro-domains (classical dance, history of art, etc…).

Lastly, the third stance holds a hybrid view, that is, understands creativity as an ability both domain-general and domain-specific. Among the authors that support this vision we can find Plucker y Beguetto (2004), who suggest that creativity has both specific and general components, but that the degree of that specific nature depends on the social context and the individual's development, of what is like the transition to adult life, as creativity has to do with the stimulation provided by the context in which we are growing up; for example: a boy growing up in a background of musicians will very likely be prone to develop in a creative manner in the field of music.

We also find the hierarchical model ATP (Amusement Park Theoretical, Baer & Kaufman, 2005), in which, departing from the metaphor "an amusement park" intends to explore creativity. The principal requirements are: intelligence, creativity and environment. These requirements must be present in a certain degree along the whole creative work. According to Baer & Kaufman, the thematic areas have specific domains, and in turn, within the specific domains, micro-domains exist.

According to Silvia et al. (2009), these hybrid models could be accepted under both stances, but it is certainly unlikely to satisfy the followers of the stricter specific models, as after all, the hybrid theories defend that certain traits of creativity carry over to all the domains, which is precisely the point of disagreement.

Objectives

The goal of the present study is ascertaining the general or specific nature of creativity, studying the relationship between the two domains of divergent thinking: the figurative and scientific. The specific goals are: studying the relation between the intellectual aptitudes and the components of the figurative and scientific creativity tests; delving into the students' creative profiles according to their academic performance.

Method

Participants

In this study, a total of 133 students (58 boys and 75 girls) of the 3rd year of Compulsory Secondary Education (average age= 14.60 years; *dt*= .72) participated. It is an intellectually very heterogeneous sample, as indicated by the marks in the DAT-5 test (Bennett et al, 2000). The sample consists of both low performance students (curricular diversification program, 23 students) as well as average-skilled students.

The socio-cultural level of the students is middle-high and the context in which the High-School (IES) is found is the urban center of the town, whose economy revolves around the primary sector (agriculture and pig farming) and the service sector, as the latter employs the greater share of the population.

Instruments

The Differential Aptitude Test DAT-5 (Bennett et al., 2000), evaluates 7 basic aptitudes: Verbal Reasoning, Numerical Reasoning, Abstract Reasoning, Mechanical Reasoning, Spatial Relationships, Spelling, Rapidity and Perceptual Accuracy. The test has proved to have appropriate psychometric properties for the Spanish population with internal consistency quotients between .75 and .92, as indicated by the manual.

The *Torrance Thinking Creative Test* (TTCT, Torrance, 1974). More specifically, the figurative test (Form A) of the adaptation carried out by Prieto, López y Ferrándiz (2003) and by Prieto, López, Ferrándiz y Bermejo (2003). This test consists of three sub-tests: drawing, completing a figure or drawing or building up figures or drawings using 30 pairs of parallel lines. The test measures the four main abilities of divergent thinking: fluency, flexibility, originality and elaboration. The timing is 10 minutes for each task. The task has shown appropriate psychometric properties in Spanish samples (Ferrando, Ferrándiz, Bermejo, Sánchez, Parra, & Prieto, 2007).

To assess scientific creativity, the *Creative Scientific Thinking Test* (TPCC) by Hu and Adey (2002) was employed. It consists of seven tasks: 1. “Glass” (the student must think of all the different scientific uses they could make of a piece of glass). 2. “Planet” (he/she must pose questions of a scientific nature he/she would like to investigate if travelling to another planet). 3. “Bicycle” (improvements that could be made to make it more interesting, useful and beautiful). 4. “Gravity” (describing what would happen to the world if gravity did not exist) 5. “Square” (drawing different ways of dividing a square in four identical parts). 6. “Napkin” (designing experiments to prove which of the two napkins is better) and lastly, 7. “Apples” (drawing and designing a machine to collect apples). These seven tasks evaluate three dimensions of creativity: fluency (number of ideas), flexibility (different perspectives used) and originality (statistical infrequency of the answers). The test has been used with Spanish population, obtaining correct reliability indexes (.89). It has been decided to not use the test “Square” due to its low reliability (Ruiz, Bermejo, Prieto, Ferrándiz, & Almeida, 2013; Ruiz, Ferrando, Bermejo & Prieto, 2015).

Procedure

The data we are presenting can be framed in the project Attention to Diversity in highly-skilled students: exceptionally gifted and talents (Ref: EDU2014-53646-R). For the compilation of data, different schools were contacted, as well as the principals and counsellors at these schools. The informed consent of both parents and students (who were informed about the research goals and the confidentiality of its results) were obtained. The participation in this activity would not entail any negative consequence for the participants. Regarding the data collection, it was carried out in a total of three sessions during class hours, facilitated by the school.

The tests were corrected according to the indicators of each manual. It is usually recommended having the divergent thinking tests corrected by more than one evaluator, though current divergent thinking tests do not emphasize this aspect (Artola, Ancillo, Mosteiro & Barraca, 2010).

Data Analysis

The scores obtained in the test were codified using the statistical package SPSS version 20 (IBM, 2011). Mainly, correlational analyses and dimensional reductions (analysis of principal components) have been carried out. Following the investigation undertaken by Tsai (2014), a multidimensional analysis by means of the perceptual mapping technique has been realized, with the aim of observing the distance (as far as scoring is concerned) between the different variables of the two creativity tests utilized in this study. Comparison of means analyses to delve into the creative profiles of students according to their academic performance have been carried out, as well (students forming part of the diversification program vs. their classmates).

Results

Prior to the correlation analysis of the main components, a study about the correlations between the variables of the TTCT and TPCC was carried out. In the analysis of said correlations, we must pay attention to the intratest (between variables of the same test) and intertest (between variables of different tests) correlations. Regarding the intratest variables for the scientific creativity test (TPCC), they range between $r = .07$ (between the originality in the task “Planet” and the originality in the task “Apples”) and $r = .96$ (between the fluency in the task "Bicycle" and the flexibility in the task "Bicycle"). There are a total of 121 interactions, being the average correlation = .43. The majority of the correlations are statistically significant (except 9 of the cases).The higher correlations exist between variables belonging to the same task, more than between the variables which measure the same dimension of divergent thinking by means of different tasks.

The intratest correlations for the figurative creativity (TTCT) resulted in 52 interactions. The highest correlation can be found between the originality and the fluency in the subtest 3 (r = .941; p < .001), and the lowest, between the flexibility in the subtest 2 and the elaboration in the subtest 1(r = .014; p > .05). The average correlation score equaled .215. Of these, the majority are statistically significant (67.3%). These correlations do not seem to follow a task-based pattern, nor do they follow a divergent thinking dimensions pattern.

In relation to the intertest relationships, that is, the correlations between the TTCT and the TPCC, a total of 171 interactions were found. The lowest correlation appeared between the fluency in the task Gravity and the originality of the subtest 1 of the TTCT (r = -.011; p = .903) , and the highest between the flexibility in the task Planet and the elaboration of the subtest 3 of the TTCT (r = .470; p < .001). The average correlation obtained was .021, of which 63.52% were statistically significant. These correlations can be analyzed according to the dimensions of divergent thinking which measure the variables (fluency, flexibility, originality and elaboration) or by means of the subtests in each test. Based on dimensions, the average correlation in fluency (12 interactions) equals $r=.23$. A 70% of the interactions in the dimension fluency in the TTCT and TPCC tests were statistically significant. In the dimension flexibility, the average correlation equaled r= .24, being the 80% of them statistically significant. Finally, for the dimension originality, an average correlation index of r= .11 was obtained, being the 11.11% statistically significant. It is worth remarking that in all the TTCT subtests the dimension which most often correlated with the variables in the TPCC was the elaboration.

The correlations according to the subtests of each test showed that it was the subtest 3 of TTCT "parallel lines" the one which featured higher correlations with the tasks of the TPCC, followed by the subtest 2 and, finally, by the subtest 1.

Exploratory Factor Analysis of the Variables in TTCT and TPCC

After verifying the factoriality of the data [KMO=.784; χ^2 = 2464.661; gl = 351; *p* < .001], an analysis of main components has been utilized, which showed a solution of 8 components with an eigenvalue above 1. These explained an 84.18% of the variance (see Table 1).

Table 1. *Rotated solution of the principal components analysis*

eigen-values	% variance	Components I	II	III	IV	V	VI	VII	VIII
		32.634	14.314	10.217	6.998	6.364	5.559	4.124	3.974
.964	TTCT_3_flu	.934							
.948	TTCT_3_orig	.930							
.936	TTCT_3_flex	.929							
.863	ORIG.planet		.852						
.881	FLEXI.planet		.833						
.869	FLUI.planet		.823						
.903	FLEXI.cristal			.923					
.919	ORIGI.cristal			.913					
.944	FLUI.cristal			.910					
.940	FLUI. bicycle				.853				
.916	FLEX. bicycle				.849				
.903	ORIGI. bicycle				.807				
.942	FLEX.gravity					.900			
.929	ORIG.gravity					.884			
.915	FLUI.gravity					.802			
.903	ORIGIN.napkin						.892		
.938	FLUI. napkin						.889		
.869	FLEXI. napkin						.851		
.733	TTCT_2_orig							.795	
.875	TTCT_2_flu							.781	
.782	TTCT_2_flex							.708	
.683	TTCT_1_elab								.660
.531	Apples_Functions								.637
.786	TTCT_2_Elab							.471	.607
.394	TTCT_1_Ori								.571
.633	Apples_Orig.				.480				.521
.830	TTCT_3_elab		.494						.500

Extraction method: Analysis of main components.
Rotation method: Varimax standardization with Kaiser.
Loads less than .4 have been removed

As it can be observed in Table 1, the variables have ended up being grouped by tasks, being the most important one the task 3 (“parallel lines”) in the TTCT, which makes for the first component and explains a 32.63% of the variance. The second component is delimited by the variables of the task “Planet” in the TPCC and explains a 13.41% of the variance. The third is delimited by the variables of the task “Glass” in the TPCC; the fourth, by the variables of the task "Bicycle" of the TPCC; the fifth, by "Gravity" of the TPCC; the sixth, by "Napkins", off the TPCC; the seventh, by the subtest 2 of the TTCT, and the eighth and last component, explaining a 3.9% of the variance, composed of the variables of the task "Apples" off the TPCC and the subtest 1 off the TTCT plus the elaborations 2 and 3 in the TTCT. Hence, this last component is formed with the factor 3 off the TTCT defined by Ferrando et al. (2007) along with the task "Apples" off the TPCC.

Perceptual Mapping by means of the Multidimensional Analysis

With the aim of proving the relationship between both tests in a graphic way and, in order to facilitate the interpretation of the results, the perceptual mapping, a multidimensional analysis technique (PROXCAL) which allows to visualize distances between variables has been used. Tsai (2014) implemented it with a limited number of variables. Experts recommend using between 8 and 20 variables (Green, 1975). For this reason, instead of using the tasks, we have opted for taking the variables of each test, using z scores, as the variables are graded in different scales. See Figure 1.

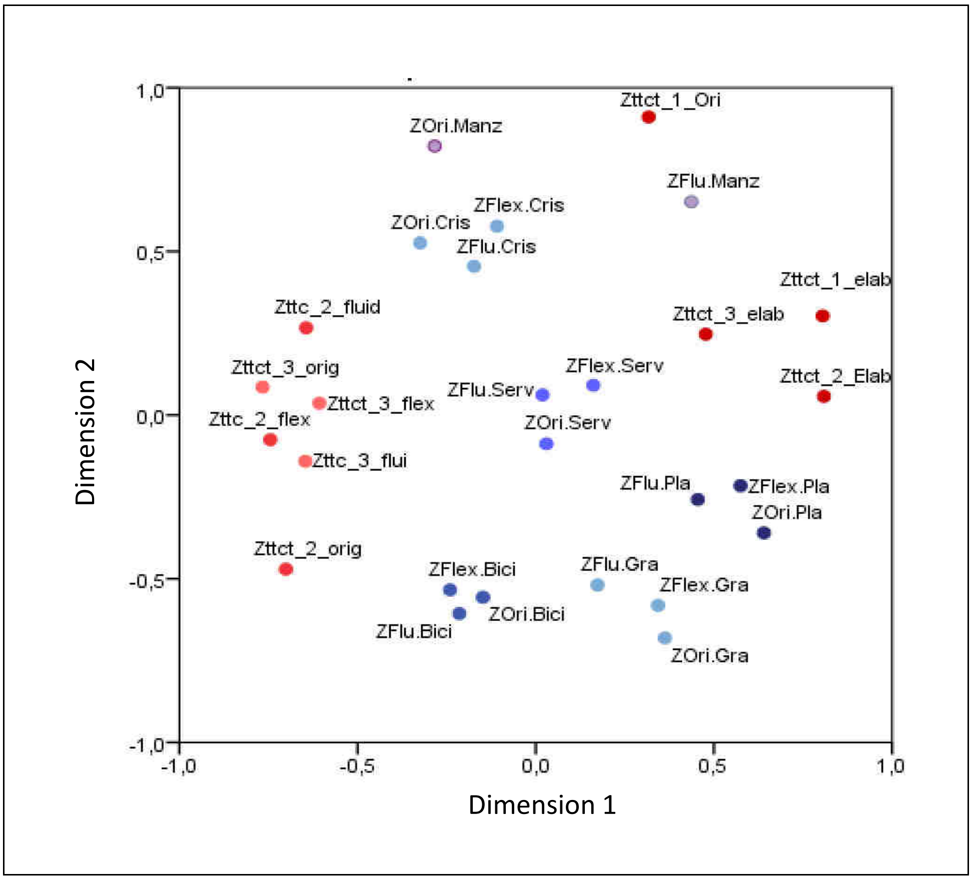

Figure 1. Perceptual Mapp of the Distribution of TTCT's and TPCC's variables

In Figure 1 we can observe the “situation” of the different variables of both tests TTCT and TPCC in terms of the distance between them. That is, by means of perceptual mapping we are informed of the position each variable acquires with respect to the others. In the graphic the variables of the TTCT have been represented in the red color spectrum and those of the TPCC, in blue, with the aim of facilitating their visualization. It can be observed that the variables are grouped according to the main component in which said variables are loaded. This way, we can see that the distance between the variables of the TTCT themselves is lower than that distance between the TPCC variables.

The variables of the factor III of the TTCT as identified by Ferrando et al (2007) (originality in the subtest 1 and elaboration of the three subtests; in the upper-right corner in the graphic) are further away from the number of the variables of the TTCT; furthermore, these variables are closer to the variables in the task “Apples” (in purple color). As it can be seen in the constellation of blue color spots, the variables of the tasks “Glass”, “Planet”, “Bicycle”, “Napkin” and “Gravity” of the TPCC are grouped according to the task they belong to. These results are in line with those obtained in the exploratory factor analysis.

Relation with the Intellectual Aptitudes measured by the DAT-5

The relationship of the intellectual abilities with the components extracted from the figurative and scientific creativity tests has been studied (Table 2). Taking into consideration the previous studies about the factor structure of the TTCT test (Ferrando et al., 2007), we opted for grouping the tests according to previous results and for utilizing the Factor I of the TTCT (subtest 3 minus the elaboration), the Factor II (subtest 2 minus the elaboration) and the Factor III (elaborations in the three tasks plus the originality of the subtest 1). The components of the TPCC correspond to each of the tasks utilized.

Table 2. *Correlation Matrix between Intelligence (DAT) and Creativity*

	RV	*RN*	*RA*	*RM*	*RE*	*Ort.*	*Rap.*
CRISTAL_total	.150	.037	-.059	.052	.139	.076	.188
PLANETA_total	.410**	.448**	.380**	.294**	.377**	.393**	.341**
GRAVITY_total	.235*	.351**	.208*	.138	.227*	.246*	.119
BICYCLE_total	.046	.125	-.073	.049	.019	.071	.071
NAPKIN _total	.193	.156	.036	.062	.104	.170	.208
APPLES_total	.080	.144	.133	.201*	.137	.088	.117
FI:TTCT3_flu.flex.ori_total	-.010	.055	.014	.031	.230*	-.018	.007
FII:TTCT2_flu.flex.ori_total	.026	.038	-.074	.043	-.023	-.019	-.065
FIII:TTCT1_.ori1.ela123_total	.341**	.356**	.428**	.365**	.477**	.368**	.259*

Note: RV: Verbal Reasoning, RN: Numerical Reasoning, RA: Abstract Reasoning, RM: Mechanical Reasoning, RE: Spatial Reasoning, Ort.: Speling; Rap.: Perceptive Speed. All dimnsions were measurd using row scores, not the percentile.
(*) The correlation was significant at p<.05.
(**) The correlation was significant at P<.001.

The average correlation equaled r = .165, revealing pretty low correlations between both constructs ranging between r= .007 (Perceptive rapidity and accuracy and the Factor I off TTCT) and r=. 477 (between Spatial Reasoning and the Factor III of TTCT- elaborations). The tasks and components which feature higher correlations with intelligence are the tasks "Gravity" and "Planet" off the TPCC. Besides, the highest correlations are found with the Factor III off the TTCT.

The intellectual aptitude which correlates the most with creative thinking is Spatial Reasoning, which apart from correlating with the tasks "Planet", "Gravity" and the Factor III, shows correlation with the subtest 3 in the TTCT (parallel lines).

Differences depending on the Students' Performance Level

It has been studied whether students belonging to the curricular diversification program show different performances in creativity with respect to their classmates. Due to the nature of the tasks these differences can be expected to be more pronounced in the scientific creativity tasks and not so much in the figurative creativity tasks measured by TTCT.

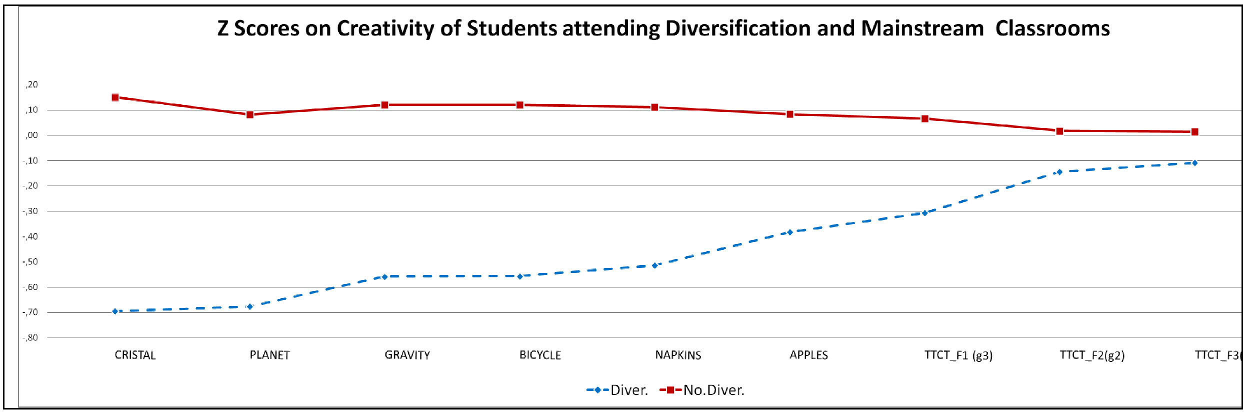

Figure 2. Graphic of average score on creativity of students attending diversification programs and mainstream classrooms (using Z Scores).

As Figure 2 and Table 3 show, the average scores in the curricular diversification group are, in all of the cases, lower than those of their classmates, although they are close to them in the Factor II of the TTCT and the Factor I of the TTCT. However, the tasks which feature the largest distance are "Planet" and TPCC and the Factor III in the TTCT. With the aim of facilitating the interpretation of said differences, z scores have been used so all the differences appear in the same scale, as shown in Table 3.

Table 3. *Descriptive Statistics of creativity scores of students attending diversificaion programme and their peers*

	Diversification Programme			**No diversificación curricular**			***t de student***
	N	M	dt.	N	M	dt.	
CRISTAL_total	23	5.00	5.25	106	10.72	9.49	t(58,16)=-3.99; *p* <.001
PLANET_total	23	19.17	11.11	106	33.45	16.88	t(47,05)=-5.03; *p* <.001
GRAVITY_total	23	15.65	9.87	106	21.74	17.25	t(55,71)=-2.29; *p*=.026
BICYCLE_total	23	14.57	8.62	106	24.28	14.73	t(54,14)=-4.22; *p* <.001
NAPKINS_total	23	6.00	6.50	106	11.89	8.77	t(127)=-3.03; *p*=.003
APPLES_total	23	8.48	6.32	106	11.12	5.46	t(127)=-2.04; *p* =.043
TTCT3_flu.flex.ori_total	13	40.38	16.76	107	43.91	22.40	t(118)=-.54; *p* =.585
TTCT2_flu.flex.ori_total	13	22.62	6.99	107	23.49	7.18	t(118)=-.41; *p* =.680
TTCT1_.ori1.ela123_total	13	30.69	16.18	107	48.49	23.51	t(118)=-2.64; *p*=.009

Discussion and Conclusions

We would like to point out that in this research, two divergent thinking tests (figurative and scientific domain) have been employed. The reason to use divergent thinking tests instead of any other type of measures has two implications: first, as Plucker (2004) signals, the results of the different studies which have utilized divergent thinking tests tend to support the idea of the generality of creativity, whereas the results of research based on performance tests in everyday situations (how to write a poem, how to solve a problem, etc.) tend to back up the specific nature of the domain. Secondly, since creativity is affected by previous experience and base knowledge (Csikszentmihalyi, 1996; Sternberg & Lubart, 1997), precisely using divergent thinking tests which, in our case, do not require a vast knowledge of a specific domain, allows us to get to know if the creative thinking abilities are actually domain-general or specific.

The results found in this study, resulting from the different analyses lead us to the same idea: the intratest relationships between the variables is higher than the intertests relationships. Besides, the different variables are more related in connection with the tasks they belong to than with the divergent thinking abilities they measure (fluency, flexibility, originality and elaboration).

Our results, observed a priori, confirm the specific nature of creativity, being in line with the results found by Han and Marvin (2002), Kaufman and Baer (2004), Ferrándiz, Ferrando, Soto, Sainz and Prieto (2017); Ferrando, Esparza, Ruiz, Sainz, and Prieto (2017) and Tsai (2014). Even more, the data obtained in the factor analysis would support the idea of microdomains as defended by Baer (2014), who puts forward that the study of the domains of creativity should be dissected even further. Let us not forget that in our study the variables have been grouped in specific tasks.

However, the fact of having found greater correlations between the variables of the task "Apples" of the TPCC test and game 1 of the TTCT test, makes us question whether that specific nature is due to the nature the tasks rather than the domain itself. Let us remember that the results of the exploratory factor analysis and the perceptual mapping reveal solutions of variables grouped according to the task's nature and, therefore, according to divergent thinking dimensions (fluency, flexibility, originality and elaboration). In this organization, the task “Apples” (TPCC) and game 1 (TCTT) do not seem to discriminate each other. Even though they are referred to different domains, in both tasks the student is asked to create a drawing complying with certain restrictions: a machine to pick up apples (TPCC) or a drawing using a piece of paper shaped as an oval (TCTT). These results match with those found by Diakidoy y Spanoudis (2002), who used two different divergent thinking tests: the verbal TCTT and a parallel test ad hoc (“Test of Creativity in History”), proving that creativity was not only specific to each domain, but also, to each task. The authors allude in their conclusions to the possible effect that the correlation and scoring of the tests could have on this results.

In the light of these results, we could ask ourselves if, in the case of the research based on self-perception reports (Gabora, 2010; Kaufman & Baer, 2004; Tsai, 2014), it could be due to the own participants associating certain type of tasks with specific areas or domains. We believe that, arguably, the domain is associated with the type of tasks which define it the best. This way, it is reasonable to think that the domain “mathematics” is more associated with the solving of problems laid out in an explicit manner, in which a certain type of algorithm or formula need to be applied for their resolution; whereas the domain “literature” tends to be more associated with an expressive flow of thoughts without restrictions in the task.

Our data differ from the model which considers domain-general creativity as a transferable ability between domains, put forward by the pioneering studies carried out by Guilford (1950) and Torrance (1974). Even more, in the light of our results, it could be argued that specific knowledge is not so relevant when discriminating between the divergent thinking abilities, such as the way to set out said problem. This would be in line with the works of David Perkins (2003), who claims that creative thinking cannot be distinguished from ordinary thinking; what differentiates a creative solution from a non-creative one can be found in the nature of the problem posed.

Regarding the relationship between both types of creativity (figurative and scientific) and the intellectual aptitudes, it could be expected that these aptitudes correlated more highly with scientific creativity (TPCC) than with figurative creativity (TCTT). However, the results obtained show very low correlations between both types of creativity and intelligence. These data are not in line with other studies where the relationship between the TCTT and intelligence was medium in magnitude (Ferrando, Prieto, Ferrándiz & Sánchez, 2005). Concerning the data resulting from scientific creativity (TPCC), two are the tasks which correlate significantly with intellectual aptitudes ("Planet" and "Gravity").

Summarizing, the results on the correlations between the constructs "intelligence" and "creativity" (figurative and scientific domains) do not offer a clear answer about the differentiation of divergent thinking according to domains, as the task-based specificity rather the domain-based specificity is confirmed again.

In relation to the differences in creativity according to academic performance, the data reveal that the students of curricular diversification program score significantly lower than the rest of their classmates. These data match with the ones obtained by Ruiz (2013), who studied the relationship between scientific creativity and academic performance, observing positive and statistically significant relationships favoring the students with higher academic performance. However, no statistically significant relationships were obtained between the TCTT scores and academic performance. For this reason, it is worth asking oneself whether it is easier to be creative in tasks which involve creating drawings (TCTT), without requiring a previous knowledge or in tasks more closely connected to a given domain (Ruiz, Bermejo, Ferrando, Prieto & Sáinz, 2014).

As we were pointing out at the beginning of the present work, the debate on the generality vs. the specificity of creativity has a direct repercussion in the educational practice. More specifically, as Mohamed, Maker y Lubart (2012) point out, said repercussion is found in two very important aspects; on the one hand, regarding the type of assessment needed to identify the creative potential and, thus, to identify students who are susceptible to join specific programs of attention to the diversity of high abilities. Apart from the transcendence about how to teach and train divergent thinking in students.

In our study we have utilized divergent thinking tests to measure the creative potential. Some experts may claim that divergent thinking does not equal "creativity" and that creativity should be measured according to real performances and innovative productions of the individual in a given field (Sternberg & Lubart, 1997).

In spite of this, since the real productions are influenced by other factors apart from creative thinking alone (e.g.: training, previous knowledge, personality traits and even luck), we have opted for utilizing divergent thinking tests. Future research in this field should delve into the differences existing between different domains, like the musical one, for which numerous specific tests exist (Webster, 1983; Wang, 1985) or the divergent thinking of movement (Torrance, 1980). Besides, it is important to take into consideration the participants' age. We are aware that in early ages, the differentiation between different abilities is not very significant, and the g factor has a higher relevance than specific abilities, whereas during adulthood, this differentiation is greater (Deary et al., 1996).

Another interesting research line is that which studies the carryover from training in divergent-creative thinking. There are programs, such as the "Mark", designed by Renzulli (1973), which address creative thinking in a generalist manner, and other programs aimed at adolescents which are centered on a specific domain, within which creative thinking is practiced. Examples of these programs include scientific thinking workshops for high abilities in the University of Murcia (during the academic years 2015-2016, 2016-2017; Esparza, Ruiz, Bermejo, Ferrando & Sainz, 2016), the course organized at the Exceptionally Gifted Center of the University of Anadolu (Sak, 2011), the Mathematical Stimulation workshops (ESTALMAT; Fernández Mota & Pérez Jiménez, 2011), which are organized in different autonomous communities, or the program MENTORAC which is organized from the University of Málaga Málaga (Fernández-Molina, Castro Zamudio, & Tomé Merchán, 2016). Knowing if children who have received training in a specific domain of creativity can transfer and applied what they have learned to other domains would be even be more useful than focusing on the measuring *per se*.

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